

**Seeing the Invisible: Understanding the Implications of Social Media Invisible Responses
for Well-Being and Relational Development**

by

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Dedication

This dissertation is dedicated to my nephew and niece, Quân and Vivi. When I inevitably fail to keep up with the latest technology, I will count on you to show me the ways.

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Abstract

Large swathes of current social media scholarship monolithically treats browsing behaviors as passive behaviors, per the passive versus active behaviors approach to social media activities. Such labeling fails to capture the numerous ways that people respond to social media sharing beyond visible clicks on the platform, such as relational distancing or switching channels to respond. Moreover, understanding what people do with information seen on social media platforms and how they respond to such information is integral to theorizing the implications of using these platforms. My dissertation tackles these challenges by first proposing the concept of **invisible responses** to unify the diverse approaches of responding possible to social media. Specifically, I define invisible responses as reactions to social media sharing by viewers that are invisible along any of the following dimensions: (1) to the original platform, (2) to the sharer, and (3) to the viewer's imagined audience of third parties.

The dissertation presents three empirical studies to investigate the different dimensions of invisible responses. Study 1 examines viewing time and visible clicks while browsing Facebook feeds. While viewing time—a proxy for visual attention—is largely invisible, public feedback of clicks are visible to everyone. Study 1 reveals that the combination of these two types of responses, along with the amount of social content in feeds, can predict important well-being outcome, namely self-esteem. Study 2 explores how people practice self-presentation and relational maintenance in an environment where responses are invisible to third parties. These findings suggest that, given responses that are invisible to third parties, sharers feel lower self-presentational pressure. However, what remains unchanged compared to public feedback is the

emphasis on the amount of attention and effort as signaling investment in a relationship. Finally, Study 3 investigates when and why people would make their reception of a social media post invisible or not to the original sharer of the post. Once again, the findings underscore that sending signals of attention and effort is meaningful for relational maintenance. Together, the studies in this dissertation illustrate the importance of invisible responses in understanding well-being and relational outcomes of social media use, as well as opening up future avenues for research. Specifically, responding to the research agenda outlined by the communication visibility theory (Treem, Leonardi, & van den Hooff, 2020), I highlight questions around the management of visibility on social media.

Chapter 1: Introduction

One of the defining affordances of computer-mediated communication (CMC), including with social media platforms, is how they render visible information to a large network of people in ways that would otherwise be impractical (Treem et al., 2020). Moreover, Treem et al. (2020) further argued that all other affordances of CMC—such as editability, persistence, connectivity—are all related to efforts to make communication more or less visible, making visibility the root of all actions on CMC. Accordingly, social media scholarship favors studying and capturing behaviors that are more visible—as opposed to invisible—on these platforms. This emphasis on visible behaviors manifests in the attention devoted by researchers to content creation behaviors such as providing public responses on these platforms (e.g. Ellison, Vitak, Gray, & Lampe, 2014; French & Bazarova, 2017; Sumner, Ruge-Jones, & Alcorn, 2018) or sharing own updates (e.g. Deters & Mehl, 2013; Y. C. Wang, Hinsberger, & Kraut, 2016). The increasing prominence of the passive versus active behaviors approach to studying social media implications exemplifies this focus (Verduyn et al., 2015; Verduyn, Ybarra, Résibois, Jonides, & Kross, 2017). In their original experiment, Verduyn et al. (2015) instructed participants to engage in either only passive behaviors (browsing social media content without generating any visible clicks) or only active behaviors (generating content and clicks such as sharing status updates or commenting on Friend’s page) for 10 minutes. The experiment shows that participants engaging in only passive behaviors reported a drop in their affective well-being at the end of the day. A follow-up experience sampling study corroborates the experimental findings by showing

an association between frequency of passive use over six days and declines in well-being (Verduyn et al., 2015).

Following this first experiment and conceptualization of passive versus active behaviors by Verduyn et al. (2015), other researchers have adopted the passive versus active lens to dissect social media behaviors (Escobar-Viera et al., 2018; Gerson, Plagnol, & Corr, 2017; H.-Z. Wang, Yang, Gaskin, & Wang, 2019). In this approach, activities that generate traces or artifacts (a “like,” a “comment,” or a private conversation) are considered active behaviors. Meanwhile, browsing behaviors are considered passive behaviors. Within this dichotomy used in much of the literature, browsing behaviors are associated with neutral or negative outcomes, such as depression or decreases in well-being (Burke & Kraut, 2016; Burke, Marlow, & Lento, 2010; Tandoc, Ferrucci, & Duffy, 2015; Verduyn et al., 2015).

On the other hand, browsing behaviors provide the foundation to the social media experience and are just as important as content creation behaviors in understanding the outcomes of social media use. People engage in browsing behaviors more than content generation behaviors (Metzger, Wilson, & Zhao, 2018; Verduyn et al., 2015). This is not surprising considering that people have many reasons to not engage with content that they see, such as privacy risks or concerns over the how others may interpret their responses (Ellison, Trieu, Schoenebeck, Brewer, & Israni, 2020). Moreover, for specific uses or motivations of social media, people may prefer to keep their browsing activities furtive. For example, when social media content causes friction in relationships, due to instigating political differences or conveying unpleasant impressions, people tend to deal with this friction by unfollowing or hiding posts—approaches that are invisible to the target of social distancing (Carpenter & Tong, 2017; Peña & Brody, 2014).

Despite their invisibility, these behaviors can contribute to relational development. People may remember information learned from social media to strategically guide their conversation with others, possibly without betraying the source of information (Hancock, Toma, & Fenner, 2008). In addition, when people seek out information about new ties, particularly in dating situations, they may prefer to keep such behaviors secretive and invisible (Ramirez, Walther, Burgoon, & Sunnafrank, 2002). Consequently, the labeling of browsing as “passive,” as in the active versus passive approach, does not capture the diverse manner in which people browse and use information garnered from social media. Notably, some of these behaviors are “active” and intentional, with implications for interpersonal relationship or psychological well-being, as documented in the current literature under various research agendas and topics (Fox, Warber, & Makstaller, 2013; Hampton, Shin, & Lu, 2016; Krämer et al., 2017; Leonardi & Meyer, 2015). In other words, responses to social media manifest in diverse ways beyond visible clicks, with distinctive implications for relationships and well-being.

In this dissertation, I argue for the importance of examining these threads of invisible response behaviors by contextualizing them within the social media environment and existing scholarship on the importance of responses. According to the communication visibility theory, “nearly all possibilities for action related to the use of CMC are connected to efforts to make forms of communication more or less visible” (Treem et al., 2020, p. 48). As such, my dissertation investigates how people manage this visibility by looking at *invisibility* (Treem et al., 2020). To this end, I advance the concept of **invisible responses**, which emphasizes their importance and provides an overarching research agenda to organize the threads of these behaviors. Finally, through three empirical studies, the dissertation investigates three types of social media responses corresponding to different dimensions of invisibility for these types of

responses. Below, I review literature on sharing environment on social media as background for my dissertation.

The Sharing Environment on Social Media

Technical features and affordances associated with sharing and responding.

Social media platforms are “computer-mediated communication channels that allow users to engage in social interaction with broad and narrow audiences in real time or asynchronously” (Bayer, Triêu, & Ellison, 2020, p. 472). Given the range of sites and platforms considered “social media,” my dissertation focuses on social media sites where users typically connect to others they know from offline contexts. Since this dissertation focuses on the implications of social media use for relationships and well-being, sites where users have existing relationships with other contacts would yield the most relevant insights. Furthermore, social media contacts with existing relationships with one another are likely to use social media along with other platforms, as people typically use multiple communication channels in a relationship (Baym, Zhang, & Lin, 2004; Isaacs, Szymanski, Yamauchi, Glasnapp, & Iwamoto, 2012; Parks, 2017). The use of multiple platforms thus allows for a multi-channel perspective in my research questions—a much needed approach in scholarship concerning communication technologies and relationship (Baym et al., 2004; Caughlin & Sharabi, 2013).

While modes of sharing constantly evolve, I target public forms of sharing in this dissertation—content appearing on someone’s profiles or the streams. Specifically, the profile element is the “audience-facing digital portrait of each user, allowing individuals to display information about themselves in a personalized space” (Bayer et al., 2020, p.476). Content displayed on one’s profile can include information shared by users to their own profiles, as well as digital traces of their activities such as their RSVP to an event or their comments on another

page. In addition to visibility on profiles, people can also see content generated by other users in their network on a stream—a social media element that aggregates and displays activities by other users in one’s network, enabling consumption of and engagement with such content (Bayer et al., 2020). However, because of ambiguous curation algorithms (Eslami et al., 2015), overwhelming amount of content posted, or a combination of both, posts by one user may not appear on another user’s feed or would require considerable effort to get to (i.e. scrolling through three days’ worth of content). For example, Bernstein, Bakshy, Burke, and Karrer (2013) revealed that a user’s post typically reaches only 24% of their network, yet users estimate the reach of their post to be even lower—at 6% of their network. Besides being visible on the two elements of profiles and streams, in some cases, the content may also be visible to anyone on the public web or more limited, dependent on the users’ privacy settings. Finally, many platforms do not show who have seen a recent post, with notable exceptions such as Stories sharing on Instagram or Snapchat (DeVito, Birnholtz, & Hancock, 2017). Thus, the key affordances associated with this type of sharing include: (1) *visibility*, making otherwise invisible information easily available and viewable to an entire network (Treem & Leonardi, 2013; Treem et al., 2020); (2) *persistence*, keeping content shared findable and viewable after posting (DeVito et al., 2017; Treem & Leonardi, 2013); and, (3) *low audience transparency*, offering little to no information about who has seen a post (DeVito et al., 2017).

While feedback to the sharing can come in many forms, the most visible type of feedback often comes in the form of one-click responses, such as “liking” or “hearting,” or a composed comment. In particular, platforms often tally the amount of these public, one-click responses and comments, providing convenient metrics of the numbers of likes and comments for each post

(e.g. 17 likes or 13 comments). Because these types of public feedback become visible to third parties beyond the original sharer, they become an important currency on social media.

Visible responses on social media platforms.

Receiving, or anticipating the reception of, responses is an instrumental part of sharing on social media (French & Bazarova, 2017; Grinberg, Kalyanaraman, Adamic, & Naaman, 2017). Given the ambiguous curation of social media feeds, prominently on sites such as Facebook, responses help audience members signal to sharers that they have seen a post (Hayes, Carr, & Wohn, 2016). More importantly, when people share publicly on Facebook, their goals often involve seeking social validation or relational development, and providing visible feedback is one way audience can support these goals of the sharers (Bazarova & Choi, 2014). Indeed, adolescents were more likely to “like” a photo with many likes, compared to those with fewer likes (Sherman, Payton, Hernandez, Greenfield, & Dapretto, 2016), suggesting that provision of likes can beget additional social approval. Additionally, fMRI brain scans showed greater activity in “neural regions implicated in reward processing, social cognition, imitation, and attention” when viewing photos with many “likes” among adolescents (Sherman et al., 2016, p. 1027).

Overall, ample evidence exists that shows the importance of visible responses to social media posts. Quality of responses received and satisfaction with those responses are strongly related to the overall satisfaction with the sharing experience (Bazarova, Choi, Schwanda Sosik, Cosley, & Whitlock, 2015). Responses from strong ties, such as close friends or romantic partners, are often expected (Grinberg et al., 2017) and important to receive (Scissors, Burke, & Wengrovitz, 2016). In particular, in a longitudinal investigation of Facebook communication and well-being, frequency of composed communication received from strong ties, including private

messaging, wall posts, and comments, predicted increases in well-being (Burke & Kraut, 2016). Finally, receiving more responses than expected predicted a sense of connectedness to the network (Grinberg et al., 2017). For relationship development, communication on Facebook, including interactive acts (such as commenting or messaging) and browsing acts (such as viewing updates), positively predicts increases in reported tie strength (Burke & Kraut, 2014). People who indicated greater extent of Facebook relational maintenance behaviors (e.g. responding to questions and saying “Happy birthday”) report greater perceived bridging social capital (Ellison et al., 2014).

However, a devaluation of one-click feedback as gratuitous, less meaningful, or insufficient by social media users is emerging in recent investigations (Hayes et al., 2016; Spottswood & Wohn, 2019). Specifically, focus group participants described their “liking” on Facebook as “aimless” and involving little cognitive processing of the content posted (Hayes et al., 2016). A follow-up study subsequently revealed that when a close tie known to engage in aimless liking behavior provided one-click feedback, participants perceived this response as lower in social support (Carr, Wohn, & Hayes, 2016). While similar findings have not emerged for semi-automatic messages such as “Happy birthday!” on social media, a similar sentiment may apply, whereby these composed messages, especially if perceived as gratuitous, can be perceived as signaling lower social support compared to more effortful forms of responses. In conclusion, while research has clearly and cohesively delineated practices of and perceptions around visible responses on social media, the feedback social media sharers receive for their post does not always manifest visibly or stop at the original social media platform. Moreover, these other forms of responses, while invisible, have important implications for relationships, and consequently well-being.

Introducing Invisible Responses

Overview.

For my dissertation, I introduce and investigate the concept of **invisible responses**. I introduce this concept in order to bring attention to alternative forms of responses to social media sharing. Specifically, I define invisible responses as reactions to social media sharing by viewers that are invisible along any of the following dimensions: (1) to the original platform, (2) to the sharer, and (3) to the viewer’s imagined audience of third parties. The ***original platform*** is where the information was first shared. The ***sharer*** is the person who shared the information. Finally, because of the pervasive publicness on social media, when people respond to content, they have an ***imagined audience of third parties***—entities beyond the original sharer, such as the sharer’s network or the viewer’s network. As such, when people take actions to make their response invisible to this imagined audience, it constitutes the third dimension of invisibility.

The use of the word “responses” is intentional in order to underscore that responding to social media content does not always mean leaving visible feedback or traces. Rather, responses can range from reactions to content such as enjoyment or disgust, without any accompanying action, to sending a message to the sharer of content. In the following sections, I continue to explain each of these three dimensions of the invisible responses concept and argue for the importance of looking at these dimensions in order to better understand social media behaviors and their implications.

Behaviors invisible on the original platform.

The first dimension of invisibility concerns the original sharing platform, which elucidates how responses are occurring beyond this platform and extend to other communication channels. A common approach in this area is to focus on a single platform—specifically the

original sharing platform (Rains & Brunner, 2015), rendering invisible the numerous interactions on other channels around social media content. However, as people connect with those they have existing relationships with on social media, they will typically communicate with these ties on multiple channels. Especially for pairs of greater tie strength, people would have more communication channels among themselves (Haythornthwaite, 2005). Daily communication is often fluid, with interactions and information from one channel seamlessly permeating interactions elsewhere (Isaacs et al., 2012). For example, as two friends meet face-to-face, they might use each another's social media feeds or photos as conversation topics. Indeed, the ease with which partners transition between channels and their communication across channels is predictive of relational satisfaction itself—demonstrating the instrumental role of better integration of communication channels to relationships (Caughlin & Sharabi, 2013).

The multi-channel nature of relational maintenance means that, for questions addressing interpersonal implications, researchers may encounter blind spots in making conclusions based on observation of the original sharing platform alone (Baym, Zhang, & Lin, 2004; Caughlin & Sharabi, 2013). As such, the first dimension of the invisible responses calls attention to these blind spots. For example, a lack of response to a post may be due to a variety of reasons. It may mean that the viewer has not seen the post, that the viewer has seen the post and finds it disagreeable, or that the viewer has seen the post but does not want to let the sharer know in case they can use the information in more strategic ways. In each of these scenarios, the implications for relational development are quite different and will not be apparent from a focus on the original sharing platform only. Thus, the theorizing of relationships between sets of social media activities and relational outcome may overlook a range of possible implications in not accounting for the flow of social media information to other platforms. Even if researchers can capture

behaviors on social media platforms at their most granular level, behaviors on other channels will still be invisible—necessitating more research paying attention to this strand of invisible responses (Baym, 2013).

Behaviors invisible to original sharers.

The second dimension of invisibility refers to the original sharer, demonstrating that substantial portion of reactions to social media sharing remain unknown to the sharers themselves. On social media, users are encouraged to leave visible and tangible feedback as a form of social grooming and a way of signaling attention to other users (Ellison et al., 2014). For instance, the metacommunication function of the “Like” button in telling the sharer that a certain viewer has seen a post was a common motivation among survey participants recruited from Facebook (Sumner et al., 2018). However, there are many instances where users refrain from responding to content in any manner, leaving their authors largely ignorant of reactions to their post, beyond the visible and often positive feedback received on social media. For instance, audience members who find the content disagreeable are likely to refrain from expressing these opinions due to the positivity bias on these platforms. For example, previous work has pointed out that people may react to political differences expressed on social media by refraining from discussing that topic in offline conversations (Hampton et al., 2016). In addition, muting—covertly unsubscribing from someone’s updates on Facebook—is a more common form of relational distance than unfriending, visibly removing someone from one’s Facebook network (Carpenter & Tong, 2017; Peña & Brody, 2014). In all these scenarios, viewers are relationally distancing themselves in ways invisible to the sharer.

For researchers, the sharer’s lack of awareness can translate into overlooking meaningful, invisible reactions of others to the sharing. A common research approach in this area is to ask

sharers about what they perceive to be the implications of their sharing, in the form of interview questions about the outcome of sharing or a survey about social support associated with social media use. However, as argued above, the sharers themselves may not be aware of all of the implications of their posting, either positive or negative. Thus, they may be able to bring up the Facebook “likes and comments” received or how their parents called them on the phone to ask about a certain event posted on Instagram; however, they would be oblivious to the judgment held silently by their colleagues. Seeing only the implications of the visible responses, both the sharers and the researcher overlook the meaningful, invisible actions of ties who respond invisibly. These invisible acts pose another blind spot for scholars interested in the implications of social media sharing and reception for relational well-being, because users are unable to accurately discern and recount them to researchers.

In summary, how viewers receive and respond to social media sharing by others can be intentional and consequential for relational development. Yet, some of these behaviors, such as when users choose to unfollow someone’s updates (Carpenter & Tong, 2017), avoid certain topics when conversing based on content seen on social media (Hampton et al., 2016), or distance themselves after seeing content they find problematic, are invisible to the sharers. Making conclusions about sharing behaviors based solely on the perspective of the sharers themselves may lead scholars to overlook important implications of social media information in their theorizing.

Behaviors invisible to third parties.

The third dimension of invisibility for invisible responses refers to invisibility to an imagined audience of third parties, as conceptualized by viewers. A distinguishing feature of public social media responses—such as a one-click reactions or comments on a public post—is

their visibility to third parties beyond the original sharer, including the sharer’s network, the viewer’s network, and their shared network. When people share about themselves, which is intrinsic in the responses process, they curate their self-presentation according to the audience. Due to the public nature of social media, along with the large network of ties, people are often unaware of their actual audience (Bernstein et al., 2013; DeVito et al., 2017) and need to construct their self-presentation based on an imagined audience, “mental conceptualization of the people with whom [one is] communicating” (Litt, 2012, p. 331). Given that this imagined audience can consist of known ties spreading multiple personal and professional contexts, the repercussions of them seeing content can cause serious privacy, relational, and professional risks (Duffy & Chan, 2018; Lampinen, Lehtinen, Lehmuskallio, & Tamminen, 2011; Mohamed, Chametka, & Chiasson, 2020). Indeed, Ellison et al. (2020) identified the network of people on social media as one of the driving reasons behind non-click—intentional withholding of public reactions on social media. For instance, people may worry about the social ramifications if their network witnesses them clicking “likes” on posts shared by ex-partners or for endorsing political opinions. As such, this imagined audience would be highly influential in people’s response decisions on social media.

Moreover, some of these third parties may not be the intended audience for the response and pose privacy risks. Such privacy risks can also concern the original sharer, as the response may contain information about or ask for information from the sharer. Previous work highlighted that users of social media are aware of their mutual responsibility in protecting one another’s privacy and enact strategies to protect such privacy (Lampinen et al., 2011). Numerous reasons exist for why people may avoid publicly responding to prevent their responses from being visible to an imagined audience of third parties (Ellison et al., 2020). Instead, they may choose to use

direct message on the platform or other means of private response to bypass the eyes of third parties.

Interestingly, people may be more likely to respond in ways invisible to third parties when the topic is sensitive or negative in valence, especially when they are close ties (Chang, Whitlock, & Bazarova, 2018; Spottswood & Wohn, 2019; Ziegele & Reinecke, 2017). When people are sharing about sad news or crisis, the lightweight forms of public responses may not be sufficient to provide support (Spottswood & Wohn, 2019). Moreover, if the viewers want to respond to the posts with their own experiences or to provide advice, they may hesitate to do so in a public channel because of reasons such as fear of judgment (Chang et al., 2018). The relational implications of these types of responses are particularly meaningful and deserving of scholarly attention, as private, composed communication on social media with strong ties is associated with long term increases in well-being (Burke & Kraut, 2016).

Outline of Dissertation Studies

Viewing of social media sharing and resultant actions deserve closer examination given their role as the fundamental set of behaviors that drives much of social media relational development processes. I seek to address this research agenda by proposing the invisible responses concept, which is defined as reactions to social media sharing by viewers that are invisible along any of the following dimensions: (1) to the original platform, (2) to the sharer, and (3) to an imagined audience of third parties. As social media platforms become taken for granted (Ling, 2012) in how seamlessly, ubiquitously, and invisibly they weave into our everyday communication and action, it is imperative that scholars can tease out the nuances of their implications and effects.

Through three studies, my dissertation investigates three types of invisible responses, corresponding to different dimensions of invisible responses concept. The first two studies are collaborations with other authors, and Study 3 is a completely independent project. In Study 1 (Chapter 2), we investigate time spent viewing content on social media—a proxy for visual attention, which is invisible along all three dimensions. Moreover, we pair this measure with public clicks to derive engagement types and investigate the well-being implications of engagement type using a combination of eye tracking methods, content analysis, and survey data. We uncover relationships between different engagement types, Facebook network size, and network composition in predicting self-esteem.

In Study 2 (Chapter 3), we examine how people perceive and use the private responses on social media Stories, which are invisible to third parties, for self-presentation and relationship maintenance via semi-structured in-depth interviews. Much of social media research on visible responses relies on the paradigm that responses are visible to both posters and audience of the posts. Responses on social media Stories deviate from this norm by making responses entirely private. By studying this form of response, we highlight how social media responses dynamics would change by taking away these responses' visibility to third parties.

Finally, in Study 3 (Chapter 4), I examine when responses are invisible or visible to the original sharers, particularly via the use of social media information outside of the original platform. In these instances, such action can be either only visible to the sharer outside of social media (e.g. a text about a social media post) or completely invisible (e.g. a change in opinion about the poster without the poster knowing). I employ focus group methods to explore how people receive and respond to social media content in other channels, particularly the difference between whether such reception is visible or not to the original sharer.

Chapter 2 – Study 1: Implications of Facebook Engagement Types and Feed’s Social Content for Self-Esteem via Social Comparison Processes

Penny Triêu, Nicole B. Ellison, Sarita Y. Schoenebeck, & Robin N. Brewer

Introduction

Self-esteem, defined as a person’s own assessment of their value (Leary & Baumeister, 2000), is a key component of people’s self-concept and one of the established indicators of well-being. Self-esteem has captured the attention of social media researchers as an important outcome of social comparison, one of the key psychological phenomena associated with social media use (Bayer et al., 2020; Burke, Cheng, & de Gant, 2020). This paper seeks to untangle some of these dynamics surrounding social comparison through behavioral data about participants’ online viewing and clicking activities, married with survey measures of self-esteem and Facebook use. We measure people’s engagement types (viewing time and clicking frequency) via eye-tracking data and collected feeds content data during a seven-minute browsing session. Eye tracking provides insights into individual differences in viewing that are not observed in self-report data (Junco, 2013; Vraga, Bode, & Troller-Renfree, 2016). Moreover, eye-tracking data capture the level of visual attention paid to each individual post, allowing for more fine-grained analysis of engagement behaviors.

In this work, we aim to advance more sophisticated categories of social media engagement types, intentionally challenging the limiting *passive versus active* behaviors paradigm that is often used to categorize social media behaviors (Escobar-Viera et al., 2018; Gerson et al., 2017; Rozgonjuk, Ryan, Kuljus, Täht, & Scott, 2019; Verduyn et al., 2015). We

refer to those with longer eye gaze duration as “high viewing” and those with shorter eye gaze duration as “low viewing.” People who click more are labeled “clickers,” versus “lurkers” for those with fewer clicks. We thus derive four Facebook engagement types: (1) high viewing clickers, (2) high viewing lurkers, (3) low viewing clickers, and (4) low viewing lurkers. These categories are theoretically driven—designed to interrogate prior literature that equates click to engagement and active behaviors (e.g., Verduyn et al., 2015)—as well as methodologically driven, allowing us to focus on subgroups of interest (i.e., Simpson’s Paradox) (Alipourfard, Fennell, & Lerman, 2018).

Second, the content of social media—the materials fueling social comparison—differs across users and even across browsing sessions in ways that can affect social comparison (Burke et al., 2020), and consequently self-esteem. First, what do people look at while browsing content? Social media streams can include massive amounts of content, especially for users with larger Friend networks or who “follow” many news or commercial entities. Our analysis finds that, on their own, neither engagement type nor feeds content composition predicts self-esteem. However, high viewing clickers with more social feeds report lower self-esteem. We thus show that Facebook engagement has complex interactions with self-esteem via social comparison processes. In addition, our findings document individual differences in how people view content on social media at the post level and demonstrate the strength of eye-tracking methods for these kinds of inquiries, a promising direction for social media research. Finally, recent literature on social media use and well-being has focused on browsing as facilitating social comparison, but little has considered the content of browsing in a nuanced manner. Here we highlight the value of distinguishing social content from other kinds of content on social media feeds, which we show to have different self-esteem implications.

Understanding self-esteem and social comparison.

Self-esteem is one of the most enduring and prevalent well-being constructs, critical to understanding people's behaviors and self-perceptions. When considered as an outcome of social media behaviors, research highlights changes in self-esteem due to processes such as social comparison (Vogel, Rose, Okdie, Eckles, & Franz, 2015). Specifically, the positivity bias documented in social media content means that social media feeds become "highlight reels" of updates from one's network, predominantly featuring the most exciting and socially desirable content (Steers, Wickham, & Acitelli, 2014; Ziegele & Reinecke, 2017). When individuals engage in social comparison with these biased, exclusively positive portrayals, the resulting upwards comparisons may contribute to lower self-esteem (Bayer et al., 2020; Vogel et al., 2015) or declines in well-being (Reer, Tang, & Quandt, 2019).

Current study: the role of social media engagement types and feed content.

Given the influence of social comparison, recent studies have investigated this mechanism in more detail by exploring it in relation to more granular measures of social media use, such as social content on feeds and time spent browsing other people's profiles (Burke et al., 2020). Our paper follows this approach and directly investigates self-esteem, one of the most important outcomes of social comparison. First, to understand the relationship between social media engagement and self-esteem—via the mechanism of social comparison, our measure of *engagement type* captures how users look at social media feeds and their clicking behaviors. As noted above, seeing content from other users may encourage people to engage in upwards social comparison, a key mechanism driving self-esteem fluctuations on social media (Vogel et al., 2015). Our focus on engagement type goes beyond rough measures of overall use by combining two central aspects of browsing: time spent viewing content and clicks on content.

Second, our study considers the content available for social comparison, focusing on participants' feeds composition. People's feeds vastly differ from one another in whether they see commercial content or social content. Compared to commercial content from public figures or organization, social content—posts shared by other Facebook Friends—is more likely to trigger social comparison, as we are more likely to compare ourselves to similar others (Festinger, 1954). Therefore our study considers the extent to which people see social content.

Social media engagement types, social comparison, and self-esteem

Engagement type: a combination of clicking and viewing behaviors and self-esteem.

With regard to engagement with social media feeds, research has identified two behaviors as particularly salient to social comparison and self-esteem: viewing and clicking behaviors (Burke et al., 2020; Reer et al., 2019; Rosenthal-von der Pütten et al., 2018; Vogel et al., 2015).

Viewing behaviors and social comparison.

Viewing other's activities and content arguably forms the foundation of most users' social media repertoire and claims most of their time online (Metzger et al., 2018). However, greater consumption of content—such as spending more time viewing Facebook profiles—is associated with more social comparison (Burke et al., 2020), in turn predicting lower self-esteem. As people tend to share more positive than negative content to Facebook (Reinecke & Trepte, 2014), browsing Facebook content may make one feel inadequate in comparison. This effect can be exacerbated if the fact that one is only viewing a contact's highly curated “highlight reel”—not the entirety of their quotidian or even unpleasant daily experiences—is not salient (Weinstein, 2017). Viewing Facebook content can thus induce unhealthy forms of social comparison and lower self-esteem (K. Jang, Park, & Song, 2016; Vogel et al., 2015). Indeed,

people with higher social comparison tendencies report greater intensity of Facebook use and exhibit lower self-esteem after looking at acquaintances' Facebook profiles (Vogel et al., 2015).

Accordingly, spending more or less time viewing each piece of content while browsing can either strengthen or weaken these associations with social comparison tendencies and self-esteem. Our measurement of viewing time intentionally zooms into time spent viewing each individual piece of content, as opposed to total time spent viewing social media or overall browsing frequency as with prior work (Tandoc et al., 2015; Verduyn et al., 2015). We argue that time spent viewing each post may provide a better predictor of engagement with content that can activate social comparison processes. For example, somebody who spends 30 minutes viewing 30 different posts on Facebook may not be as engaged with the content as another person who spends 15 minutes to view five posts, even if the former spent more time on Facebook. Measuring engagement at the post level is important, because different types of content on social media can have different effects on social comparison processes; for example, Burke et al. (2020) shows that seeing more content from people with similar ages positively predicts more social comparison.

Clicking behaviors and their implications.

In our paper, we explicitly focus on “click behaviors,” those that leave visible traces for others to see, which can vary in frequency among individuals. The number of clicks that people generated during a browsing session could be indicative of the valence and social desirability of the content they are seeing. Sherman et al. (2016) demonstrated via an experiment that people were more likely to click “like” on posts with more “likes.” Seeing posts with more likes and more positivity, in turn, is associated with greater social comparison (Burke et al., 2020), and clicking may mean that the viewer is more attuned to the amount of feedback a specific post is

receiving. In addition, Yang (2016) found that more frequent Instagram interactions were correlated with greater social comparison tendency. Meanwhile, more Instagram interactions were related to lower loneliness, but only for people with less social comparison tendency. In other words, social comparison can interact with clicking behaviors on social media in ways that are predictive of negative well-being outcomes.

Engagement type, social comparisons, and self-esteem.

In short, both viewing and interactive behaviors are constitutive of one's social media engagement type, with multiple possible implications for self-esteem. In our study, we measure the extent of viewing via duration of eye gazes on posts in participants' feeds. Combined with a measure of clicking activities, together these comprise each person's *engagement type*. We use high and low levels of clicking and viewing to construct four data-driven user engagement "types;" we intentionally aim to complicate assumptions in the literature about engagement and clicking being yoked (as in "active" use, where people are high on both, or "passive," where they are low on both). We specify four engagement types: (1) high viewing clickers, (2) high viewing lurkers, (3) low viewing clickers, and (4) low viewing lurker; with high viewing clickers the most engaged typed in terms of both clicking and viewing behaviors.

Feedback and the act of giving feedback can amplify the effect of social comparison. Similarly, expending more viewing time to content on social media can lead to greater activation of social comparison processes. Based on previous studies showing a link between social comparison and lower self-esteem, our first hypothesis states:

H1. High viewing clicker will report the lowest level of self-esteem compared to other engagement types.

Social content on feeds and self-esteem.

Of the varied types of content on social media, posts shared by other Facebook contacts—social content—maybe most influential in social comparison and self-esteem processes: with more social content, people have more opportunities for social comparison (Burke et al., 2020). However, the extent to which people may see content from other Facebook contacts, as opposed to commercial content or public pages, is far from consistent across users. Each user’s personalized collection of Friends, Pages, Groups, and ad preferences is unique, reflecting their use goals and expected gratifications. As such, even with the exact same Facebook Friends, two persons’ feeds can look drastically different (e.g., one of them chooses to follow more Facebook Groups or interacts more with public Pages on Facebook). Additionally, not all possible content is displayed to each user. The uniqueness of each feed is amplified by the influence of algorithms which determine what content people are exposed to (Eslami et al., 2015; Mosseri, 2019; Rader & Gray, 2015). Given these algorithms, each user’s past interactions with a certain type of post shapes the likelihood that those kinds of posts will appear in their feeds.

In other words, for a more complete picture of people’s engagement with their feeds, we have to account for the qualitative composition of their social media feeds. Seeing social content enables social comparison, potentially because people tend to socially compare themselves to those closer to their own ability and opinion (Festinger, 1954). For instance, people are more likely to socially compare themselves to former high school friends than celebrities, so the extent to which these two kinds of content appears in their feed may have implications for their self-esteem. Indeed, Burke et al. (2020) found that seeing more social content (i.e. content from Facebook Friends, as opposed to from public pages) was associated with greater levels of social comparison. Here, we similarly consider the **social content** of Facebook feeds and hypothesize:

H2: Participants with more social feeds will report lower self-esteem.

When it comes to interactions with engagement types, we hypothesize:

H3: High viewing clickers with more social feeds will report lower self-esteem compared to other engagement types.

Methods

We conducted a lab study from May to July 2018, where we brought participants into our lab and eye-tracked them while they browsed their own Facebook feeds for seven minutes. Participants then completed a recall task, an interview, and a survey. In this paper, we do not report data from the recall task or interview, and instead focus on data from the eye tracking session and the survey.

Eye-tracking as a method.

To understand how people pay attention in browsing, we used eye-tracking technology, which provided data on eye gaze with regard to “regions” of Facebook activity. A region consists of each post and any corresponding comment activity. We collected data on participants’ browsing experiences of their own Facebook feeds to increase ecological validity. Eye-tracking allowed us to move beyond the limitations of self-report data and log file data, which may overlook certain kinds of attention (King, Bol, Cummins, & John, 2019; Vraga et al., 2016). For example, Vraga et al. (2016) tested participants’ recall of Facebook feeds immediately after a browsing session and found that participants were unable to accurately report what they saw. Specifically, they overestimated the amount of political or news post and underestimated the amount of personal posts (Vraga et al., 2016), suggesting that people’s attention varies by content. Similarly, Counts and Fisher (2011)’s eye-tracking study of Twitter posts showed that people were not able to recall tweets they saw despite finding the post interesting.

Recruitment and demographics.

We recruited participants via an automated emailing system to staff at our U.S. university. We advertised the study with a generic descriptor of “eye-tracking of social media use.” To be eligible, participants had to be at least 26 years old and use Facebook at least once a month. We chose to recruit people older than the emerging adult category of 18-25 (Arnett, 2000). We also wanted to limit the number of students in our sample, as they are over-represented in behavioral science studies yet not representative of the general population (Henrich, Heine, & Norenzayan, 2010). Staff affiliated with the authors’ academic unit were disqualified to minimize the likelihood of the research team seeing personal or sensitive content of immediate coworkers, an ethical issue. In addition, we opted for the recruitment email to be sent to proportionally more men and people of color, since these populations are often under-represented in social media studies. Eligible participants clicked on a link from the recruitment email to complete an online prescreening survey.

From the pool of those who completed the prescreen, we selected participants, prioritizing diversity with regard to gender, age, and race. Our final sample included 41 employees at the university, with 20 women and 21 men, 76.5% of whom self-reported as White. We have 10 participants aged between 26 – 34, 15 participants aged between 35 – 44, nine participants aged between 45 – 54, four participants aged between 55 – 64, and three participants aged between 65 – 75. Participant employment varied widely and included positions like sports coach, administrative associate, event manager, custodian, nurse, construction specialist, project manager, and communications director. We experienced technical problems with three participants; as such, our data analyses and findings are based on data from 38 participants.

Study design.

When participants arrived at our lab, we conducted the eye-tracking calibration then asked them to browse our university website for two minutes to acclimate them. Afterwards, they logged into their Facebook account and browsed their own Facebook feeds for seven minutes. We pilot tested a 10-minute browsing session with five different Facebook users. Most agreed that 10 minutes was too long (i.e., they were bored by the 10 minute mark). However there was variance on how long it took before pilot participants reached boredom, from 30 seconds, three minutes, to up to one hour, if they were actively attending to content. We chose seven minutes as long enough to observe varied levels of engagement, but short enough to minimize wasting participants' time. Although not the focus of this study, clicking and engagement behaviors would likely vary with different browsing times.

We instructed them to “use Facebook as you normally would.” While we encouraged participants to stay in the feeds, they were not limited to browsing only their feeds and could go to other Facebook pages (e.g., other people's profiles or Events page). They could “like” and “comment” on content as they typically would during a Facebook use session. Following the Facebook activity, participants did other research activities and then completed a survey to report on their demographic characteristics, general Facebook use and self-esteem, as well as other measures not reported here. We measured Self-Esteem ($\alpha = .89$) with the 10-item Rosenberg Self-Esteem scale, whose scores ranged from 1 to 7 (Rosenberg, 1965).

Eye tracking apparatus and approach.

We used a Tobii X2-30 infrared eye tracker for data collection and Tobii Studio software for data analysis. The X2-30 samples gazes at a frequency of 30Hz per second and is a small device unobtrusively attached to a computer monitor. Participants in our study sat at a desktop computer and viewed a 22” monitor with the eye-tracker affixed to the bottom of the monitor.

The Tobii Studio software captured a video recording of participants' browsing session which included metadata (location, time) for click and typing events. The software provided a visual representation of eye gazes on Facebook page as well as logs of participants' gaze behaviors.

Data analysis.

We manually coded each participant's Facebook recording for every post each participant clicked on, in addition to a random sample of 21 posts from each participant's feed. The authors collaboratively decided on the criteria of and instructions for coding together, and a research assistant conducted the coding. During the coding process, the research assistant communicated with authors frequently to resolve coding questions and decisions. We elaborate on our coding procedure below. A summary of the variables and their data source is provided in Table 1.

Sampling of posts.

We used a stratified random sampling approach where we separated the seven-minute browsing period into three segments of 140 seconds each. Within each 140-second segment, we randomly generated seven timestamps per segment for a total of 21 timestamps. This stratified approach ensured that we collected roughly equal number of posts from the beginning, middle, and the end of the browsing session. Analyses revealed that there was no difference in viewing time across the three bins.

We coded the post that the time-stamp landed on, with several exceptions. First, if the post was not on the feed but was somewhere else (e.g., a profile page), we skipped this timestamp. Second, if the timestamp landed on a post that was already coded because participants saw it earlier in the browsing session, we generated a new random timestamp. If the timestamp landed on a "clicked" post, we included the clicked post in the sample of random posts. Following this method, we captured and coded 598 posts across our participants.

Constructing engagement types: viewing time and click count.

In coding the eye tracking videos, we used two variables comprising each participant's engagement type. First, our **viewing** variable refers to how much time participants spent looking at a post, derived from averaging the time they spent looking at the random sample of posts. In the video generated by Tobii software (see Figure 1), the area of the screen where the participant was looking is indicated by red dots, which move as their gaze shifts. When participants' eye gaze landed on a post, we captured this timestamp, and when their eye gaze left the post, we recorded this timestamp as the end of that attention interval. After that, we averaged the time each participant spent looking at posts to compute their general **viewing** level when browsing.

Second, we tallied each participant's **click count**. For our study, we defined *click* as a reaction to Facebook posts that generates a visible trace on the platform. We are interested in the extent to which individuals are leaving traces that their Friends and others can see, not instances where the user is navigating the platform without visible traces. For example, "liking" a post would be a click, but scrolling the News Feed or clicking on an article to read it would not. **Click count** refers to how many clicks participants generated during the seven-minute browsing session. We calculated this click count by reviewing the eye tracking video and tallying every single instance of a click. From our data, we captured 268 one-click reactions (207 of which were "likes"), 32 comments including one birthday message, three Shares, and one RSVP (Going to an Event). In total, we captured 304 clicks on 289 posts, because some posts received more than one click (e.g., a comment and a like).

To derive different Facebook feed engagement types, we divided participants into (1) **high viewing clickers**, (2) **high viewing lurkers**, (3) **low viewing clickers**, and (4) **low viewing lurkers**. We aimed to develop a measure that expanded upon the dichotomous active versus

passive labels used in other work. To create our four categories of engagement, we constructed two groups (high and low) of each of our variables of interest, in order to more clearly identify how these four categories might interact with self-esteem and other variables of interest. We calculated the median of the viewing time among our participants, which was 7.650 seconds per post. We classified those below and at the median as “low viewing” and those above the median as “high viewing.” Similarly, we derived the median of clicks participants generated during the session, which was six. We classified those with number of clicks below six as “lurkers” and those with six clicks or more as “clickers.” From the 38 participants, we have 7 high viewing clickers, 12 high viewing lurkers, 7 low viewing lurkers, and 12 low viewing clickers.

Coding of browsing content.

Finally, we computed the **social content** of each participant’s feed by coding the posts in our dataset by who produced them. Asking people to recall the content of their feeds may not yield accurate findings, as certain types of posts may be more salient and memorable to people than others while browsing (Vraga et al., 2016). Thus, instead of relying on self-reports of feed characteristics, we coded each participant’s feed using a random sample of their posts (as captured by the eye tracking video). To do so, we first classified the producer of the post into three categories depending on whether it was from: (1) a Facebook Friend (categorized as **social content**), (2) a Facebook Group, or (3) a public Facebook Page. We used the percentage of feed’s posts produced by other Facebook friends as a proxy for the social content of each participant’s feed, in order to test our hypothesis regarding the inverse relationship between social content and self-esteem.

Results

Descriptive statistics.

Participants had an average self-esteem score of 5.96 on a scale of 1 to 7 ($SD = 0.84$). On average, our participants clicked 7.79 times during the session ($SD = 7.25$). Four participants did not click on anything during the browsing session. The time spent gazing at clicked posts ranged from 1.62 to 80.48 seconds (median: 6.51s; $M = 8.33$ s; $SD = 7.49$ s). The time spent gazing at unclicked posts ranged from 0.13s to 110.68 s (median: 3.99s; $M = 7.8$ s; $SD = 11.12$ s).

Our coding of feeds' social content confirmed that Facebook feeds varied individually in content composition and contained a range of social and non-social content. On average, fewer than half of posts on participants' feeds came from other Facebook Friends ($M = 46.33\%$, $SD = 22.79$). An average of 47.42% of posts were produced by public Facebook Pages ($SD = 20.48$). Finally, 6.04% on average came from Facebook Groups ($SD = 9.14\%$).

Analysis strategies.

For each model, we controlled for participant's age, gender, and race. Due to the small percentage of people of color in our sample, we converted race into a binary variable of whether the participant is a person of color or not. In our regression analyses, the "high viewing clicker" group is treated as the dummy variable for the engagement type variable.

Findings

Engagement type (H1) and feed's social degree (H2) not associated with self-esteem.

To answer research questions regarding the relationship between self-esteem and each of the three main variables—**engagement type** (H1) and **feed's social content** (H2), we ran a regression model, with (1) engagement type and (2) social degree as main predictor variables. None of the main effects were significant (see Table 2 for detailed regression output).

High viewing clickers reported lower self-esteem with more social feed (H3).

To answer H3 on the interaction between engagement type and feed's social content, we tested a model including a **two-way interaction** between engagement type and feed's social content. The two-way interaction showed a significant difference between high viewing clickers and low viewing lurkers when the feed's social content was included. In other words, among participants with highly social feeds, high viewing clickers reported lower self-esteem than low viewing lurkers (see Figure 2). Table 3 provides the detailed regression output.

Discussion

Our study investigates the relationship between self-esteem and different engagement types on Facebook by focusing on the confluence of how people browse content, measured via eye tracking and click data, and what content they attend to, derived from content analysis of feeds and network size. Most notably, we found that high viewing clickers with more social content on their feeds reported lower self-esteem compared to other engagement types. We draw upon the literature on social comparison processes to understand these findings.

Self-esteem and social comparison processes in social media activities.

Discussions of social media's possible influence on self-esteem often point to social comparison as a probable mechanism (Vogel et al., 2015). By comparing oneself to the "highlight reels" presented by others—especially peers—on social media, people may feel worse about their lives and themselves, resulting in lower self-esteem (Chou & Edge, 2012). The magnitude of social comparison can increase when participants compare themselves to someone similar to them (Vogel et al., 2015) but do not personally know (Chou & Edge, 2012): a weak tie that is the same age and gender would be a more powerful comparison point than an older celebrity, for instance. Although previous studies have not explored our specific variables of interest, the general thrust of the literature suggests that we would see a relationship between

activities on social media (e.g., whether a user is actively engaging with her network or passively consuming) and self-esteem. However, we did not identify any main effect for our two variables of engagement type and feed's social content. The differences between our four engagement types emerged when we accounted for the social content of their feeds via interaction tests. Our results indicate that self-esteem experiences are influenced by complex interrelated mechanisms, above and beyond the content of a feed and simple viewing and clicking behaviors.

The null findings of the main effects of our variables demonstrate that the self-esteem implications of social comparison are complex and may hinge on specific elements of the Facebook experience that are unique to each individual. Unlike studies exploring the effect of traditional, broadcast forms of media on self-esteem, e.g., the effect of advertising images on social comparison processes via a magazine ad shown to all readers (Richins, 1991), social media researchers must account for the fact that each viewer sees an idiosyncratic mix of content from commercial and personal contacts. In our study, we documented and tested the effects of social content (i.e., shared by Friends versus other entities) in combination with people's engagement with such content. Specifically, we found high viewing clickers with more social feeds reported lower self-esteem.

Future research should probe the mechanisms behind these patterns by including more nuanced measures of users' Facebook networks, such as how well they know people in their networks or how they interpret social media content. For example, do they see the content as selected highlights from their Friends or as comprehensive representations of how others live on a daily basis? Moreover, future research could zoom into characteristics of comparison targets and whether certain aspects (such as gender or age) make social comparison dynamics more pronounced and their implications for self-esteem. For instance, Burke et al. (2020) provided

evidence that social comparison frequency was positively associated with seeing more content from people with similar ages and same gender. Meanwhile, Tazghini and Siedlecki (2013) revealed that people with lower self-esteem were more likely to accept Friend requests from others they do not know as well. A strength of our feeds content analysis is how it provides a more precise measurement of what participants actually engage with, rather than simple metrics of time spent on browsing or frequency of browsing. Future scholarship in this space may wish to emulate our approach to documenting feed content and connect specific targets of social comparison to levels of self-esteem, given the relevance of these variables in our present study and prior work.

Research suggests that peers are more likely to trigger social comparison than celebrities, but what about social media influencers—presumably “real people” who attract large audiences on social media? We would predict that this phenomena might be contributing to unhealthy social comparison dynamics, in that these peers presumably are seen as comparable yet much more successful, stylish, happy, etc. Studies on viewing content from social media influencers showed outcomes of declines in body image satisfaction (Fardouly & Holland, 2018; Tamplin, McLean, & Paxton, 2018). Future research could expand to more general self-esteem outcomes. In addition, future studies can explore the self-esteem implications of another social media phenomenon: everyday individuals caught in unfortunate situations that subject them to extraordinarily public ridicule (e.g., the Star Wars kid, Rebecca Black). Presumably, these figures may encourage more *downwards* comparisons and subsequent increases in self-esteem.

Acknowledging the role of feeds’ content also highlights the hidden downstream effects of clicking behaviors on social comparison processes: individuals (knowingly or unknowingly) shape their future feed content via their clicking behaviors. Thus users might entrench

themselves deeper into the upwards social comparison loop via their clicking activities, as Facebook algorithms interpret clicks as indicators of personal relevance and thus displays more posts with similar characteristics (Mosseri, 2019). Reflecting this, our data show a strong correlation between the proportion of clicks on social content and the social content of their feeds ($r = .653, p < .001$). These findings could be explored more via experimental methods that compare the effects of viewing social-heavy versus celebrity-heavy feeds and suggests interventions that could be staged by platforms or users themselves. For instance, users could be encouraged to be more cognizant of how they feel after viewing specific kinds of content and then curate different feeds using Facebook's list feature to manage the content they are exposed to based on their current mood or mood goals.

Notably, our engagement type variable captures how much time participant spend viewing each specific piece of content—not just frequency of browsing in general. In our study, there was no correlation between participants' average viewing time and their self-reported frequency of using Facebook for browsing. Moreover, correlational tests revealed that participants with higher self-esteem actually reported more browsing ($r = .342, p = .031$). As such, greater frequency of browsing Facebook on its own may not have negative implications for self-esteem, contrary to earlier findings suggested by work that dichotomizes social media use into passive versus active categories (Verduyn et al., 2015).

Methods contributions and limitations.

Using an eye-tracker allows us to obtain fine-grained data about how participants pay attention to each piece of social media content. However, eye-tracking measurements are susceptible to errors. With our study, we had to remove three participants' data from analysis due to various technical problems with the eye-tracker to ensure data quality. One limitation of

conducting lab studies is external validity. We attempted to create a more naturalistic environment by asking participants to use the platform as they normally would in our instructions. We also gave them a warmup task of browsing an unrelated website to acclimate them to being eye-tracked. Nonetheless, it is likely that participants' behaviors might differ from their Facebook browsing in the wild (e.g., on their mobile device). A fundamental assumption in eye tracking studies is that visual attention indicates cognitive attention (King et al., 2019). However, we acknowledge that this is not always true (e.g., one can look at one thing but be thinking about something else).

Our sample size is relatively small which limits our statistical power. One possibility for future studies is to leverage remote eye-tracking technologies to observe participants' Facebook use, with their consent, in their home environments, which would allow researchers to scale data collection up significantly. This method will also improve external validity because in allowing for more naturalistic data collection of browsing behaviors. We believe there are promising opportunities for testing and refining well-established theories in social media scholarship, such as the active/passive binary divide, via eye-tracking technologies.

Conclusion

Browsing one's feed is among the most frequent activities on social media (Metzger et al., 2018), with implications for relationship development and well-being. Our paper investigates implications of browsing along two dimensions—engagement types and feed content—to self-esteem, a key well-being variable. We find that by considering the interactions of these two variables, they become meaningful predictors of self-esteem, and their potential mechanisms correspond to social comparison processes. We also show the promise of eye tracking as a rigorous and fine-grained method for understanding engagement behaviors (browsing and

clicking) in more nuanced terms and highlight the importance of considering people's idiosyncratic feed composition in future work. We are excited about the insights into self-esteem suggested by our study and the methodological routes charted for future scholarship in this area, given the importance of better understanding how our activities on social media make us feel about ourselves.

Chapter 3 – Study 2: Private Responses for Public Sharing: Understanding Self-Presentation and Relational Maintenance via Stories in Social Media

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Introduction

Responses to social media sharing constitute an essential element of the social media experience, with implications for both how people curate their sharing on social media and how people support their relationships on these platforms. Bazarova and Choi (2014), for example, find that when people share publicly on Facebook, they are often seeking social validation or relational development, and providing feedback is one way audience can support these goals. Social media self-presentation often tends toward the socially-desirable (Vitak & Kim, 2014). This is at least in part because people have to consider the possible visible responses to sharing and even strategize to receive these responses (Madden et al., 2013). Relational maintenance on social media also partly depends on responses as a way to signal relational investment and support (Ellison et al., 2014). As instrumental as responses are to social media processes and scholarship, much of this literature has built on the assumption that responses to social media posts are visible to those posts' audiences (Sherman et al., 2016; Walther, Van Der Heide, Hamel, & Shulman, 2009). Such visibility means the responses themselves become part of the shared content. Indeed, public responses on social media can influence how people respond to posts (Walther et al., 2009), evaluate the sharer (DeAndrea, Van Der Heide, & Easley, 2014), and shift the sharer's self-perception (Carr & Foreman, 2016). Similarly, public responses can

serve as a form of public association and endorsement of relationships (Treem & Leonardi, 2013).

What happens, then, when new ways of sharing diverge from this paradigm? The format of social media Stories—an ephemeral form of sharing on platforms such as Facebook, Instagram, WhatsApp, and Snapchat—has grown immensely in popularity in recent years. With close to two billion users ("Number of daily active WhatsApp Status users from 1st quarter 2017 to 1st quarter 2019," 2019; Statt, 2019), Stories sharing was “on a path to surpass feeds as the primary way people share things with their friends sometime [in 2019]” according to Facebook chief product officer (Constine, 2018). Sharing via Stories differs from other social media posts in both ephemerality, and, as discussed in this paper, the absence of visible feedback (e.g. “likes” and “comments”) that have come to characterize social media communication. In addition, scholarship has focused on modes of sharing where knowing who and how many people look at a post often involves guesswork (Bernstein et al., 2013; DeVito et al., 2017). For most social media posts, sharers do not know whether others have seen it, unless the viewer “like,” “comment,” or otherwise make their attention visible. With social media Stories, a list of contacts who have viewed the Stories is provided for the poster, but not visible to anyone else. The viewers list for Stories makes the very act of viewing visible.

This paper explores the consequences of these features. For self-presentation, the lack of visible responses potentially de-emphasizes the necessity and social status associated with high level of responses and, along with it, the need to “perform” an image via social media postings. However, since the Stories posting could still potentially be seen by the entire network anyway and can be updated multiple times per day, the self-presentational pressure may still persist and become even more relentless. The provision of a viewer list could further enhance the

surveillance and performative aspects of sharing. The implications of Stories for relational maintenance are similarly unclear. When people know exactly who is looking at their content, how might that influence the functions of responses? Moreover, who responds to Stories may also differ from who responds to public posts, given that more private channels can be more intimate and reserved for stronger ties (Bazarova & Choi, 2014).

In this paper, we ask how people perceive and practice self-presentation (RQ1) and relational maintenance (RQ2) on Stories, given the private feedback mechanism. For self-presentation, we find that the private responses lower expectations for receiving responses, downplay pressure for polished self-presentation, and preclude any negative feedback from affecting the sharer's image. For relational maintenance, we find that the act of viewing becomes more meaningful when made visible via the viewer list and that the private feedback can open up more chances for extended conversations.

This analysis of responses to Stories enables us to distinguish the importance of responses that are public from that of responses per se. This contributes to dissecting the emerging, yet increasingly important, model of sharing via Stories by showing how self-presentation and relational maintenance function through responses to Stories. We also contribute to understanding of the mechanisms through which responses affect self-presentation and relational maintenance more broadly. We argue that responses signal both acknowledgement of the effort made by the sharer and the audiences' effort to display attention on social media platforms. We thus affirm the role of responses as signals of attention and investment identified in prior literature, while extending it to a new context.

Related Work

Social media Stories at the time of writing.

The Stories format was first introduced on Snapchat in October, 2013 (Etherington, 2013). In August 2016, Instagram, owned by Facebook, became the next major platform to adopt its own version of Stories (Constine, 2016). Facebook and WhatsApp, both owned by Facebook, followed in adding this feature. All of the participants in our research study used Instagram Stories, Snapchat Stories or both, except for one person who used Facebook Stories and Instagram Stories. The following descriptions focus on Stories as operated by Instagram and Snapchat at the time of the research.

When user posts new social media Stories, the content of their updates is not automatically displayed on a feed—unlike the front-facing views on Instagram and Facebook. Instead, a highlighted circle signifies that a user has a new Stories update, and the viewer can click on the highlighted circle to see that update (see Figure 3). The content of the update can be a picture, a video, or text. When viewed, the update always takes up the entire screen (see Figure 4). Story updates display one at a time. One person can upload multiple Stories posts at any given time, which means each post will be displayed chronologically one after another. The Stories updates disappear after 24 hours, unless saved elsewhere, such as the Highlights section on Instagram. With small exceptions, such as a poll on Instagram Stories, there is no way to make a public response to a Stories post. Viewers can click on a dialog box and type a message or click on a provided emoji, which becomes a private chat to the receiver. Finally, a list of how many and who have viewed a Stories posting is provided for sharers and constantly updated to reflect new views. Snapchat pauses after each person’s Story, allowing the viewer to exit out before proceeding to the next person. On Instagram, users must click on a specific Story to view it, but the stream of Stories then moves automatically from one person’s story to the next. On Instagram, the user is thus offered less control over who to view.

Self-presentation and responses on social media.

Self-presentation is “the process of controlling how one is perceived by other people” (Leary, 1995). Goffman (1959), in particular, articulates a dramaturgical perspective on this process. Specifically, Goffman argues that self-presentation is a performance in which people present different aspects of themselves to different interaction partners at different times (Goffman, 1959). Self-presentation on social media often occurs through a public profile, which enables users to “maintain unique collections of personal attributes created by the user, their network, and/or the platform” (Bayer et al., 2020). Social media users also tend to accumulate a network of known ties of disparate contexts (e.g. work colleagues, school mates, or family members) on these platforms (Hampton, Goulet, Rainie, & Purcell, 2011). As such, self-presentation on social media typically involves sharing content to a large network of ties from different social circles, a phenomenon termed context collapse (boyd, 2014; Marwick & boyd, 2011). Social media self-presentation has been compared to an exhibition (Hogan, 2010) and to shouting in a public square (Vitak & Kim, 2014), demonstrating key characteristics of social media sharing: publicness, persistence, and scrutiny and commentary from an unknown or ambiguous audience (with exceptions such as the Stories format discussed here, posts in Facebook Groups, or LinkedIn profiles).

Such conditions help explain the ubiquity of the one-click responses on social media, such as the “like” button on Facebook or the “favorite” button on Twitter. Since responses play such a salient role for audience members, social media users in turn have to consider these responses in determining their self-presentation. From the sharer perspective, these clicks can signal agreement or support of their self-presentation (Scissors et al., 2016). More than half of the Facebook users surveyed by Scissors, Burke and Wengrovitz (Scissors et al., 2016) indicated

that getting enough likes for their posts was at least somewhat important. People may even delete posts that do not receive sufficient public feedback (Madden et al., 2013). From the audience perspective, public responses to a post provide an additional metric, which may influence perception of the post itself (Sherman et al., 2016; Walther et al., 2009). For instance, adolescents were more likely to “like” a photo with many likes, compared to those same photos but shown with fewer likes (Sherman et al., 2016). Additionally, fMRI brain scans of these participants showed greater activity in “neural regions implicated in reward processing, social cognition, imitation, and attention” when viewing photos with many “likes” among adolescents (Sherman et al., 2016). In addition, third-party viewers relied more on comments from friends—rather than self-generated claims by the sharers—in evaluating how extroverted a sharer on Facebook was (Walther et al., 2009). When people share publicly to Facebook, receiving public feedback increases how much they internalize the postings to their self-views, compared to when they receive the same feedback—but privately (Carr & Foreman, 2016). In other words, the evaluation of self-presentation on social media involves both the original content shared and the visible responses to such sharing. Consequently, this potential of receiving public feedback, and how audience members perceive such feedback, is key to social media self-presentation.

Self-presentation via Stories removes this pressure of public feedback from sharing. Furthermore, Stories postings are ephemeral, lasting only 24 hours. Ephemeral social media posts offer an appealing alternative to the currently dominant feeds sharing (Morlok, Schneider, Matt, & Hess, 2017; Taber & Whittaker, 2018), whose self-presentational settings have grown increasingly inhibitive (Duffy & Chan, 2018; Vitak & Kim, 2014). However, research on self-presentation on Stories suggests that people still face self-presentational pressure due to the public nature of Stories. Specifically, people aim to post more noteworthy experiences and

content that would be broadly interesting to everyone and consciously refrain from selfies (McRoberts, Ma, Hall, & Yarosh, 2017). These findings illustrated noted differences in self-presentation strategies between Snapchat Stories and Snapchat private messages, which seem to feature prominently selfies and everyday moments (Bayer, Ellison, Schoenebeck, & Falk, 2016; Xu, Chang, Welker, Bazarova, & Cosley, 2016). With a private message, the scope of the audience is defined and known. In contrast, when posting via Stories, people confront an audience of their entire network. Given this more public sharing and the salience of audience to people's sharing decision (Zhao, Lampe, & Ellison, 2016), Stories users may still have to exercise caution in their self-presentation and post for the "lowest-common-denominator" (Hogan, 2010; Vitak & Kim, 2014). In summary, although people have to present themselves to a public audience in Stories, they do not need to be concerned about audience's feedback being visible and viewable by third parties. Given these contesting forces of responses and audience pressure to Stories self-presentation, we ask the following research question:

Research Question 1: How do Stories' private response mechanisms affect perceptions and practices of self-presentation?

Stories' mechanism of responses and relational maintenance.

Private responses and relational maintenance on social media.

Relational maintenance are actions taken "(1) to keep a relationship in existence, (2) to keep a relationship in a specified state or existence, (3) to keep a relationship in satisfactory condition, and (4) to keep a relationship in repair" (Dindia & Canary, 1993). Feedback on social media is a mechanism of relational maintenance (Burke & Develin, 2016; Burke & Kraut, 2016; Ellison et al., 2014; French & Bazarova, 2017), even at the lightweight level of one-click "likes," "favorites," or "hearts." Given that feeds on most social media sites are algorithmically filtered

so that users may not see everything post shared by their network, responses help audience members signal that they have seen and paid attention to a post (Hayes et al., 2016; Sumner et al., 2018). Sharers similarly use responses to estimate the audience size of their posts, even if these responses may not provide the most reliable cues (Bernstein et al., 2013).

The quality of responses received and satisfaction with those responses are strongly related to overall satisfaction with the sharing experience (Bazarova et al., 2015). People expect, and find it important, to receive responses from strong ties, such as close friends or romantic partners (Grinberg et al., 2017; Scissors et al., 2016). Receiving more responses than expected by the sharers also helps the sharers feel more connected to their networks (Grinberg et al., 2017). The prominence and usefulness of responses as a relational maintenance tool hence emerges clearly from research conducted in public responses contexts. One possible reason is that, in these contexts, the visibility of others' responses constitutes a public endorsement of relationship and enhances the relationship (Ellison et al., 2014; Trieu & Ellison, 2018). That is, by leaving a response visible to the sharer, as well as other viewers of the post, one is willing to make known and visible one's association with the sharer of the post (Treem & Leonardi, 2013).

However, for people who want to communicate about more intimate or sensitive topics to seek support, social media platforms may be too prohibitive due to self-presentational norms (Andalibi & Forte, 2018; Bazarova, 2012; Haimson, Andalibi, De Choudhury, & Hayes, 2017; Vitak & Ellison, 2013). Alternatively, when people make a public disclosure on social media, the default option is, in turn, a public response to their updates. Such publicness can make the support received appear less authentic (Vitak & Ellison, 2013). As illustrated by Bazarova (Bazarova, 2012) via experimental methods, people see intimate disclosures made publicly as less appropriate than those made privately.

With social media Stories, two important functions of social media responses as typically studied are absent, or unnecessary: (1) the signaling of attention, negated by the viewers list and (2) the public performance of relationship, negated by the private mechanism of responses. Nonetheless, the responses sent to social media Stories postings may be more supportive of relationship maintenance, given that they are composed messages, instead of a one-click reaction, sent via one-on-one private channels. In a longitudinal investigation of Facebook use and well-being, frequency of composed communication with strong ties, including private messaging and comments, predicted increases in well-being (Burke & Kraut, 2016). Notably, none of the other forms of communication, including all communication with weak ties or one-click responses between strong ties, predicted increases in well-being (Burke & Kraut, 2016). Private channels are also where people are more likely to disclose more intimate information on social media (Bazarova & Choi, 2014).

Viewing receipts as a form of communication.

Moreover, making visible the act of viewing can also have implications for viewing behaviors and interpretations of such behaviors. Previous research on this form of viewing receipts—such as LinkedIn viewing notifications or read receipts Facebook Messenger—reveals that viewers may intentionally maneuver around these features. For example, on LinkedIn, a social media platform for professional networking, Hoyle, Das, Kapadia, Lee, and Vaniea (2017a) found evidence of people choosing not to view others' profiles due to LinkedIn rendering this act visible under certain privacy settings. Interestingly, a minority of participants (16%) also indicated intentionally viewing content to express professional or personal interests in the profiles (Hoyle et al., 2017a). A majority of participants (70.7%) viewed the profiles of people who had viewed their profiles. These findings suggest that when platforms make viewing

behaviors visible, users can use them as a networking strategy. In another study on messaging read receipts, 68.4% of participants reported avoiding seeing a message on Facebook Messenger; among these respondents, a majority cited not wanting the seen receipts to show up as the reason (Hoyle, Das, Kapadia, Lee, & Vaniea, 2017b). Indeed, not receiving response while seeing a seen receipts can invoke in senders negative emotions, especially for those with higher need to belong and fear of ostracism (Mai, Freudenthaler, Schneider, & Vorderer, 2015).

Just as the novel features of the Stories format may affect how people perceive and practice self-presentation, they seem likely to affect relational maintenance. We ask:

Research Question 2: How do Stories' private response mechanisms affect people's perceptions and practices of relational maintenance?

Methods

The main aim of our study is to achieve an in-depth understanding of relatively novel phenomena around Stories. As such, we adopted semi-structured interviews as our method. The strengths of semi-structured interviews include a rich and contextualized understanding of the lived experiences of our participants. We conducted semi-structured interviews, lasting approximately 60 minutes, with 22 participants between June and August 2018. We employed convenience sampling and recruited the majority of our participants by emailing the interns at the Microsoft office in Cambridge, MA, United States—in addition to from personal networks and posting flyers in nearby areas. We targeted the interns, because they were more likely than full time employees to be of the demographics to use Stories. Indeed, most of our participants were college students, who are frequent (Smith & Anderson, 2018)—and intense (Alhabash & Ma, 2017)—users of Instagram and Snapchat, popular Stories platforms. As such, this sample could be particularly meaningful for achieving an in-depth understanding of Stories.

We described the study as an interview study about use of social media Stories and recruited for adults who use social media Stories. Before scheduling the interview, we asked participants which platforms they posted Stories to and how often to verify their eligibility. Participants received a \$20 Amazon gift card as a token of appreciation. We stopped recruiting after reaching saturation: we started to notice the same themes around participants' Stories perceptions and practices for the last few interviews. At the end of the interviews, we asked participants to provide their age, gender, and occupation (see Table 1). We referred to our participants in the paper with pseudonyms that they offered or created by us (if not offered by participants). We received IRB approval for the interview questions, recruiting strategies, and the handling of personally identifiable information.

Four of the interviews took place via Skype, and we conducted the remainder in person. Interviews began with a brief inquiry into the social media sites that participants use and then turned to focus on Stories. We asked how they decided what to post, what kinds of responses they received, how they interpreted those responses, and how they responded to others' Stories. We recorded the audio of all interviews.

All the interviews were transcribed with an IRB and GDPR-compliant transcription service. After verifying the accuracy of the transcription, we then exported the transcripts to Atlas.TI, where one of the authors conducted iterative coding as delineated by Charmaz's grounded theory practice (Charmaz, 2006). The coder developed the initial codebook based on research questions, as well as themes noted from interviews. The coder coded the first few interviews based on this codebook. The authors then discussed the codes and identified important emerging themes. From these discussions, the coder refined the codebook by collapsing codes that were similar to one another and devised new codes for important phenomena. The coder

then used the revised codebook to re-code the first four interviews as well as to code the remainder of the interviews. The authors had regular meetings to discuss key themes of the findings. In constructing our findings, we also pay attention to negative cases to see where one particular phenomenon may or may not apply. Quotes in the Findings section have been lightly edited for readability.

Methodological Limitations

Many of our interviewees skewed younger and were more technologically savvy. We also recruited via convenience sampling, which further limited generalizability of findings. We make no claim that the specific interpretations and practices we highlight here are the only ones, nor that they are universal. The aims of our study are to surface phenomena around Stories use, not generalizable finding for the entire population. Future studies can consider exploring or verifying the generalizability of these themes by interviewing different populations and with complementary methods such as surveys and experiments.

RQ1: Private Feedback and Self-Presentation

Our first research question asked how participants presented themselves on Stories, given the private feedback. In our interviews, we took care not to mention the lack of public responses until one of our last interview questions to avoid biasing participants' answers. Yet, we found it was nonetheless influential throughout the interviews. The relationship between private feedback and low self-presentational pressure was twofold. First, there was a mutually held perception between sharer and viewer that Stories postings largely did not need feedback, which freed people from having to consider the feedback when posting. Second, any feedback was private and known only to the sharer, and this precluded the feedback from negatively influencing perception of their posting. We discuss each of these below.

Low Expectations for Feedback and Low Self-Presentational Pressure for Sharing

Consistent with McRoberts et al. (2017), our participants described their Stories posting as lower pressure and much more relaxed than posts on other platforms such as Instagram and Facebook feeds. In explaining the low pressure, the lack of public feedback and low expectations for responses are among the primary reasons.

In deciding what to post to Stories or how often to post, our participants generally opted to show interesting content or snippets from their lives. At the same time, they held that content to a lower standard than a post to the regular feed. Several of our participants also described posting to Stories more when there were interesting events in their life, such as the activities of their summer or from their travels. When asked about their thoughts on Stories not having “likes” and comments, most of our participants enjoyed that there was no mechanism for visible feedback with Stories. They associated the absence of feedback with a lower bar for what can be shared. This lack of expectation freed them from having to account for feedback in deliberating what to share to Stories. The lack of expectation also deviated from feeds sharing, where expectation for feedback was instrumental for the sharing process (French & Bazarova, 2017). One participant, M3gh@nn, pointed out:

I feel like it's great that [Stories] doesn't have Like.... I feel like the part of the no pressure or the low pressureness of Stories is that it's more about sharing just to share...There's no thought in your mind about how many likes is this going to get? It's not even an option.

Enjoying the freedom from public responses with Stories does not preclude receiving pleasure from public responses in other formats. For most of our respondents, the “likes” and “comments” that were unfavorable when associated with Stories were appreciated and important for feed posts. For example, Sapphire, who did not even look at her list of audience for Snapchat

Stories, stated “*what’s the point*” when asked what it would mean to her if Instagram were to entirely do away with likes or comments. Our respondents explained the value of these metrics in terms of effort. Not only did they put effort into making those posts, they understood responses to them as validations of that effort. When participants posted to the regular Instagram or Facebook feeds, they expected responses and were accordingly mindful of crafting a post worthy of such responses. When asked what it would mean to him were Stories to start including likes and comments, Dmitri highlighted the circular relationships between having the ability to respond, expectations for responses, and pressure on higher quality post on social media:

I feel like [not having likes and comments for Snapchat Stories] is kind of better because when you add the like and comments feature, then there’s also a little pressure to start liking and commenting, which means that you have to spend more time per Story. I think the appeal of Stories is it’s very quick and you get a good idea of what people are up to with very little involvement on your behalf . . . generally Stories are designed so that they are of the quality where they normally don’t require a response.

In other words, whether on the feed or in Stories, audience responses serve to acknowledge the effort a sharer put into their posting. With Stories, where sharing is more in-the-moment and lower effort, viewers express less need to acknowledge the sharing with responses. In parallel, sharers, who view their Stories as low effort, have low expectations of receiving responses to them as a result.

Private Feedback Serving as Protection Mechanism

The private feedback also serves as a protection for the sharer. No matter how the post is received, most of the feedback is obscured from audience. Jamie Bond explained:

[Posting to Stories is] like putting something against a glass window and being like “Here. You can’t do anything to it, but here. You don’t have to deal with or worry about

somebody saying something that you might not want. So if somebody is like “Well, this is stupid” then you could be like “Okay.” No one else is going to see that they said that, though, so it doesn’t matter.

In another instance of employing the protection of private responses, Milo relayed his strategy of posting a Story where he blocked all but a single person from seeing. Since the responses and the viewer list were private, Milo’s intended viewer could not tell that they were the only one able to see Milo’s Story, allowing Milo to effectively send a one-on-one message disguised as a one-to-many messages. He elaborated:

Well, if you like somebody and then you happen to take a really good picture of yourself, then you want them to see it, but you don’t want to snap them because it will look pushy, you will post on your story and then you would block other people. So then, that person will actually see it without having to snap them.

This strategy for self-presentation in service of relationship building speaks to how deeply self-presentation ties into relationship processes.

RQ2: Private Feedback & Relational Maintenance

Our second research question asks how Stories sharing and responding foster relational maintenance. We emphasize how participants make sense of the viewers list and use the private message response mechanism. Our interviews show that the lightweight nature of Stories encouraged more quotidian sharing that helped people keep up with close ties’ daily lives. Moreover, the viewers list—while not intended to be a response itself—took on the symbolic meaning of a response because a viewer’s choice to watch a person’s story was made visible. Relatedly, our interviews with participants revealed deliberation around whose Stories postings to watch, although several participants approached watching Stories out of habit or boredom, instead of interest in a specific poster. Finally, Stories’ one-on-one response mechanism fostered

catching up between ties because its privacy allowed a Story to serve as a conversation opener. We elaborate on each of these findings below.

Keeping Up with Daily Life via Stories

Watching other people’s Stories and posting Stories provided a convenient way for our participants to keep up with their ties’ daily lives, as well as share their own. Earlier, we discussed that sharing via Stories involves lower pressure and is thus more lightweight, partly thanks to the private responses. As a result, people can post to Stories more frequently—and about more quotidian events than they would on their feed. Consequently, especially for strong ties such as close friends or family members, audience members appreciate Stories for allowing them to see glimpses into the sharers’ lives. When asked if there are things her parents would not learn otherwise if not for her Stories postings, Lan answered:

they get to see what I’m doing [much] more frequently. I call my parents once a week on FaceTime and I can only remember so much during that time [versus] little snippets every day [via posting Stories]. I think they get a better understanding of what I am going through here.

Not only did audiences of Stories see more glimpses of daily lives thanks to the frequent sharing, they also viewed Stories as showing more “real” and ordinary moments from others’ lives, as opposed to the feed. Participants, like Iris, described the feed as “hyper-curated” or only showing the best moments from people’s lives:

even when I’m looking at my [Instagram] feed, and it’s usually really nice, well-crafted photos, and then the Insta stories would be them making funny faces or ridiculous poses and stuff, and it makes them seem more like real people rather than just like sort of flat characters

That the content shared on Stories was more representative of daily life also helped the sharers feel as if the viewers were connected to the lives they led, which may differ from the less frequent and more polished images that they shared elsewhere. Bart, a participant who lived in a rural area and far away from his friends, answered our questions about the value of responses to his Stories by saying:

because I live the life that I do, and I live in a more rural area, and I don't have a lot of friends that I can hang out with in person, it is really helpful to get positive feedback on the stuff that I post online, because I think that people are able to...learn about my life.... It is useful to know that people are keeping up with me....

Similarly, Elizabeth compared these daily glimpses against postings on other social media platforms:

It's more of a day-to-day, random moments, as opposed to staged...like you're more likely to spend 20 minutes editing a photo for Facebook or Instagram, but Snapchat, you post it, it's done.

Thus, the lower pressure of Stories sharing means that not only is sharing easy, the postings also often happen in the moment and reflect current events in one person's life. This can create a sense of ongoing togetherness, especially when people consistently view one another's stories over time. This stands in contrast to Instagram or Facebook updates that may be a highly polished portrayal of events which happened weeks ago or only major life announcements.

Deciding and Managing Whose Stories to View

The viewers list is another key element in relational maintenance processes via Stories. Compared to feed posting, the viewers list—which shows exactly how many and which users have seen a Stories update—is a novel feature of Stories. In addition, unlike with feed sharing,

people may specifically click on Stories to start viewing them, making the act of viewing at least interpretable as more intentional.

From our interviews, we find the decision to view Stories to range in its intentionality, from purely habitual to very deliberate. First, several participants acknowledged that they viewed Stories out of boredom and habit—instead of an inherent interest in the sharers—and assumed the same of their own Stories’ viewers. For example, Bart observed that the same set of people always view his Stories first and suggested that some viewers of his Instagram Stories tend to be habitual viewers of Stories:

it’s usually the same people...especially the first people to view my stuff, because I just assume that those people are just like addicted to Instagram and are just always looking at it, so it is not just about seeing the story.

This assumption of Stories viewing out of habits and automaticity was often applied to weak tie viewers. Elsa said: *“If it’s someone who I’m not super close with, then I’ll just assume that they just tapped through everyone’s stories at once.”* This reasoning for Stories viewing possibly stems from perceptions of Stories postings as often “boring” or “ordinary,” making it less likely that a weak tie would be interested in such updates.

Although this mindset of habitual watching may apply for several of our participants or to certain type of ties in one’s network, there were also many instances of intentional Stories viewing among our participants. For example, some participants responded that they make sure to watch updates from strong ties such as close friends, romantic partners, or family members. In contrast, people deliberately avoided watching Stories by contacts who they were in sensitive situations with, such as former romantic partners. Amy expressed why she would not view the Stories posting by her former partner: *“I don’t want them to think that I still care what they’re up*

to.” Furthermore, the difference between how participants interpret the intentionality of Stories viewing can lie with platform’s features. Once you click on an Instagram Stories, you can be automatically directed to the next person’s Stories, without any preview of who it may be. Meanwhile, after viewing one person’s Snapchat Stories, you have an option to see whom you will view next before proceeding. Although this is a subtle difference, the extra click and pause before viewing with Snapchat can underscore intentionality behind the act of viewing. The (non)responsive quality of visible Story viewing can thus serve as a marker of relational dissolution as well as maintenance.

Stories Viewing Serving as Signal of Attention.

When we asked interviewees how they approach the viewers list and whether there were some people they wished would view their Stories, we found that the signal of viewing takes on varied significance among our participants. The significance also differed across disparate types of audience members. As discussed above, external reasons such as boredom or habit may sometimes motivate Stories viewing, which consequently renders viewing as an unreliable signal of interest. That said, certain participants found the signal of viewing to be important or enjoyable when it came from people such as their crushes, romantic partners, or family members. This is in keeping with earlier findings about visible forms of responses, such as Facebook “likes” (Scissors et al., 2016). The act of viewing with social media Stories, particularly with Snapchat Stories, serves as a signal of attention due to its intentional and self-selecting nature: at least at the start, people have to opt to click on a Story and have control over what they view, as opposed to the feed displaying posts to them (McRoberts et al., 2017). In describing the significance placed on his romantic interest viewing his Stories, Naraic ascribed “[an] interest in what I’m up to or an interest in me as an individual” to the act of viewing. As a result, while likes, comments, and other sorts of responses may be essential for showing effort in other modes,

in Stories, viewing itself demonstrates investing effort (albeit small) into a relationship. Milo further compared the experience of the viewer list to a “like” on social media:

I guess the satisfaction from seeing people who look at my Stories who don’t typically [click ‘like’ on] my pictures... It’s like: “Ha! Caught you! You are actually seeing my posts but you didn’t ‘like’ it!”

In other words, the viewers list, while not explicitly built as a feedback mechanism, takes on the significance of a response mechanism in signaling one person’s attention to another. The same act of viewing takes on the meaning of interest when rendered visible. The symbolic meaning of attention conveyed via the act of viewing Stories was particularly striking with one of our participants, Mike. He was not aware of the viewers list until our interview. Once he learned that others could see him viewing them, Mike expressed intentions to revise his viewing practice:

I told you earlier that usually when I use my story, I just go through everything and I swipe, swipe, swipe until I go the end of the last stop. But now...I might not go through all the lists because I mean, sometimes I don’t really care about them that much. Maybe I should not look at them...if they’ll see me on the list, maybe they’ll think I care when I actually don’t care.

Learning that others could tell when he viewed their Stories prompted Mike to assign meaning to his act of viewing: the same mindless viewing may signal “caring” when the sharer is aware.

Similarly, Elizabeth recounted her realization as she first learned about the viewers list:

[Learning about the viewers list] made me consider, “What if my ex posted a story?”... and then it made me realize that that person that I’ve been trying to avoid has seen that I look at his stories, which was a painful realization.

Opening Extended Conversations with Responses to Stories

Our findings suggest that people may not respond privately to stories very often. When responses did occur, however, our findings suggested that they could serve as conversational openers that foster catching up. Since Story responses routed to a one-on-one chat space, the sharer and responder can have an extended conversation that would otherwise be unwieldy or too visible in the public comment space, as Devin explained:

I think people don't want to have public conversations that often or at least my friends.

And if they reach out to me privately on Snapchat then we can have an actual conversation rather than like a comments thing that might bother other people.

Second, with the live and instant norm of posting to Stories, people understood that whatever was happening in a Stories update was going on at the moment, evoking conversations around that topic. In contrast, an Instagram post in a certain location may mean someone was there weeks ago, making it less certain that the location was still an appropriate topic of discussion. Ashley likened the experience to meeting someone you have not seen in a while:

Initially, it's [the response] obviously about the context and then go on to be, like, how have you been? It's been so long. I'm not saying it's a follow-up through all the way, but it's a short catchup and what are you doing in your life right now, basically if you see someone in a long time in person or it would be awkward to just say that's cool.

Discussion

Compared to the feed posts that are the usual objects of social media scholarship concerning self-presentation and relational maintenance, Stories postings feature the same audience but differ in the private mechanism of responses. Such conditions provide the opportunity to see deeper dynamics of social media responses in these processes and to understand which are due to responses and which to platform design. Our interview study

investigates how people understand social media Stories and how the private response mechanism shapes users' self-presentational and relational maintenance practices. Our findings indicated that people experienced reduced self-presentational pressure with Stories, which they associated with lower expectations around responses and the protection provided by private responses. For relational maintenance, the act of viewing Stories sometimes sent a signal of attention and interest that fostered relationships, even if minimally. This is evident by the attention many of our participants paid to the viewers list and to managing whose Stories to view. Finally, though private responses to Stories posts were infrequent, such responses could initiate extended, one-on-one conversations that helped people stay close.

Although we studied a relative novel platform, from our findings, we seek to highlight basic mechanisms that may extend to all form of responses on social media. In doing so, we heed the call for grounding among technology scholars (Baym, 2009), where we contextualize our findings on Stories, a relatively novel platform, within existing knowledge of responses on social media and of relational maintenance processes in general. To this goal, for our Discussion, we draw attention to two salient aspects important to making sense of feedback on social media: (1) the relationship between effort and expectations and (2) signaling of attention.

Social media responses and expectations of effort.

Expectations of responses for feed sharing is an instrumental dimension of social media platforms (French & Bazarova, 2017). However, in contrast to previous work, which consistently showed the importance of receiving ample public feedback for Feeds sharing (Bazarova et al., 2015; Grinberg et al., 2017), we found that people have few expectations of receiving responses for Stories, partially attributed to the responses being private. This distinction between private versus public responses, however, supports a shared theme about responses, regardless of

platform: they provide sharers and audience members a way to create, and fulfill, expectations of effort.

The distinction made by our participants seems to lie in the effort invested in each type of postings. Effort has always been a salient aspect of relational exchanges (Kelly, Gooch, & Watts, 2018). In building a messaging a system to nudge users to write increasingly longer messages, thus expending more effort, Kelly et al. (2018) found that some participants appreciated this nudge and saw the longer messages as potentially more meaningful. Our findings point to how this emphasis of effort also occurs in the realm of public postings in the exchange of posting and responding effort. When people share to the feeds—where public responses are possible and expected—they work to ensure that their posts are worthy of responses. Several of our participants elaborated that, for an Instagram post, they would have to plan out the photo and post after sufficient editing. In turn, as viewers, they recognize the effort exerted and the expectations placed in a feed post and respond accordingly—giving out clicks and comments. Stories postings, on the other hand, seem to discourage effort. The norm is to capture and post in the moment, often with the built-in camera in the application. Furthermore, Stories postings are ephemeral, disappearing after 24 hours. Consequently, sharers neither expect nor desire the responses that would be integral to feed sharing (French & Bazarova, 2017). Stories viewers also share this perception and do not feel expectations to respond to the Stories they view. While social media research has always underscored the importance and expectations of response to sharing, our findings offer an explanation for this phenomena: a mutually held set of expectations between the effort it takes to create a post and the effort it takes to respond.

Future work should investigate these themes further as norms start to coalesce around these emerging forms of sharing. For example, as Stories postings start to replace feeds sharing,

would people come to expect more engagement with these postings in terms of responses? In addition, Stories postings originated from Snapchat, which has always embraced a norm of quotidian and lightweight sharing (Bayer et al., 2016). As they become more popular on platforms associated with polished sharing, such as Facebook and Instagram, expectations for the quality of post may differ from the current norms of lower effort postings. Finally, without public responses, how are sharers determining what type of content their audience finds interesting and desirable in order to fine-tune their subsequent posts?

Social media responses signal attention.

Previous research has theorized that the signaling of relational investment and attention is a particularly salient aspect of social media platforms (Donath, 2007; Ellison et al., 2014). Although these platforms frequently feature explicit replies as a central feature of the sharing experience, people find implicit mechanisms of responses elsewhere. For instance, the viewing of profiles in LinkedIn (Hoyle et al., 2017a) or the checking of messages in a system without any notification built by Kelly et al. (Kelly et al., 2018) both provided communication partners with signals of interests. This is because the act of clicking presumably comes from an interest in the target in these cases. With feeds sharing, this signaling seems to occur via lightweight responses.

What we surface here is how this signaling of attention by the feedback giver—or the interpretation of attention by the feedback receiver—occurs via Stories’ viewers list, a feature typically absent for feed posts. As such, the viewers list becomes a vessel for attention exchange. Indeed, the language our participants used to describe whose Stories they choose to view or what they think of people who view their Stories bore strong resemblance to how the “like” button has been discussed and studied (Sumner et al., 2018). That is, both the “like” button and the act of viewing someone’s Stories could be described as a lightweight action to maintain contact and to

gesture your continued interest in weak ties (Sumner et al., 2018). However, as reminiscent of the “like” button, the intentionality behind the act of Stories viewing is ambiguous: some participants view Stories habitually without much deliberation over whose Stories they are viewing, while others go to great lengths to avoid viewing Stories by certain contacts. Finally, for strong ties, the act of viewing Stories may feel compulsory, similar to the expectations for a “like” (Scissors et al., 2016; Sumner et al., 2018).

These findings affirm that the relational use of social media sharing and response requires negotiating and assigning symbolic meaning to the technological features offered by these platforms. Just as the one-click feedback (e.g. “likes,” “hearts,” or “favorites”) and “comment” can take on a variety of meanings and functions with feeds sharing, people can find meaning in the viewers list beyond its face value. The act of viewing a Stories is often self-selecting (McRoberts et al., 2017), and the act of viewing is rendered visible to the sharer. Together, this makes it possible to read the viewing of Stories as a signal of interest, even when it may in fact result from automatic or bored viewing rather than genuine interest. That is, not only is the viewer seen as intentionally interested in a Stories post, they are seen as willing to let the other party know that they have seen it. One popular press writer has even extolled the Snapchat viewers list as the tool to tell whether your romantic interests are reciprocated (R. Thompson, 2016). Given this combination, the act of viewing a post in and of itself on Stories becomes a gesture of attention and an indicator of caring about the other person, whether intentional or otherwise.

The multitude of interpretations around the meaning of viewing someone’s Stories also harkens back to Goffman’s distinction between impression “given” versus “given off” (Goffman, 1959). Goffman distinguished between impression “given” (what someone intentionally wanted

to convey) versus impression “given off” (what someone unintentionally conveyed). Goffman’s theory thus provides a useful lens to contextualize findings around how people interpreted the viewing signal. Given people’s idiosyncratic approaches to the viewers’ list (how much attention someone pays to it, how often someone looks, etc.), the impression “given off” while viewing can vary widely. For example, if someone always views another person’s Stories very soon after posting, they may “give off” the impression of being preoccupied with this person, but only if the other person fastidiously checks their viewers list soon and frequently after posting. These varied interpretations further attest to the existence of different media ideologies (Gershon, 2010) surrounding and governing technology use and its consequences.

Design implications for publicness of response.

It is striking that our participants shared an almost universal enjoyment of the private responses to Stories sharing. Although many social media platforms default into public modes of sharing and aggregate each discrete response (i.e. a “like” or a comment) into numbers (i.e. 65 likes and 28 comments), certain sites are experimenting with hiding the number of likes from the audience, such as Instagram and Facebook (Conger, 2019). In addition, other platforms with reduced levels of publicness (i.e. Facebook Groups) or persistence of content (Snapchat) are enjoying greater popularity (Holmes). These shifts suggest that both users and platform designers are looking for alternative solutions to the tyranny of publicness demanded of users typically. Considering Goffman’s enduring theories on self-presentation (Goffman, 1959), the ability to have more control over audience for self-presentation is more in line with how people typically prefer to present. While sharing via Stories is public, people can benefit from the assurance that each piece of response is seen by them only and that no one else is privy to how their self-presentation is being received by their separate social circles.

However, public responses could serve many purposes. Andalibi et al. (Andalibi & Forte, 2018) found beneficial network effects among people who choose to disclose their pregnancy loss online: seeing the positive responses to one person's disclosure of pregnancy loss encouraged others to make the same disclosure and allowed them to access social support. Whether responses are public or private, there are hence tradeoffs to the sharers and their audiences. Instagram, for instance, cited mental health concerns around the restless pressure of public feedback, especially on teenagers, as a motivation behind the platform's hiding "likes" (Leung, 2019). Future designs of platforms should consider iterating on these choices and default options provided to users.

Design and research implications for response's effort.

Although posting to Stories largely involves lower effort from both sharers and posters for each post, questions remain around how these dynamics play out. First of all, while most Stories do not receive a response, the responses that occur are often more effortful and can even facilitate extended, private exchanges. When we compare these responses to the frequency or effortfulness of other types of composed responses such as a comment to a public post or a private message prompted by a public post, it is unknown whether composed responses to Stories occur more or less frequently. In other words, Stories postings may potentially serve to encourage more one-on-one exchanges through their response mechanism of private messages. On the other hand, Instagram and Facebook now provide quick reaction to Stories, where you can click once on one of the default emojis to send a private reaction message. Although such designs may make responses easier—and perhaps more likely, platform designers should be mindful of intentionally instilling low-effort responses. This is because effort is an important consideration in relational maintenance, with greater effort potentially gesturing more investment

in a relationship. Recent interventions in this topic have explored, for example, messaging system that requires progressively longer messages (Kelly et al., 2018).

Moreover, as Stories posting and viewing become more frequent, people may start to invest greater accumulative effort into this genre of post as a whole. In other words, sharing and viewing 50 low-effort Stories postings over a month may require more time and energy than a single polished Instagram post. As a medium, Stories postings can be particularly useful in building a greater ambient awareness of one's network (Krämer et al., 2017; Levordashka & Utz, 2016), given its constancy and volume. Ambient awareness of network has been associated with beneficial implications for well-being. Future studies should investigate this effect of Stories on relational investment via quantitative methods (i.e. surveys, experiments, or longitudinal studies) to determine the interpersonal and psychological implications of Stories use.

Conclusion.

In summary, the increasing popularity of Stories presents a paradigm shift for social media users, and the invisibility of feedback offers scholars the potential for new insights into how relationships and selves are created and maintained through online interactions. This paper highlights the thus far under-examined negotiation of expectations around effort and attention displays that may be integral to interpersonal exchanges on social media. Whether sent privately or publicly, our study reveals that social media responses serve to (1) acknowledge mutually-held expectations between sharers and audience about effort put into social media and (2) send signals of attention and interest. With Stories, the effort put into posting is often lower and associated with low expectations and low level of responses. Secondly, we find that participants search for and find cues of attention and interest with Stories' viewers list—functions scholars have attributed to one-click feedback with feeds posting (Sumner et al., 2018). Importantly, we

highlight how these functions emerge independently of whether the responses were sent publicly or privately, clarifying and supporting social media literature on responses to public sharing. We encourage further research that considers these questions in different or broader populations, and that examines questions of the self-presentational and relational negotiation of effort in other digital media.

Chapter 4 – Study 3: “Social Media is the Second Impression”: The Invisible Roles of Social Media Information in Interpersonal Communication

When people post to social media, receiving responses is an instrumental part of the process. Social media scholarship has heavily emphasized the role of visible responses on social media platforms to interpersonal relationships. However, communication within interpersonal relationships often spans multiple channels (Baym, 2015), especially with strong ties (Haythornthwaite, 2005). As highlighted by the invisible responses concept, there are numerous meaningful ways that social media information enters daily communication outside of the original platform. For example, information from social media would presumably travel to, and spark conversations on, other channels. Similarly, people can develop an ambient awareness—being informed of the lives and updates of people in their network via the multitude of their postings on social media (Levordashka & Utz, 2016). In other cases, when people share bad news on social media, such sharing may spur conversations elsewhere, inspiring richer and presumably more meaningful forms of communication than the lightweight one-click reactions available via social media (Chang et al., 2018; Spottswood & Wohn, 2019). Further taking into account the widespread use of social media on the phone—a portable, ubiquitous device increasingly and seamlessly interwoven into people’s lives (Campbell, 2018)—meaning that social media users have a constant access to information about other people.

However, these strategies all demand that people render visible their attention to others’ social media sharing, which is not always feasible. For example, stigma around “social media stalking” can make such actions seem inappropriate (Lyndon, Bonds-Raacke, & Cratty, 2011;

Schoenebeck, Ellison, Blackwell, Bayer, & Falk, 2016). Moreover, information gained from social media in covert ways can help people strategically navigate conversations elsewhere (Hampton et al., 2016; Hancock et al., 2008). Given the various ideologies around social media (Gershon, 2010; Haimson et al., 2017), people may have clashing opinions about what is or is not suitable to bring up outside of the original platform.

In this study, I investigated people's practices around managing the visibility of their attention to someone else's social media content and perceptions of the relational implications of such use. I employed focus group study for my research questions. As a qualitative method, focus group is particularly helpful for spurring conversations and gathering multiple perspectives at once (Krueger & Casey, 2014). Findings revealed that people often opted to make their attention to someone social media's post visible if they are aiming for relational maintenance. In contrast, when they find the content disagreeable or negative—behaviors suggesting relational distance—they usually keep their reception of such content invisible. My discussion highlighted the influence of social media information on relationships as part of a multichannel communication and the management of visibility people enacted in responding to social media sharing.

Literature Review

Scope of current study.

My paper focuses on people's perceptions of and action in response to information shared on social media by people whom they have a relationship with outside of social media. The actions in response to sharing here can take many forms. They can range from forming an impression of the sharer, finding the information noteworthy and memorable without any further action, to calling the sharer to talk about the information. This study investigates the responses

people take and what distinguishes between responses that are invisible versus visible to the original sharers.

Recalling the definition of invisible responses, invisibility to the sharer is one way responses can be invisible. In understanding the implications of sharing and communication on social media, there is extensive social media research reporting on the sharer's experiences with feedback after posting and probable outcomes of their sharing (Deters & Mehl, 2013; Grinberg et al., 2017). However, these approaches do not capture the perspective of the viewers, especially people who opt to refrain from responding in ways invisible to the sharers and their motivations for doing so. This study seeks to complement our current understanding of social media responses by looking at the viewers' perspectives—especially those without visible responses—in order to show a more complete picture of the implications of sharing and communication on social media. Below, I review the literature on several prominent roles of social media information in relationships.

Seeking information via social media.

Invisible response can be particularly relevant at the beginning phase of the relationship, where people tend to seek information about one another, as highlighted by uncertainty reduction theory and strategies for information seeking. Uncertainty reduction theory (URT) posits that people seek to reduce uncertainty at the beginning phase of a relationship by seeking out information about the other person (Berger & Calabrese, 1975). One of the axioms from the first paper on URT by Berger and Calabrese (1975) argued that less uncertainty is associated with greater social attraction. Meanwhile, Sunnafrank (1986) argued that the predicted outcome value (POV) of a relationship would dictate people's decision to whether or not continue to extend interactions and maintain communication in a relationship. In other words, if I foresee a positive

relationship with somebody, I will continue to establish more communication and interactions with that person. However, if I detect unfavorable outcomes for our relationship, I would curtail my communication with this person. Compared to URT, POV theory similarly maintained that people would be motivated to seek out information to reduce uncertainty during relationship initiation. However, unlike URT, POV theory distinguishes between whether the information points to negative versus positive outcome (Sunnafrank, 1990). If the outcome is positive, people would continue to seek information to further affirm their positive outcome judgment. However, if the outcome is negative, people would reduce information seeking effort. These theories have informed CMC research, including social media, on information seeking during relational formation, which illustrates information seeking via CMC to be common this initiation phase.

Strategies for information seeking include: *active*, asking a third-party about the target; *passive*, obtaining information through “unobtrusive observation” (p. 220); and, *interactive*, asking the target person themselves (Ramirez et al., 2002). Moreover, with computer-mediated communication, Ramirez et al. (2002) proposed a fourth category of *extractive*, searching for information about someone. Notably, three of these strategies—active, passive, and extractive—employ routes invisible to the target of information seeking (except for active strategy cases where the third parties inform the target).

Social media can provide an ideal conduit for this information-seeking phase. A substantial amount of information on one’s profile is public and can be accessed without one’s knowledge, an ideal setting for passive or extractive strategy of uncertainty reduction (Antheunis, Valkenburg, & Peter, 2010; Fox et al., 2013). Notably, college students with higher global uncertainty traits—meaning they experience more uncertainty than others when interacting with new ties—were more likely to engage in online information seeking about new

acquaintances (Stefanone, Hurley, & Yang, 2013). In romantic relationship contexts, college students in focus groups conducted by Fox et al. (2013) heavily relied on Facebook “creeping”—obtaining information about someone surreptitiously via Facebook—as a key uncertainty reduction strategy in the initiation phase of romantic relationships. Users of online dating sites similarly engage in uncertainty reduction strategies such as comparing dating partners’ profiles across websites or checking public records (Gibbs, Ellison, & Lai, 2011).

Information seeking via social media can also ease communication at this stage. When conversing with someone for the first time, people who had access to their partners’ Facebook profiles beforehand could strategically guide the conversation towards favorable topics. For example, if they know they share a common interest in a band with their target, they may deliberately ask their target about the target’s favorite band and “discover” shared interest, helping them appear as more likable than those without the strategic access to Facebook information (Hancock et al., 2008). However, in this experiment, participants were instructed to hide the fact that they obtained information from social media, which 77% of the participants rated as deceptive (Hancock et al., 2008). In other words, it is unknown whether people find these approaches socially acceptable and how frequently they may practice such approaches.

Lubricating interactions with social media information.

Another important way of receiving social media is how people can use the information to lubricate and spur communication on other channels. Ample evidence exists for the use of social media information as a facilitator of daily interactions in contexts outside of social media (Ellison, Steinfield, & Lampe, 2011; Hancock et al., 2008; Leonardi & Meyer, 2015; Utz, 2016). Ellison et al. (2011) investigated a set of behaviors labeled “social information-seeking,” where participants use Facebook for purposes such as to “check out someone [they] met socially,” “to

learn more about other people in [their] classes” and “to learn more about other people living near [them].” This set of behaviors, wherein individuals use Facebook to learn information about people they have an offline connection with, is predictive of both bridging and bonding social capital (Ellison et al., 2011). These findings suggested that information gleaned from Facebook may serve as a “catalyst” for offline interaction with people already in one’s network, instead of replacing offline interactions (Ellison et al., 2011, p. 886).

Indeed, when people share negative news on social media, their stronger ties are likely to follow up with this update via a private means of responding and often on channels outside of the original social media platform (Spottswood & Wohn, 2019). Meanwhile, research from organization communication also hints that information from social media can lubricate exchanges between pairs who do not know each other well (Leonardi & Meyer, 2015). In addition, social media may support daily interactions by helping people gauge conversational topics to avoid or engage in (Hampton et al., 2016; Hancock et al., 2008). By browsing and seeing where someone leans regarding political topics, people may consciously try to avoid that topic in offline conversations to evade confrontation (Hampton et al., 2016). What these findings demonstrate is the use of social media to lubricate conversations can be invisible to sharers. In other words, when people unobtrusively gather information from social media to avoid or engage certain topics in other channels, they may never bring up the source of information as social media.

Even when people are not actively seeking information about someone, the knowledge they accumulated about their ties via social media update results in an ambient awareness that support relational maintenance. Ambient awareness is the idea that the many small updates on social media can coalesce to create an increased awareness of people around you (C. Thompson,

2008). For example, when asked about ties in their Twitter network, participants were cognizant of these contacts' hobbies or professional interests (Levordashka & Utz, 2016). Moreover, participants' awareness of individual ties served as a mediator between the frequency of reading tweets posted by this tie and how approachable they found the tie (Levordashka & Utz, 2016). Krämer et al. (2017) further connected the extent of ambient awareness to social well-being outcomes. Particularly for those low in social connectedness, greater degree of ambient awareness was predictive of well-being (Krämer et al., 2017). The greater association between ambient awareness and well-being for those low in social connectedness has several noteworthy implications. It may mean that for those who do not socialize much, they can gain some sense of connection via looking at social media updates (Krämer et al., 2017). Alternatively, people low in social connectedness may find value from the knowledge gained unobtrusively from social media as a way to facilitate their daily interactions. That is, the utility of the ambient awareness does not stop at the level of consumption of information but extends to interactions with the target as well.

Distancing over social media content.

Given its sensitive nature, relational distancing resulting from social media information likely remains invisible to the sharer. Earlier, we showed that awareness of possible confrontational topics, such as someone's divergent political opinion, may prompt people to choose to avoid these topics in interpersonal communication (Hampton et al., 2016). Although this strategy could help people avoid friction in their communication, the finding also suggests that information from social media may prompt people to engage in avoidant behaviors during conversations. It is hence feasible that social media information may cause someone to avoid interacting with another person altogether in other channels, and not just simply unfollowing on

online platforms. For example, in using Facebook to reduce uncertainty about potential romantic partners, people may end up uncovering red flags—such as pictures of excessive partying or promiscuity—that lead to reconsideration of the relationship (Fox et al., 2013).

Moreover, as people unfriend or unfollow one another because of social media behaviors (John & Dvir-Gvirsman, 2015; Sibona & Walczak, 2011), the unfriending suggests a fracture in their relationships and potential disconnect on other channels as well. Evidence exists that people engage in avoidance behavior offline following Facebook unfriending (Sibona, 2013). The study suggests this type of avoidance is more likely with unfriending resulting from serious transgression behaviors offline (Sibona, 2013). Although an online – offline binary emerged from some of these studies, whereby offline behaviors are considered more impactful as drivers of relational distance, online behaviors and offline behaviors cannot be completely divorced from each other. For example, if I find a friend’s excessive bragging disagreeable during our face-to-face meetings, their self-promotional posts on Facebook could be the last straw that finally convinces me to unfriend them and terminate our relationship.

Visible versus invisible use of social media information.

Social media information can both support relationships (Ellison et al., 2011) and create distance between people (Carpenter & Tong, 2017; Hampton et al., 2016). One consistent thread of prior research on relational development is the importance of signaling attention and relational investment in another person (Ellison et al., 2014). This is intrinsically tied to making visible your response or attention to someone’s sharing on social media, such as using the “like” button. Thus, an explicit reference to the sharer of their post—which we refers to as visible use—to social media information in another channel is a strong signal to the sharer that a viewer has not just seen but attended enough to the content to remember it.

However, making visible your attention to someone is not always favorable. As made evident from literature on URT, people may prefer more subtle forms of information seeking (Ramirez et al., 2002). Social norms still suggest certain taboos or stigmas around looking at social media information as stalking, which may deter this kind of explicit reference. As such, people may also engage in *invisible use* of social media information. How such invisible use can translate to relational maintenance is an open question.

The present study will explore the specific practices of and perceptions around how someone manages the visibility of their attention to others' sharing on social media. In particular, a fruitful distinction that is under explored in the literature is whether the use of social media information in another channel is visible or invisible *to the original sharer*. I ask the following research questions:

RQ1: What are people's perceptions and practices of invisible use of social media information in interpersonal communication?

RQ2: What are people's perceptions and practices of visible use of social media information in interpersonal communication?

Methods

Participants and groupings.

Considering the open-ended nature of the research question, focus group presented an appropriate method for this study. In prior works, I have attempted to investigate these questions with open-ended surveys and one-on-one interviews, but these methods have not yielded particularly insightful findings. Focus group settings allow the responses from attendants to spur new ideas and answers in others (Krueger & Casey, 2014), which lent itself to questions about everyday social media practices.

I recruited participants by sending an email via the University of Michigan's targeted emailing system to 700 staff members and 200 undergraduates. Women use social media at greater rates than men ("Social media fact sheet," 2018) and can be over-represented in social media research; as a result, I oversampled for men at 60% in the sample of targeted staff members and undergraduates. I advertised the project as a research study on social media information in personal relationships and provided a \$40 cash incentive for participation. Participants clicked on a link to access the prescreening survey, where they answered questions about their frequency of social media use and demographics. I manually screened the questions and follow up with eligible participants while trying to ensure age, gender, and racial balance.

In focus group, homogeneity among group members is desirable (Morgan, 2002), because it allows for a more open discussion. Although the discussion topics of my study were not sensitive or had behaviors high in social-desirability, social media use differs across age groups (Hargittai, 2020; Smith & Anderson, 2018). For example, people in the 18 – 24 age groups are more likely than older age groups to use platforms such as Instagram and Snapchat (Smith & Anderson, 2018). They are also in different life stages, with disparate social settings and gratifications sought from social media. As such, I conducted six focus groups and organized the groups based on five different age brackets.

To be eligible, participants had to be at least 18 years old and used social media at least a few times a week. Most participants used various social media platforms several times a day. Across the six focus groups, there were 43 participants (39.53% men & 60.47% women; 60.5% White). All groups had between five to eight participants. One group consisted of undergraduate students aged 18 – 24. The remaining five groups consisted of staff members, with one group for each age range: 18 – 24; 25 – 34; 35 – 44; 45 – 54; 55 – 74 (see Table 5 for detailed participant

information). As reflective of the population of staff members, all participants were office workers with job titles such as coordinators, administrative assistants, assistant directors, and lab managers.

Procedure.

All focus group took place in conference rooms on campus and lasted 60 minutes. The majority of participants arrived to the focus group early, which allowed the participants to establish some rapport with one another and the researchers prior to the official session. The focus group protocol (guide in Appendix A) began with warm-up questions about social media use patterns, including sites used by participants and daily habits of social media use. After these initial questions, I continued to inquire about specific scenarios regarding use of social media information outside of the original platforms, in ways that are invisible or visible to the original sharer. Once participants recounted their scenarios, I probed them on motivations for their behaviors and perceptions of the implications of such scenarios

Analysis.

A research assistant was present to take notes during all focus group sessions. Specifically, the research assistant noted down which participant was speaking, along with body language and other nonverbal cues that would not be captured by transcription services. After each focus group session, I and the research assistant had a debrief session where we discussed the major themes from each session, following guidance from Krueger and Casey (2014). This debriefing session helped us capture key themes from each sessions and to address any issues or changes needed with the protocol as we progressed through the session.

I video-recorded the focus group, which was then transcribed by professional transcription services. I also verified the transcription by watching the recording of the sessions

and corrected the transcripts as needed. I conducted line-by-line, iterative coding of the data in Atlas.TI—following approaches inspired by grounded theory (Charmaz, 2006). In writing up the findings, I followed criteria outlined by Krueger and Casey (2014) for focus group analysis in order to identify major themes; these criteria include frequency, extensiveness, intensity, specificity, internal consistency, and participant perception of importance. All of participants' names have been changed to protect their confidentiality, and I made small edits and condensed the quotations for readability.

Findings

Overview: Differences between visible and invisible use

Across our participants, people were largely comfortable with bringing up information shared on social media explicitly with the sharer as long as the topic is positive, innocuous, or uncontroversial. Moreover, such visible use often has positive relational implications. Participants said that switching from public social media post to another channel—often private—can allow for a more personal conversation and signal greater interest in the conversational partner, a sentiment I discuss in RQ3. In addition, social media information enables channel blending among close ties and ambient awareness among more distant ties, which supports relational maintenance.

Sometimes visible use can have negative implications for relationships, such as when participants mentioned confronting someone over social media posts deemed problematic. Nevertheless, most participants did not take this approach when it comes to these sensitive topics. Instead, they refrained from discussing controversial topics or political differences—as gauged from social media. Thus, the most common form of invisible use of information is a change of perception or opinion about somebody else, unbeknownst to that person. For example,

Carla from G2 said she would “make a mental note” about not wanting to engage with somebody in the future, but she would keep this to herself. In summary, the biggest distinction between invisible use and visible use of social media information in interpersonal communication is in their implications for the relationship. Visible use often has more positive implications, and invisible use often has more negative implications—specifically relational distance. In the following sections, I discuss each type of use in detail.

RQ1: Invisible use of SM info

My first RQ investigates when reception of social media information happens in invisible manners. One common theme emerged across these categories: invisible use of social media information is often associated with relational distance and negative implications for relationships.

Social media as “second impression”

The first major theme emerging from participants’ invisible use of social media information is the frequent use of social media to supplement information about social ties. Moreover, the use of such information is often complementary of interactions outside of social media and can be relatively influential, shifting perception of somebody to be more negative or positive. As expressed by Quân from G1, social media serves as the “second impression:”

Whenever I meet someone, that's my first impression of them. And then I get their social media, and that'll be my second impression of them. So I always check their social media..., and that would kind of dictate if I would try harder to build a relationship with them or not.... (Quân – G1)

What the notion of “second impression” highlights is that social media does not function independently in interpersonal communication. Rather, people triangulate information from

social media with their knowledge of people obtained elsewhere (i.e. “first impression”) and across all forms of interactions. As such, their impression of someone may not necessarily be the face value of the impression conveyed via social media but also whether impression contradicts or reinforce impression obtained elsewhere. Specifically social media can shift perception or cause relational distance via several ways: serving as a screener of new ties, reinforcing existing negative perception, tipping off discrepancy between social media versus in-personal self-presentation, and showing undesirable cues about how someone use social media. I discuss each of these sub-themes below.

Social media serving as screener.

There are several ways that social media can influence perception of ties. As Quân (G1) noted above, the first invisible use could be as a “screener,” where people use social media to decide whether to pursue a relationship with somebody early on in the process of getting to know each other. Specifically, in the relational formation phase, it is common practice to add somebody on social media. Given access to someone’s social media profiles, people can search for certain types of content that dictate whether they want to distance themselves from or to pursue a deeper friendship with somebody or not. For example, people may discover that they have more in common with somebody and make a conscious attempt to connect with that person. This is reminiscent of the passive information seeking strategies for relational formation formulated by Ramirez et al. (2002), where people sought out available information unobtrusively, as opposed to asking the target of information seeking or a third party. In addition, these findings also support predicted outcome value theory, in that finding negative information can prompt curtailing of a relationship (Sunnafrank, 1990). Mallory from G2 described:

I've gotten to the point that I almost use social media as a screener for acquaintances. So if I meet somebody and we add each other and I can see them posting things that are potentially problematic and can be like, "Okay, I don't actually wanna be friends with this person."...But I've also had the opposite happen where I see people post things and I'm like, "Oh my goodness, this is somebody that I have a lot in common with. I want to make an effort to talk to them more

One possible drawback to this use of social media as a screener is people's skepticism in the authenticity of social media content. Due to prevailing social norms that favor sharing of positive and socially desirable content on social media (Ziegele & Reinecke, 2017), prior research suggested that not everyone could present themselves authentically on social media (Reinecke & Trepte, 2014). Similarly, participants across groups expressed hesitation over how much they can trust social media content, considering that it is only a "facade" and is not "authentic." For example, Brandon (G2) expressed his ambivalence about how his partner's friends exclaimed that they knew him already thanks to social media during their first meetings:

sometimes I'll meet my partner's friends...and they'll always be very welcoming and heart-warming. [They're] like, "I've seen so many pictures of you. I feel like I know you already," and I was like "Woah! I've never met you"...It's really weird. But I always feel welcome in that way, because they feel like they know who I am already....[Social] media for me is a facade too, in terms of we project something that is not always the case. So they know me as the social media Brandon but not as the authentic Brandon.

Social media reinforcing existing negative perception.

In some cases, social media can re-affirm participants of perceived character flaws in other people. On social media, people may feel the liberty to post more frequently or freely about

topics that are taboo in person because of social norms. Moreover, content on social media is typically more persistent, which allows a broad audience to view it repeatedly. As a result, social media can exacerbate this difference by providing constant reminder of such conflict in opinions, as exemplified by this quote from Michael from G5:

you generally knew [about someone's political opinions]....but being exposed to it on Facebook...in a constant reminder and depth [It] gets wilder a lot from my perspective....[That's] the downside for me...you can know they're conservative and have this, but ... then you start seeing how deep it goes and how nasty it gets.... It does change my perspective of people.

In another focus group, G3, Brad expressed the same sentiments: “I think sometimes with family, yes, we knew ahead of time, but then sometimes you don't know the severity of it....Like, you're like, ‘Wow, that was even worse than where I thought you were.’” Beyond political differences, in another instance, Elizabeth from G4 was turned off by her social media contact's postings on social media, which she described as “narcissistic”

I have an acquaintance [on Instagram] who started posting her personal workout videos....I've always known she was kind of narcissistic....So I did have sort of negative feelings about that.... There's a quality to these little videos that seems very navel-gazing narcissistic. So it just reinforced that perception [that she's narcissistic].

Social media giving off impression.

On social media, people can give—as well as give off—impressions. In his discussion of self-presentation, Goffman (1959) distinguishes between the two: *giving* impression refers to a deliberate action to convey a self-image, and *giving off* impression refers to when people unintentionally or unconsciously convey information about themselves. Accordingly, another

theme that emerged from my focus group interviews was how people's patterns of social media use social media, such as how often they post, can create negative impression. Importantly, such negative impression was independent of any content they posted. Lindsay from G1 described how she shifted her impression of her housemate because of social media use between this housemate and the housemate's boyfriend:

I really liked [my housemate] the first year, and I still really like her this year. But just the way that she uses her social media and her boyfriend's social media is kind of off-putting....He can't follow girls that he doesn't know. He can't like pictures of girls.... On TikTok...if there's a pretty girl, he's not even allowed to watch the video.

In this example, Lindsay was able to observe the way her housemate controlled the social media use of a romantic partner, souring Lindsay's impression of this housemate. In addition, other cues giving off impression mentioned by participants can include grammatical mistakes on people's posts and the frequency of postings. Posting too much about politics can also be unfavorable, even if participants agree with the opinions expressed. Given the level of embeddedness of social media within daily communication repertoire, social media use can come up and be observed in a variety of ways, begetting more opportunities for impression to be given off based on their use. In other words, while people may post innocuous or even positive content on social media, their approach to the platform—such as how often they post or how they manage their use of social media—becomes another thread of information that can give off impression to others.

Social media revealing discrepancy with in-person behavior.

Discrepancies between someone's social media versus in-person self-presentations can also *give off* impressions unknowingly. In these cases, our participants suggested that someone's

socially desirable or positive image on social media self-presentation can backfire if such image diverges from the one presented on other communication channels—such as in-person conversations. Cindy from G6 explained:

When you know someone in real life [and know]...they're not that kind or...they really don't hang out that group of friends that much. But that's like the one post that they did...for the past month and... they put "Me and my besties." [You] hung out with them like one time, so calm down....

Vivi from G2 recounted a similar example where Vivi's acquaintance projected a more positive image of their life on social media compared to what Vivi learned from in-person conversations:

[On] social media she would be really positive..., but then in person she would be like "This is the worst."It influenced my perception of her....Now every time I see [her] post..."This is a wonderful experience." [I think] "are you just lying?"

In these examples, discrepancy between social media self-presentation versus on other channels seemingly arose from selective self-presentation processes (Toma, 2016; Walther, 2007), whereby people try to convey socially-desirable and positive images on social media. Meanwhile, in person, their self-presentation may be less polished or more negative.

In yet other cases, the discrepancy arose because people engaged in controversial behaviors on social media, despite shying from doing so on other channels. For instance, Jean from G3 recounted how he changed his impression of someone over how incendiary their social media behaviors are and how he would be oblivious of such behaviors if not for social media:

So there's a guy...who is very, very personable and nice in person and....But on Facebook I see him comment on other mutual friend's posts in a very...incendiary way

and it really does make me want to create distance between him and myself.... It makes me think that I can never really be close to this person....And I would only know about that by witnessing it on social media.

Similarly, Shiqing was perplexed by one of her social media contacts' decision to express provocative opinions on social media, but not in person:

[This] particular friend would post a lot of stuff on social media...that are, to me, backwards...[But] then, in person, this person is just so sweet and kind....[It's] so interesting because [she is] throwing out all these opinions for almost everything and [she knows] that people are seeing everything. But in person, I know for sure she's never gonna engage in what she posts. [Shiqing – G2]

These instances illustrate that people may not always opt for a safe and uncontentious image on social media. Additionally, as illustrated by the example provided by Jean, one person's interaction with another person on social media is visible to many third parties. Consequently, interactions on social media may have unintended audiences and reveal aspects of oneself that are meant for only a small group, causing context collapse (Marwick & boyd, 2011).

Avoiding uncomfortable interactions via invisible relational distance.

Although many types of content or behaviors could make someone's social media sharing unfavorable or distasteful for others, most of our participants keep such "second impression" to themselves. They prefer to avoid uncomfortable discussions where they have to discuss political differences or point out perceived flaws in others. As a result, this type of negative reception of social media sharing stays invisible, corroborating prior research on relational dissolution on social media (Carpenter & Tong, 2017; Peña & Brody, 2014). A major category of such avoidance involves political differences. While some participants mentioned engaging in debate

over social media content, most of our participants opted to avoid these topics altogether. Consequently, this avoidance is often what comes to participants' minds when asked about invisible use of social media information. When asked about confronting people about content posted on social media, Alex (G4) said:

I may have done that, maybe you know, like early on when I first joined in, I don't know, 2009 or something. But I think you kind of learn (laughs) like you know....a few- few gut punches and you're like, "Okay, that's enough of that."

Because of this strong preference to avoid discussing controversial topics, the majority of our participants kept their disagreements with social media contact invisible and subtle. However, the impact such disagreements had can be substantial for the relationship.

RQ2: Visible use of social media information in interpersonal communication.

My second RQ concerns the relational implications of visible use of social media information. With some exceptions, the visible use of social media information often has positive implications. Specifically, major themes of visible use for relational development include the initiation of "more personal" conversations from social media posts and the constant integration of social media information in everyday conversations. However, participants also brought up confronting people over disagreeable social media posts, which may have negative implications for the relationship. We discussed each of these themes below.

Initiation of "more personal" conversations from social media posts.

One of our interview questions ask participants about cases where they bring up or mention something that somebody posted on social media elsewhere. A common answer to this question is when people see noteworthy or significant posts on social media and opt to respond elsewhere instead. Responding outside of social media platform is widely considered to be more

“personal,” a word often used to describe how private communication is more meaningful compared to public social media communication. When prompted further about what makes a private response more personal, three key reasons emerged. First, as demonstrated in the quote below from Paige, sending a private response allows the sender to stand out instead of being one of the many people to respond.

A friend of mine...posted about her mom passing away. And instead of commenting on that and being one of 181 people commenting, I called her...Because I felt like that was a way more personal way to respond...than to add to the 180 comments.

Second, others also cited the visibility of comments as the reason why they refrain from this form of composed, yet public, response. In contrast, a private conversation offers more privacy and lends itself better to an extended conversation. In response to my question asking them to explain why reaching out was more “personal,” Rick, Mallory, and Vivi in G2 discussed:

Rick: I think for me, it's more personable because it's between the two of us, or whoever else I'm involving in the conversation...rather than it being posted publicly....

Mallory: Yeah, I feel the same. [For example], with my friend, that was moving back to town, I wanted to text her directly because now we're having a personal conversation. [She could] feel more safe to give me private details about what's happening, in comparison to expecting her to put all that information on a comment underneath her post for everyone to see.

Vivi: It's a conversation tool. If you just comment, you're just saying "That's nice." You're not necessarily expecting a response.

In other words, participants consider the initiation of a private conversation to be more personal because it begets an opportunity for extended exchanges that stays private from the public

settings of a masspersonal post. The privacy can allow for more intimate and vulnerable content to be shared. The gesture of switching to this private space further signals a willingness and desire to have this kind of intimate exchanges with another person, hence more “personal.”

Finally, given the capability to contact the post sharer in multiple ways, including social media or other platforms considered to be more personal, the choice to switch to another channel itself helps to signal the increased interest placed in the conversation, as Hailey (G6) explained how she felt when a friend from college messaged her to offer support:

Hailey: And she could have just put that on my Facebook post and commented it, right? But it would've gotten kind of buried in there and I would have kind of written it off probably....But because she sent it as a text message, it just seemed more valid. Like it was a more genuine offer of support.

Ari: I agreeYou have my phone number; you have my social media. Which do you choose to interact with me with? [Choosing the phone] to connect [makes] it like you really are one of my inner close group of friends across the social media networks.

In addition, participants expressed little hesitation over bringing up most things shared on social media. Given the public nature of social media, participants deemed content shared on social media to be fair game when it comes to discussion, except for clearly controversial topics such as politics. When asked about times when they did not enjoy having their own content brought up, most participants did not have an example of this scenario. Again, they reaffirmed that they would only share innocuous content on social media from the first place. As such, they did not anticipate or recall instances of negative references to their own social media content.

While this gesture of explicitly switching to a private platform in response to a private post can send a strong signal of interest in the person and the relationship, a few participants also

brought up that it may not always be appropriate when you are not as close to the person. For instance, in response to Paige's remark that she did not want to be one of the 181 people commenting on a friend's post about her mom passing away, Molly and others (G4) added:

Molly: I'm one of those 181 commenters saying "I'm so sorry for your loss."...A very small close-knit friend group, then I would reach out if it was one of them. But there's so many that were friends maybe at one time [and] it's been so many years that that's probably the platform I would take to [say something]

Paige: So you still want to acknowledge their loss or their happiness....but you wouldn't necessarily like, "Lemme look up their phone number on White Pages."

Constant connection via social media.

Beyond conversations prompted by noteworthy posts, our participants also described connecting on other channels over more mundane and quotidian social media content. These findings revealed the interweaving of social media information into everyday communication. They illustrate a seamless integration between content shared on social media with communication on other channels, known as channel blending (Isaacs et al., 2012), among close ties and also provide evidence for the ambient awareness among more distant ties (Krämer et al., 2017; Levordashka & Utz, 2016).

Channel blending among close ties with social media.

Focus group interviews surfaced many instances of channel blending involving social media—"the integration of interactions and content over multiple channels into one coherent conversation," a phenomenon surfaced by Isaacs et al. (2012) via observing and studying dyads and triads who communicate frequently (p. 617). My findings suggested that channel blending with social media happens in various different manners. For example, Jane (G3) and her husband

were able to spontaneously meet up with friends who learned they were at the same event thanks to her husband's Facebook post. Alex (G4) mentioned a routine where his friend would call him on the phone after seeing him post recipes on Facebook to ask about the dish, an extension of their communication pattern of sharing recipes to each other over text. Meanwhile, Michaelanne (G6) described using two channels at the same time by sending social media memes over messages while chatting on the phones. Finally, Nancy mentioned that she and her friends often arrange to attend events together after seeing one another RSVPing to events on Facebook. Across these disparate examples by our participants, a common theme emerges: among ties that communicate frequently, content from social media frequently traverses to other channels. Moreover, the content does not necessarily have to be noteworthy or important to show; rather, they can be more quotidian, ranging from recipe videos on Facebook to a funny selfie over Snapchat.

Ambient awareness over social media.

Ambient awareness was particularly pertinent when people bring up long distance ties. As people who are long distance do not communicate as often, social media updates help them fill in the blanks in between. For instance, Angela (G3) described how social media can be helpful for her relationships with her nieces and nephews:

[As my nieces have] grown up I've been able to kind of see what they've been involved with and so that's been nice. It's kind of keeping me connected to what's going on back homeAnd it does help me to have something to talk to them about....It kind of starts the conversationSometimes it's hard with a 12 year old.

Mallory from G2 echoed this sentiment:

I can have a better opportunity to keep up with my friends that I don't see very frequently and see things that are happening in their lives....In comparison to like, oh what do you remember that you did in the past six months? Can you tell me about how awesome it was or I can bring it up naturally [after seeing it on social media].

Similarly, for participants in our undergraduate groups G1, several mentioned that social media supported them in maintaining their connections and demonstrating their interests in staying in touch with high school friends as they transitioned to college. Besides the utility of this ambient awareness for distant ties, others mention that learning about hobbies or interests via social media may lead to them inviting these social media contacts to share in the interests:

I've definitely had experiences where people have posted about things which have led me to invite them to do activities....like fellow tabletop gaming where someone express interests in it....When it comes time to [look] for players or looking for people to bounce ideas off of, suddenly that person is someone I can reach out to. (Jean, G3)

Causing confrontation and friction.

While participants' discussion of visible use of social media information is largely positive, instances where such use has negative implications for relationships also came up with some of our participants. For example, people may switch to a private channel in order to confront someone about a political disagreement or to discuss a sensitive topic. (With that said, most participants said that they would choose not to confront when it comes to differences in opinion—a theme I discuss in RQ2.) The willingness to engage in discussion over differences in opinions was also more apparent among focus group participants in the younger age bracket (under 34). Even then, only a few people from these groups brought up directly discussing differences with others. Several people brought up a calculus of whether they want to invest in

the energy to engage in this discussion, which factors in things like how close they are to somebody or whether they think they can change the other person's mind, something identified in prior research (McLaughlin & Vitak, 2012).

sometimes I find myself stuck, like, do I wanna invest in the energy in arguing or coming to an understanding...and also knowing that's not my responsibility, at the end of the day, but like I also owe it to like, my community to do good in the world (Shiqing, G2)

I give it a scale of one to 10 where... if I talk with you, [is] this gonna change your mindset? (Ari – G6)

When they do engage in these sensitive conversations, however, participants described opting for a more private channel or a richer medium, where they are more confident that their words would not be misconstrued. Joey (G6) elaborated:

[Talking in private is] better than when you opening up to a large forum. Anyone can kind of interject and either misconstrue your words cause you know it is online...versus talking on the phone you can get something across or in person. It's better 'cause you can read facial signs and cues. (Joey – G6)

In other cases, discovering differences of opinions—as expressed on social media—can lead to fracture in the relationship. David from G1 described terminating an initially very positive relationship over differences discovered on Instagram:

I've actually stopped talking to someone because of [social media]. I met someone really nice. I spent a whole night with them, and then we exchanged Instagram. And literally we had opposite views on everything. So we stopped talking.

Similarly, Cindy (G6) distanced herself from former friends—including unfriending on Snapchat—when she saw them getting married or having kids, explaining that such choices

made their lifestyle too different from hers. Meanwhile, Andy from G3 said that people from his information security professionals community on Twitter can “get ostracized” or “lose respect” over Twitter postings that show them to be “really negative, terrible people.” From G1, Taylor and Robin also recounted instances of schoolmates getting in trouble over postings racist content on private social media platforms. These posts originated from private Instagram and Snapchat private Stories, which often have smaller and specified audiences. However, due to their incendiary nature, the posts were screenshot and spread widely over public networks. In both cases, the spread of such material caused serious relational repercussions for the sharers.

Discussion

Prior research demonstrates the various threads of how social media information can be used in interpersonal communication. My paper investigates when the use of social media information becomes visible in daily communication. Our findings revealed the mechanisms of how social media information functions at each primary steps of relationships: relational formation, relational maintenance, and relational dissolution. The numerous subtle, yet significant, manners of how information weave into and out of social media underscore the importance of a multi-channel approach in studying mixed media relationships—the default state of most interpersonal communication (Baym, 2015; Parks, 2017).

The role of social media information across relational phases.

Relational formation.

First, in relational formation, social media information functions *invisibly* as a screener of new ties. In this initial stage of relationships, social media can play an important role in facilitating the information seeking process (Fox et al., 2013; Lampe, Ellison, & Steinfield, 2006; Tokunaga & Gustafson, 2014). Social media platforms often contain information about others

that are highly public and persistent, allowing information seekers to sometimes browse years' worth of content (Schoenebeck et al., 2016). As such, the amount of information available on social media profiles may be more abundant than what someone may gather from a first face-to-face meeting or initial email exchanges (Bazarova & Choi, 2014). Moreover, given people's diverse media ideologies, information obtained from social media versus in-person could correspond to different aspects of someone's self-presentation and personality. For example, individual differences exist in whether people find social media appropriate outlets for political discussion (Chan, 2018). As a result, by adding someone on social media, people can sometimes see displays of political beliefs, which may or may not contribute favorably to the relationship.

Functioning as a screener, social media may accelerate the relational development of a relationship by providing more information and reducing uncertainty (Berger & Calabrese, 1975) but can also cause faster dissolution or distance. My participants recounted finding both positive and negative information about new ties on social media. Consistent with predicted outcome value theory (Sunnafrank, 1990), when they find a new tie's social media sharing to be favorable, such as shared interests and hobbies, such discovery could motivate them to seek out this person more. However, the opposite may happen, where they decide to terminate the relationship after discovering unfavorable information on social media, such as opposing political views.

Beyond relational formation, future research can look into the utility of social media as a screener during relational reconnection. Prior research identified relational reconnection—reactivating formerly active ties out of dormancy and maintaining this tie—to be an important and common function of social network sites (Ramirez Jr, Sumner, & Spinda, 2017). For example, three-fourths of the participants surveyed by Ramirez Jr et al. (2017) reported

reconnecting a relationship over social network sites. However, given the possible time lag prior to reconnection, these ties may have changed drastically compared to their last impressions of one another. As a result, beyond screening of new ties, social media can potentially serve as a screener for these former ties.

Relational maintenance.

Secondly, during the relational maintenance phase, social media information often functions *visibly* by spurring private conversations and providing ambient awareness of one's ties. The most striking difference between visible versus invisible use of social media information was how visible use is almost exclusively associated with relational maintenance. On social media, including the ones discussed by my participants, sharers often have ambiguous ideas about who are looking at their post due to the large volume of content shared on social media and ambiguous algorithmic curation of their feeds (Bucher, 2012; Eslami et al., 2015; Mosseri, 2019). As a result, responses visible to sharers—such as public liking—can serve a metacommunication purpose of signaling to sharers that somebody has viewed a post (Sumner et al., 2018). My findings revealed that when participants go beyond the one-click, or even composed comments, these types of visible responses could send stronger signals of investment in the relationship. Specifically, participants interpreted responses made via private messages or on other channels as more “personal” because the private channel allows for more intimate conversations. Moreover, the choice to opt for a private channel, in and of itself, carry weight in its symbolic meaning. These findings support the application of signaling theory (Donath, 2007) in understanding people's interpretation of communicative gestures on social media. Compared to a public response, switching to a private channel demands more effort and a willingness to engage in extended back-and-forth with the sharers. The choice to opt for a private channel thus

delivers a more reliable signal that the viewer is interested and invested in a relationship with the sharer.

Some participants also suggested that they are more likely to engage in these private conversations with closer ties. Accordingly, prior research on how people like to respond to negative news shared on social media affirmed that people are more likely to respond via private channels with stronger tie (Spottswood & Wohn, 2019; Ziegele & Reinecke, 2017). This is in line with prior findings in social media and relational maintenance scholarship, which underscores attention and effort as intrinsic to any type of response on social media (Triệu & Baym, 2020).

As people typically access internet, and consequently social media platforms, via their mobile phones (Auxier, Anderson, & Kumar, 2019), social media content thus enters the sphere of mobile communication (Campbell, 2020), which typically fosters a communication landscape of being permanently online – permanently connected (Vorderer, Krömer, & Schneider, 2016). This ethos of constantly having access to these platforms—along with a multitude of other communication channels such as text messaging, video chatting, or phone calling—thus gives rise to practices such as channel blending among close ties, identified in this study and also prior research. In other words, social media can support relational maintenance among close ties by giving additional information about one another or content for these ties to weave in their interactions on other channels (Isaacs et al., 2012). These pieces of content are often lightweight and quotidian, ranging from memes, a silly selfie, to an event RSVP. Indeed, the way my participants described the use of social media content bears resemblance to how WhatsApp users interviewed by O'Hara, Massimi, Harper, Rubens, and Morris (2014) enact “everyday dwelling”—a sense of being together and living together among those who are geographically

and emotionally close to each other—via this platform. Specifically, WhatsApp users described sending one another small tidbits of non-functional conversations over this application, creating “an ongoing weave of text and media-based tittle-tattle and ‘tosh’ with an emphasis on the phatic rather than the functional” (O’Hara et al., 2014).

Future research can investigate to what extent this form of additive communication contributes to relational development among strong ties. Although our participants enjoyed incorporating these bite-sized, lightweight pieces of content into their communication with strong ties, whether such addition makes a perceptible difference in the quality of their interaction with these ties is unclear. For example, without seeing each other’s silly selfies on Snapchat, a pair of strong ties may still have many things to converse about throughout the day.

Another salient theme of how social media information functions is via building ambient awareness (Krämer et al., 2017; Levordashka & Utz, 2016). As operationalized by Levordashka and Utz (2016), ambient awareness refers to familiarity with people in one’s social media networks thanks to the multitude of updates from these contacts coalescing together into an awareness of who they are. Levordashka and Utz (2016) did not distinguish between strong ties and weak ties in their study, which used survey questions to gauge ambient awareness on Twitter at a general, network level. Meanwhile, interviews and surveys conducted by Krämer et al. (2017) seem to target weaker ties as the beneficiary of ambient awareness, as they prompted participants to think about someone they have not talked to for a while and gauged participants’ ambient awareness of this person. Among my participants, the utility of ambient awareness is more obvious in more geographically or emotionally distant relationships, where people do not converse as frequently. Specifically, my participants suggested that the ambient awareness

provided over social media keeps them updated of these ties' lives and lubricates their interactions during their conversations, which happen infrequently.

Ambient awareness is positively associated with well-being, particularly for those low in social connectedness (Krämer et al., 2017). Future research can refine theories around ambient awareness to elucidate for which types of relationships and which communication scenarios ambient awareness can be most helpful. For example, if I reconnect and develop ambient awareness of my high school friends from 20 years ago, without ever meeting them in person or having directed communication with them, how useful would such awareness be?

Relational dissolution.

Finally, participants also recounted cases of developing negative implications of somebody due to social media information, which corresponds to the phase of relational dissolution. Here, the use of social media information tends to be covert. With some exceptions, the act of dissolution often happens quietly and without the other person knowing about it. When people do confront people over differences or problematic content on social media, they seem to favor doing so for closer relationships. According to predicted outcome value theory (Ramirez Jr, Sunnafrank, & Goei, 2010), people may sometimes choose to have difficult or unrewarding conversations, if they perceive the outcome of having these conversations as superior to not having these conversations at all. Among close ties, people may perceive that they may potentially influence their ties to shift their opinions and behaviors, whereas such attempts may be futile for weak ties. Moreover, relationships with close ties may be rewarding and can persist despite frictions, unlike with weaker ties.

In other cases, many of our participants cited a preference to avoid confrontation and drama as the reason for not being open about their disagreement with somebody. This is

supported by prior studies on relational distance on social media, where people favored invisible acts of dissolution (unfollowing or mute), as opposed to the visible act of unfriending (Carpenter & Tong, 2017; Peña & Brody, 2014; Pennington, 2020). These findings lend further support to predicted outcome value theory; some participants quickly and quietly decided to terminate the relationship when the information seen from social media suggested the outcome of the relationship to be negative and unfavorable (Ramirez Jr et al., 2010; Sunnafrank, 1986). The invisibility of such meaningful acts to the sharer affirms that this area of relational dissolution deserves more research attention to dissect the mechanism behind these behaviors. Moreover, it may also explain the lack of effects when it comes to social media and connectedness identified in recent meta-analyses and review papers, such as the small negative effect between digital technology use and adolescent well-being identified by Orben and Przybylski (2019).

Multichannel expansion of social media self-presentation.

The findings also highlight how expectancy violations may occur when somebody presents contradictory images of themselves across different platforms. Research on online dating suggests that a long period of online communication may have negative implications for the first in-person meeting, potentially due to daters developing an idealized—or hyperpersonal—image of each other (Ramirez Jr, Sumner, Fleuriet, & Cole, 2015). With the prevalence of communication technologies in general and social media in particular, people are constantly engaging in modality switches. Specifically, they constantly receive information from and communicate with their contacts on multiple platforms at once, and people may present different aspects of themselves across these platforms.

Communication channel—including social media platforms—rarely exist in a vacuum (Baym, 2015). With some of our participants, the combination of these platforms resulted in

expectancy violations (Burgoon, 1993), where they encountered content on social media about somebody that does not match their impression of that person elsewhere. Interestingly, this contrast can sometimes involve a socially desirable self-presentation on social media, which may differ from a less polished self-presentation in-person. Such discrepancy presumably speak to selective self-presentation processes on social media (Hogan, 2010). On social media, people have greater control over their self-presentation, as can be the case with computer-mediated communication (Walther, 2007): they have more time to curate their posts, edit their photos, or refine their wording. At the same time, they have to contend with affordances such as the persistence of social media content, where people can view something they posted anywhere from yesterday to six years ago (Schoenebeck et al., 2016). Moreover, contacts from various social circles, complete strangers, or even current employers can view such content, since they are often highly public. The co-presence of multiple social groups—termed context collapse (Marwick & boyd, 2011)—is hence at odds with how people typically like to present themselves, which is to only a specific audience at any particular time (Goffman, 1959). As a result, people may feel like they have to share only the positive highlights from their lives and to curate a socially-desirable image (Steers et al., 2014).

Self-presentation on social media can also invoke negative impression in other ways, such as via political differences. People’s media ideologies can vary widely (Gershon, 2010; Haimson et al., 2017). Although some people may consider private, cue-rich channels such as phone conversations or face-to-face interactions to be better-suited for sensitive political discussion, others may turn to social media as outlets for sharing opinion pieces or engaging in political debates. As a result, some participants were surprised by their ties’ political tones on social media, even though these ties refrain from political discussion in person.

Finally, even when people enjoy someone's sharing on social media, the sharers may be reluctant to embrace this enjoyment because of authenticity concerns. As highlighted by Brandon from this study, he could feel fully comfortable when people said they knew him from social media, because such image did not fully represent who he was. These findings further underscore the authenticity challenge associated with self-presentation on social media (Bayer et al., 2020; Reinecke & Trepte, 2014). More important, longitudinal investigations revealed that people with low well-being did not benefit as much from authenticity on social media and had a smaller chance of feeling authentic on social media (Reinecke & Trepte, 2014). The struggles for authenticity among users with low levels of well-being speak to how social media platforms often demand positive and socially desirable self-presentation, which may be less accessible for these users (Reinecke & Trepte, 2014). Indeed, people with lower self-esteem were more likely to project false selves on social media (Gil-Or, Levi-Belz, & Turel, 2015). Future studies should investigate the implications of multichannel self-presentation further and their implications for relational development. For example, researchers can probe into how these perceived contradictions in self-presentation can influence relational satisfaction. Given that users with low levels of well-being are more likely to engage in these inconsistent self-presentation practices, demonstrating the outcomes of such inconsistencies can provide beneficial insights into the implications of social media use.

Chapter 5: Conclusion

As social media platforms become an integral part of how people communicate with and learn about one another, understanding what people do with information seen on social media and how they respond to such information becomes integral to theorizing the implications of using these platforms. Moreover, these behaviors take on many forms and occur on numerous platforms outside of social media (Spottswood & Wohn, 2019), presenting exciting challenges to researchers (Parks, 2017). My dissertation tackles these challenges by first proposing the concept of **invisible responses**, defined as reactions to social media sharing by viewers that are invisible along any of the following dimensions: (1) to the original platform, (2) to the sharer, and (3) to the viewer's imagined audience of third parties. The dissertation continues to present three empirical studies to investigate the different dimensions of invisibility for invisible responses (Chapter 2, 3, & 4).

Study 1 (Chapter 2) examined viewing time and visible clicks while browsing Facebook feeds. While viewing time—a proxy for visual attention—is largely invisible, public feedback of clicks are visible to everyone. Study 1 reveals that the combination of these two types of responses along with feeds content can predict important well-being outcome, namely self-esteem. Study 2 (Chapter 3) explored how people practice self-presentation and relational maintenance in an environment where responses are invisible to third parties. The findings revealed that, given responses that are invisible to third parties, sharers feel lower self-presentational pressure. However, what remains unchanged compared to public feedback is the emphasis on the amount of attention and effort as signaling investment in a relationship. Finally,

Study 3 (Chapter 4) investigated when and why people would make their reception of a social media post invisible or not to the original sharer of the post. Once again, the findings underscored that choosing communication channels or approaches that signal greater attention and effort is a meaningful way to foster relational maintenance. Together, the studies in this dissertation illustrates the importance of invisible responses in understanding well-being and relational outcomes of social media use, as well as opening up future avenues for research.

Invisible Responses and Implications for Well-Being

The findings from this dissertation underscore that invisible responses are prevalent and play a critical role in determining whether social media platforms support well-being and relationship. A large body of scholarship has focused on the most visible type of responses: public feedback given on the platform that the sharer, third parties, and platforms can easily view and access (French & Bazarova, 2017; Hayes et al., 2016; Sumner et al., 2018). Understanding invisible responses, on the other hand, necessitates research that goes beyond the original platform and seeks the perspective of the viewer. Targeting this form of elusive response, the studies in my dissertation reveal how they can play a role in important well-being outcomes such as relational development and self-esteem.

In Chapter 2, we paired public clicks with an invisible response behavior—viewing time—to develop four engagement types with Facebook feeds: high viewing clickers, high viewing lurkers, low viewing clickers, and low viewing lurkers. Our findings demonstrates that, combined with measures of feed’s social content, engagement type predicted self-esteem. Specifically, for people with more social content on their feeds, high viewing clickers reported the lowest level of self-esteem. Social comparison mechanisms may explain these findings, where interacting with and viewing content for an extended period deepen social comparison

tendencies, ultimately leading to lower self-esteem. Moreover, as apparent from the literature on social comparison (Burke et al., 2020; Steers et al., 2014; Vogel et al., 2015; Yang, 2016) and self-presentation (Hogan, 2010; Toma, 2013; Ziegele & Reinecke, 2017), the content of feeds sharing is often a polished and highly curated version of somebody else's life. Spending extended time engaging with this kind of content can be maladaptive for self-esteem due to social comparison processes (Vogel et al., 2015).

Despite social mechanism processes, behaviors associated with the high viewing clickers engagement type may have favorable implications for relational development. Greater frequency of Twitter use was associated with more ambient awareness of one's Twitter network (Levordashka & Utz, 2016). Meanwhile, Krämer et al. (2017) identified a positive relationship between ambient awareness on Facebook and Facebook intensity—a measurement of frequency of Facebook use, emotional connection to the platform, and integration of this platform to daily activities (Ellison, Steinfield, & Lampe, 2007). Although it is unclear how the engagement types identified from Study 1 translate to Facebook intensity or use frequency, high viewing clickers may potentially acquire better ambient awareness of their network, considering their greater engagement. Higher levels of ambient awareness, in turn, are positively associated with greater well-being, especially for those low in social connectedness (Krämer et al., 2017).

However, there may be more substantive ways of engaging with content shared on social media beyond providing visible clicks. According to Study 2 and Study 3, participants consider private communication between only the viewer and the sharer, as initiated by social media content, as a particularly meaningful act for showing interest in relationship and supporting relational development. On social media platforms, it can be challenging to determine who, among your many contacts, is truly interested in your content and a relationship with you.

Signaling theory suggests that, in order to interpret a signal's reliability, people would consider how costly to produce or how difficult to fabricate that signal is (Donath, 2007). Extending this theory to relationships and social network sites, Donath (2007) argued that the cost in time or effort of a communicative act would signal someone's investment in a relationship.

The signals of relational investment approach to understanding social media communication would then suggest that more effortful forms of communication would communicate stronger signals of investment (Burke & Kraut, 2016; Ellison et al., 2014). A one-click reaction, or even a short comment, can be easy and almost effortless to create—rendering their signaling value to be lower. Indeed, Hayes et al. (2016) found devaluation of one-click responses to be widespread, since participants frequently gave out these click responses mindlessly, particularly on Facebook. In addition, Burke and Kraut (2016) found that of the amount of one-click communication (i.e. Likes and Pokes) received on Facebook from either strong ties or weak ties did *not* predict increases in well-being over a three month period. Rather, only targeted, composed communication (i.e. wall posts, comments, and private messages) received from strong ties predicted improvements in well-being (Burke & Kraut, 2016).

Findings from Study 3 indicated that participants are discounting the signaling value of even composed comments, citing the large number of comments some posts receive and the superficial content of such comments. Moreover, although Burke and Kraut (2016) classified comments and wall posts (currently known as Timeline posts) as forms of targeted information together with private messages, the visibility of comments and Timeline posts suggested that they should be a separate category from private communication. Participants from both Study 2 and Study 3 expressed discomfort at having extended conversations over such public channels,

especially for sensitive information such as asking about someone’s health or their home address for an upcoming move.

Meanwhile, entering a private messaging space with another person creates an opportunity and a more secure space for extended back-and-forth and intimate exchanges. For example, an experiment conducted by Bazarova (2012) showed that intimate disclosures made privately are judged as more appropriate than those made publicly. As such, these types of responses may be superior in supporting relational maintenance than one-click responses and even composed public comments. Prior studies showed that close ties are more likely to follow up about negative posts over private messages (Spottswood & Wohn, 2019; Ziegele & Reinecke, 2017). However, the causal direction of this relationship is unknown, and future research can continue to refine our understanding of the directions of these mechanisms. As glimpsed from Study 3, close ties may feel more comfortable initiating private conversations based on social media posts. However, ties who capitalize on social media to initiate private conversations can also foster stronger relationships with their network. In addition, future research can also examine the sharers’ perceptions if they were to receive these kinds of communication gestures from weak ties. Would they value these gestures and develop stronger relationships with weak ties? Or would they perceive them as inappropriate, souring their impression of the weak ties?

Visibility Management on Social Media

One reason for social media’s popularity and prevalence in our lives is undoubtedly their affordance of visibility—allowing content to be visible at scale otherwise impractical (Treem et al., 2020). Such emphasis on visibility on the platforms’ design help create lightweight and efficient ways of communicating, transferring, and gathering information (Leonardi, 2015; Treem & Leonardi, 2013). Nevertheless, as evidenced by each study of this dissertation, for

every turn towards visibility, people take steps to manage their privacy and protect their information by engaging in invisible response behaviors. Specifically, Study 1 demonstrates an independent relationship between clicking and viewing time, suggesting that people may spend a long time looking at content without leaving visible traces. In Study 2, the avoidance of visibility is clear in our participants' enjoyment of private responses to Stories sharing, as both sharers and viewers. Finally, findings from Study 3 elucidate numerous strategies around managing visibility, notably channel switching and silent relational distancing. Thus, behind each visible act by one person, numerous invisible acts exist.

Embedded within the concept of communication visibility theory (Treem et al., 2020) are actor's attempts to "make their communication more or less available, salient, or noticeable to others" (p. 46). Furthermore, Treem et al. (2020) proposed that future research investigate questions around how people manage their visibility on CMC channels. Given that large amount of information about someone is visible by default on online channels and sometimes to unintended audiences (Marwick & boyd, 2011), people need to enact strategies to manage their presentation online, meaning managing the visibility of their information. Drawing on this theory and from the three studies in my dissertation, I argue that the visibility management of information can at times be as important to understanding communication as the content of the information itself. In addition, in dissecting visibility management, researchers should consider: (a) to whom the activity is visible or not invisible and (b) why the viewer want the activity to be visible or invisible to that party.

In response to these questions, I present how findings from my dissertations illuminate that, in the context of interpersonal communication and social media, people primarily want to manage the visibility of their responses to the sharer themselves and an imagined audience of

third parties. In the following sections, I delve into each of these two entities and explicate why management of visibility is consequential in each case.

Managing visibility to an imagined audience of third parties.

My dissertation findings revealed common practices and desires among viewers to make their response invisible to third parties. Specifically, Study 2 showed that the lack of visibility to third parties fostered more extended, private conversations between sharers and viewers from public sharing. Meanwhile, Study 3 similarly showed that switching to private communication is a meaningful act of relational maintenance.

A key affordance of social media is the ability to make content visible to many entities at the same time (Treem et al., 2020). This visibility is particularly important for when people intend to share content to many contacts at the same time, since the mass announcement saves them the trouble of sharing individually (Haimson et al., 2017). However, even when a piece of information could possibly involve only two parties, such as one person commenting on another person's post, the design of these platforms is such that these activities might become massively visible. This mass visibility to third parties can stifle responses and discussion. For instance, when responding to a post seeking support, people may fear that others would judge their response to be too shallow and hence refrain from responding at all (Chang et al., 2018). For controversial topics such as political discussion, people may be comfortable discussing these topics privately with someone but hesitate to do so with the same person on a public channel (Chan, 2018; S. M. Jang, Lee, & Park, 2014; Liu, Rui, & Cui, 2017), given the many possible unintended audience for such a platform.

Consequently, the findings from my dissertation showed that the management of visibility to third parties can sometimes be a conscious decision that people deliberate in order to

respond appropriate to social media content. Specifically, in response to public posts on social media, participants from Study 3 frequently sought out avenues of responding privately to the sharer. People cited a desire to communicate in a more personal manner and to engage in extended conversations behind these acts—interpretations they hold as both senders and recipients of these gestures. In other words, beyond the content of the communication itself, the act of choosing a private space to respond shows greater investment in a relationship.

Although this dissertation, along with the literature (Chang et al., 2018; Ellison et al., 2020), surfaces many reasons by the viewers to conceal their response to sharing from third parties, including privacy risks and desire for more private and intimate conversations with sharers, visibility to third parties also has potential benefits. For example, Andalibi and Forte (2018) suggested that some women who suffered from pregnancy loss were encouraged to share about their loss—a stigmatized topic—on Facebook after seeing the positive responses given to other women sharing about the same topic. In addition, romantic couples can affirm their commitment to each other by going public with their relationships on social media, or going “Facebook official” (Fox et al., 2013). Moreover, even though visibility to third parties can make one vulnerable to the public gazes, the public gaze can also make people’s identity claims and self-presentation more reliable—according to warranting theory (DeAndrea, 2014; DeAndrea & Carpenter, 2018; Walther et al., 2009). Warranting theory argues that the more information about someone is immune to manipulation by that same person, the more reliable that information is (DeAndrea & Carpenter, 2018). When people share information about themselves publicly, they allow for the possibility that others can contribute or comment this information in similarly public forms—actions that the original sharer cannot control. For example, for somebody with 2,000 Twitter followers, a public post on Twitter, compared to private conversations on the same

platform, would be subjected to substantially greater public scrutiny or additional remarks from a large audience.

Future investigations can further explore how people manage visibility of their responses to imagined audiences of third parties. One potential practice that can enrich our understanding of third party visibility is how people employ technological feature to create a curated list of viewers. For example, Finstas, or “fake Instagram,” refer to a type of alternative Instagram account, where people deviate from the norms of social desirability and sharing highlight reels commonly reinforced on social media platforms (Taber & Whittaker, 2020; Xiao, Metaxa, Park, Karahalios, & Salehi, 2020). For these finstas, people often have a much more limited set of viewers, who are often close friends. Thus, what finstas represent are users’ attempt at restricting their imagined audience of third parties. Moreover, they also exemplify another form of relational practices on social media, where being invited to see someone’s Finsta signals greater depth in a relationship.

Managing visibility to the sharers.

Findings from this dissertation suggested that making visible one’s response to social media content to the original sharers is key to relational development. The role of making response visible to relational maintenance illuminates the importance of attention—along with discerning who to pay attention to and who is paying attention to one’s content—in the social media landscape. When people share to social media, they often do not know with certainty who is viewing their content (Bernstein et al., 2013; DeVito et al., 2017). On the other hand, the viewers, with some exceptions, can see content for as often and as long as they want without informing the sharers. Given these dynamics, if viewers want to communicate their interest in sharers’ content or in the sharers, they need to take action in response to the post in order to

deliver these messages. Without taking any visible action in response to someone's sharing, they will have no way of distinguishing themselves from someone who has not even seen the post or has any interest in the sharer.

Together with the literature on signaling theory (Donath, 2007) and signals of relational investment (Ellison et al., 2014) discussed above, findings from the three studies in this dissertation speak to the role of visibility management in interpreting attention and relational investment in social media. Indeed, the most significant distinction between use of social media information that is invisible versus visible to the original sharers identified from Study 3 is that between relational distance versus relational maintenance. Study 1 shows that visible clicks may not be a reliable indicator of time spent viewing content, a proxy for visual attention. Instead, there was no significant difference between time spent viewing clicked versus non-clicked posts. These findings show that people are spending a long time viewing posts without clicking on them. Second, people are also clicking on posts without spending longer than a few seconds viewing them. This would not be entirely surprising, given that people do give out likes out of social obligation (Hayes et al., 2016; Sumner et al., 2018), rather than an intrinsic enjoyment of the post. As mentioned by one of our participants from Study 3, even commenting—a composed communication more effortful than one-click response—would have made her only one of the 180 people to respond in such a way.

Participants from both Study 2 and Study 3 showed that social media users are highly cognizant of managing the visibility of their attention to somebody's content on social media. With Stories sharing, simply clicking on a post will communicate to the sharer that someone has seen their Stories. Given this technical feature, some participants from Study 2 ascribed the function attributed to one-click reaction—showing attention—to the act of viewing. For

example, after learning that his viewing is made visible during my interview with him, Mike said that he would revise his practice to no longer view Stories shared by people he did not care about. Similarly, participants in Study 3 described managing which posts to provide strong signals of interest to versus to ignore. Specifically, people may be more inclined to respond in a one-on-one channel to major news shared by a close tie. Meanwhile, participants described refraining from engaging with political posts, especially those expressing views incongruent with theirs. In addition, if participants can detect incompatibility with new acquaintances based on their social media screening, participants mentioned that they would silently decide to not pursue a friendship with this person and keep their screening furtive. In other words, people calibrate the visibility of their attention and interest in somebody's content to be reflective of their appreciation for or distaste of the content, and the level of attention made visible to the sharer is one way of viewers can signal their interpersonal interest to the sharers.

In conclusion, although the dissertation surfaced many forms of invisible actions, any act with an aim of supporting relational maintenance often involves visibility to the sharer. Without communicating attention to the sharer, the viewer cannot show their investment in the relationship. As such, we should also pay more attention to responses to the sharer beyond the original platform, because people see the transport of information as indicative of higher levels of effort and attention.

Methodological Engagement with Invisible Responses

As reflected in its name, studying invisible responses necessitates targeting behaviors that can be elusive to being captured and studied. Researchers of digital technologies have always contended with the challenges of studying people's behaviors on these platforms and the implications of their use (Boase, 2016; boyd & Crawford, 2012; Ellison, French, Litt, Sundar, &

Trieu, 2018; Ernala, Burke, Leavitt, & Ellison, 2020; Hampton, 2017; Hargittai & Sandvig, 2016; Junco, 2013; Vraga et al., 2016). Along each of the three dimensions of invisible responses, (1) platform, (2) sharer, and (3) imagined audience of third parties, we can have methods that address these behaviors and shortcomings associated with each of these methods. This dissertation provides an example of some of the methods needed to study these behaviors, employing a combination of behavioral data (click count and eye tracking measurements), self-reported survey data, interview data, and focus group data, across the three studies. Below, I review some common approaches to studying social media and response behaviors and comment on their strengths and weaknesses for capturing invisible responses.

Study 1 of this dissertation employed a combination of survey data and behavioral data obtained by observing and recording participants' behaviors as they used their own Facebook feeds. In this study, we were able to capture accurately the number of clicks generated by each participant and their interactions with each post. The use of eye tracking allowed us to document how long they looked at each post in millisecond unit. Meanwhile, by recording all of the posts that participants saw, we were able to measure the level of social content they saw with relative accuracy. These are all variables that participants may likely misreport if asked directly (Ernala et al., 2020; Junco, 2013; Vraga et al., 2016). More importantly, capturing these behaviors allowed us to assess the content of participants' feeds and develop classifications of engagement types that meaningfully predicted self-esteem outcomes. However, this study also encounters limitations of lab-based study, whereby the artificial settings of the lab may influence participants to behave differently from their typical behaviors in more natural settings.

The use of people's behavioral data in Study 1 demonstrates, on a much smaller scale, a major trend of social media research (boyd & Crawford, 2012; Hampton, 2017; Welles, 2016).

Via computing approaches or direct access to user data, researchers can study the behaviors of hundreds of thousands of users (e.g. Burke & Develin, 2016; Rajadesingan, Mahalingam, & Jurgens, 2019)—if not millions (e.g. Bond et al., 2012)—for their research. The strengths of data obtained from platform log data or recording of subjects' behaviors are that researchers can capture with high accuracy a substantial portion of users' behaviors on a platform and avoid certain pitfalls of self-reported data such as misreporting (Ernala et al., 2020). Compared to lab studies, the behaviors recorded occur during users' typical use of these platforms—offering insights into users' naturalistic behaviors. In the context of invisible responses, these approaches can be particularly powerful for recording more opaque behaviors such as private messaging (e.g. Burke & Develin, 2016), muting of content (Golbeck, 2012), or self-censorship of comments (Das & Kramer, 2013).

Nevertheless, relying on behavioral data on social media platforms alone leaves unknown many factors about invisible responses that may elucidate important theoretical mechanisms or causal directions—necessitating the addition of survey or experimental data (Boase, 2016). For example, they do not clue us into people's motivations behind actions: is someone's extended viewing time on a post sharing bad news suggestive of their sympathy for the sharer or of more perverse motivations (Ouwerkerk & Johnson, 2016), such as *schadenfreude*? In Study 1, attitudinal data such as whether seeing a post makes participants feel envious would greatly support our theorizing on social comparison and self-esteem. Moreover, data from a single platform fail to capture the full picture of people's relationships, given the multichannel nature of most relationships (Baym, 2015; Dienlin, Masur, & Trepte, 2017; Scissors & Gergle, 2013; Trieu & Ellison, 2018). In Study 3, our participants were able to triangulate their impression of

somebody across channels, which led them to conclude that some of their ties' self-presentations on social media were inauthentic.

Finally, purely quantitative measures may not clue us into edge cases (e.g. see Gilbert and Karahalios (2009) who used follow-up interviews to investigate errors in their quantitative models predicting tie strength via Facebook use) or an in-depth understanding of people's lived experiences. In these cases, qualitative approaches, such as interviews or focus groups as with this dissertation, can help provide contexts around people's invisible responses via generating thick descriptions from participants on a focused topic (Hesse-Biber & Leavy, 2010). The structure of these methods allows for more follow-up with participants and provides a more in-depth look at people's lived experiences. Thus, qualitative methods such as interview study can provide a thorough examination of a particular phenomenon via deep understanding of participants' perspectives (DeCoster & Lichtenstein, 2007). Sometimes, researchers also want to probe into behaviors that are ingrained in people's daily social media habits, such as the channel switching from Study 3, or normative behaviors across multiple users, as with McLaughlin and Vitak (2012) or Fox et al. (2013). In these cases, focus groups can be particularly powerful as a way to have participants invoke ideas in one another and spur discussion among participants themselves (Krueger & Casey, 2014). However, one trade-off for the rich findings derived from these qualitative methods is that they cannot address questions of causality or clarify complex relationships between multiple variables. For example, in Study 1, quantitative analyses allowed us to uncover interaction effects between engagement type and social content on feeds to predict self-esteem, while controlling for multiple factors such as Facebook network size, age, and gender.

Given the respective strengths and weaknesses of these methods, two principles become critical to researching invisible responses: a multi-channel perspective and complementary combination of qualitative and quantitative methods. First, given that communication between people often spans several channels (Baym et al., 2004; Dienlin et al., 2017; Haythornthwaite, 2005), with the channels being complementary of one another, we need a multichannel perspective to capture the full picture of the role and implications of platforms in relationships (Trieu & Ellison, 2018). Some participants from Study 3 highlighted how they viewed negatively inconsistencies between in-person versus social media self-presentation. Consequently, if somebody raves about their new job on social media but complains about the job in-person, their positive image on social media will backfire and create a negative impression, due to the discrepancy across different channels.

As hinted in the earlier discussion, quantitative and qualitative approaches, given their respective strengths and weaknesses, are suited to addressing different aspects of questions surrounding communication (DeCoster & Lichtenstein, 2007) and social media research. Scholars across a range of disciplines, including psychology, communication, information science, and public health, are interested in questions around implications of social media use. Reflecting these interdisciplinary interests, scholarship in this area spans both qualitative and quantitative methods, but studies incorporating both are less common. For invisible responses and their implications, such combination can provide particularly powerful explanations and theorizing on these behaviors. For example, to capture people's multichannel approach to communication and social media use, interviews and focus groups can provide thick descriptions of people's deliberations behind channel switching decisions (e.g. Scissors & Gergle, 2013; Zhao et al., 2016). Meanwhile, analyzing the outcomes of multichannel communication would require

quantitative approaches, such as longitudinal surveys (e.g. Dienlin et al., 2017). Even though it is possible to hypothesize about the outcomes of these behaviors by synthesizing across qualitative and quantitative studies in the literature, the conclusions we can make are less definitive given the differences in demographics, geographic locations, or points in time across disparate studies.

Limitations & Future Directions

Tie strength.

Given the focus on interpersonal relationships, this dissertation faces a limitation in not accounting for tie strength and differences across ties in communication patterns. Strong ties communicate with each other via more channels than weak ties, who may have only one single channels for interactions (Baym & Ledbetter, 2009; Caughlin & Sharabi, 2013; Haythornthwaite, 2005). This distinction suggests that, for strong ties, social media platforms play a different role from that of weak ties. As hinted from Study 3, strong ties may also be more willing to follow up on sharing from social media or confront one another over social media content.

On the other hand, when such gestures come from a strong tie, it may be less effective given the expectations between strong ties. For example, if I send a message to congratulate my sister on her job promotion, it may be an anticipated gesture and contribute little to our relationship. However, if a former colleague sends my sister a LinkedIn message on her promotion, it may be seen as an active effort to reach out and strengthen their relationship. In other words, social media may be of greater, or different, utility for weak ties than strong ties.

Moreover, the role of weak ties cannot be overstated for certain outcomes such as bridging social capital (Granovetter, 1973; Trieu, Bayer, Ellison, Schoenebeck, & Falk, 2017) or even social and emotional well-being (Sandstrom & Dunn, 2014). Moving forward, another approach to improve understanding of browsing behaviors is to look at how the receiving and

responding of social media sharing manifests differently for ties of varying strength and on multiple channels as well.

Measurements of relational development & interpretation of findings.

Another limitation of this dissertation is the lack of quantitative measurements of the interpersonal implications of social media. Study 2 and Study 3 surfaced several potential mechanisms for relational maintenance and distance via social media. For example, responding frequently to Stories may be predictive of greater relational satisfaction compared to public one-click reactions or comments: Stories responses are more likely to lead to extended, private conversations—better suited for relational development. Meanwhile, Study 3 suggested that people may be more willing to engage in confrontation over social media content with stronger ties. These are intriguing hypotheses that would contribute to our understanding of how social media behaviors can support well-being. However, both of these studies employed qualitative methods and a smaller sample size, as typical of these methods (Jensen, Christy, Gettings, & Lareau, 2013). As a result, the findings from this dissertation are largely limited to a cross-sectional capture of social media experiences. As such, future research can build on the findings identified here to test some of these hypotheses quantitatively. In particular, if researchers want to determine the causal effects of different types of invisible responses on relational development, longitudinal or experimental methods may be needed to observe changes over time or to confirm causality (Kraut & Burke, 2015).

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Appendix A. Focus Group Guide

Intro: 5 minutes

Hello everyone, thank you so much for taking the time to come to this focus group.

My name is Penny. I am a 5th year PhD candidate at the School of Information at the University of Michigan. For my research areas, I am interested in the role of social media in relationships, which is what our conversation will be about today.

This is [name redacted], who's a 2nd year Master student at the School of Information. She will help us take notes of the session today.

Could I have everyone go around to introduce their first names and what they do?

[wait for people to finish introducing themselves]

Thank you. Today, I am interested in learning about your experiences around using social media information in your personal relationships. That is, how you use social media with people you know: your friends, colleagues, partners, families etc.

We will ask you questions about your relationships. When you bring up someone, please describe that person with regard to the relationship you have with them--your friend, your romantic partner, your colleague etc. Please do not use their real names in order to protect their personal information.

In addition, the purpose of our conversation is to find out about each of your own opinions and experiences, so there is no right or wrong answers to our questions. Please feel free to express your individual perspectives, even if you may disagree among one another.

Please listen carefully to what each person has to say and refrain from using your phones, unless you absolutely have to. We are recording the session today, because we are very interested in what you have to say about the topic and want to make sure we don't miss anything. Be assured that your confidentiality will be protected, and nothing you say here will be linked back to your names. If we publish paper based on our conversations, your names will not be used. To protect everyone's privacy, please refrain from sharing what you learned about others in this focus group with people outside of this group.

Finally, as the moderator, I will be asking questions and guiding the conversation, but feel free to follow up on what any of the other participants say. Let's make this a conversation!

What are questions you have for me before we begin?

Warm - Up:

1. My first question is what are the social media platforms (can be more than one) that you use most often for the purposes of staying in touch with and communicating with other people? Please go one-by-one.
2. Can you briefly describe when and where you use these social media platforms throughout the day?

Explicit Reference:

For the following series of questions, we are interested in when information on social media is used outside of that platform. There are many ways this can happen.

Being Asked about Social Media Information:

1. Think about a time when someone mentioned or asked about something you posted on social media outside of that platform (for instance, text message or face-to-face)? How do you feel about that gesture?
2. Can you think of a time when this made you feel good? What happened?
3. Can you think of a time when this made you feel bad? What happened?
4. How do you think this helps or hurts your relationships?

Explicit Reference:

5. Now, I'd like you to think of a time when you mentioned or asked about something somebody posted on social media outside of that platform. For example, this may mean texting your friend about something they posted on Instagram.
 - a. Please describe that instance, including what was the information from social media, what kind of relationship you had with that person, and why did you bring up that piece of information?
6. Thinking of the different things that people post to social media:
 - a. Are there times that you intentionally respond to something in private or outside of social media because you didn't want to make your response public on the platform?
 - b. How does this compare to commenting on or liking the social media post?
7. With whom do you do this most often? Please describe with regard to your relationships with these people, not their names.
8. How do you think these gestures affect your relationships? For example, do they help or hurt the relationships?

Implicit Reference:

9. Now, to switch gears a little, I'd like you to think of a time when information you learn from social media influences your relationship or interaction with somebody, without them knowing about it.
 - a. Can you describe that instance?
 - b. How come they did not know about it?
10. Thinking of the different things people post to social media, what would you avoid bringing up with them?
11. When would you NOT want someone to know that you saw their social media post?
12. Are there times that you avoid responding to something on social media because you want to avoid other people seeing your response?
13. What are some differences between social media content that you would bring up with people versus things that you avoid bringing up?

Relational Development/Distance:

14. Did your opinion of someone improve because of what they post on social media?
How about decline?
15. Are there people whom you feel closer to because of what they post on social media?
16. Thinking of people you know or maybe yourself, do you know of anyone whose relationship took a bad turn or came to an end because of information shared on social media?
17. How about a relationship that improved because of social media, either your own relationship or people you know?

Ending Question:

18. Have we missed anything today when it comes to how social media information is used in everyday communication?

Table 1. Key Variables from Study 1

Key Variables	Sources of Data
Social content of feed	Content analysis of a random sample of posts from session
Click count	Content analysis of the entire session to identify all clicks
Attention to post	Eye tracking data
Attention selectivity	Eye tracking data
Self Esteem & Network Size	Survey data

Table 2. Regression analysis output for Study 1 - H1, and H2

Variables	Model 1
Engagement Type	
High Viewing Lurkers	-0.122 ($p = .558$)
Low Viewing Lurkers	0.012 ($p = .959$)
Low Viewing Clickers	0.105 ($p = .643$)
Feeds Social Content	-.00148 ($p = .994$)
Network Size	-.249 ($p = .228$)
Race	-0.048 ($p = .773$)
Gender (dummy variable: Male)	-0.147 ($p = .457$)
Age	0.236 ($p = .200$)
Adjusted R ²	.078

Table 3. Regression analysis output for Study 1 – H3

Variables	Model 3
Engagement Type	
High Viewing Lurkers	-.904 ($p = .230$)
Low Viewing Lurkers	-1.136 ($p = .058$)
Low Viewing Clickers	-1.053 ($p = .162$)
Feeds Social Content	-.977 ($p = .112$)
Network Size	-.230 ($p = .259$)
Engagement Type*Social Content	
ET: High Viewing Lurkers	.815 ($p = .299$)
ET: Low Viewing Lurkers	1.076 ($p = .037^*$)
ET: Low Viewing Clickers	1.338 ($p = .115$)
Race	.114 ($p = .507$)
Gender (dummy variable: Male)	-.168 ($p = .409$)
Age	.256 ($p = .149$)
Adjusted R ²	.163

Table 4. Participant information for Study 2

Pseudonym	Age	Gender	Occupation	Platform
Sara	21	M	Student/intern	Snapchat
M3gh@nn	28	W	Student	Instagram
Ashley	25	M	Chemist	Instagram
Bart	29	M	Research assistant, PhD student	Instagram
Diane	32	W	Researcher/intern	Instagram
Mike	26	M	Graduate student	Instagram
Iris	28	W	Librarian	Instagram, Snapchat
Naraic	36	M	Animal Technician	Snapchat
Sammus	32	W	Rapper, Producer, PhD Student	Instagram
Bryant	21	M	Computer engineer	Snapchat
Elizabeth	20	W	Student/intern	Snapchat
Amy	19	W	Student/intern	Instagram, Snapchat
David	20	M	Student/Intern	Snapchat
Jamie Bond	21	W	Student/intern	Snapchat
Sapphire	19	W	Student	Snapchat
Dmitri	20	M	Student/intern	Snapchat
Lan	19	W	Student/intern	Snapchat
Milo	20	M	Student/intern	Instagram, Snapchat
Junie	22	W	Student/intern	Instagram, Facebook
Elsa	20	W	Student/intern	Snapchat
Devin	20	M	Student/intern	Snapchat
Holly	20	W	Student/intern	Snapchat

Table 5. Participant information for Study 3

Pseudonyms	Group	Sites	Gender	Ethnicity	Age
Michaelanne	G6	1,3	W	W	18 - 25
Hailey	G6	1,2,4,3,5,10	W	W	18 - 25
Scott	G6	2,4	M	W	18 - 25
Solange	G6	1,2	W	B/AA	18 - 25
Cindy	G6	3,5,6	W	W	18 - 25
Joey	G6	1,2,4,3,5	M	W	18 - 25
Sarita	G6	1,2,3	W	W,A	18 - 25
Ari	G6	1,2,4,5	M	B/AA	18 - 25
Jake	G1	1,2,4,3,5,8	M	O	18 - 25 UG
Giselle	G1	1,2,3,5,7	W	A, L	18 - 25 UG
Robyn	G1	1,2,4,3,5	W	W, B/AA	18 - 25 UG
David	G1	2,3,5	M	W	18 - 25 UG
Quân	G1	1,2,3,5,8	M	A	18 - 25 UG
Tsubasa	G1	1,2,4,3	W	A	18 - 25 UG
Lindsay	G1	1,2,4,3,5	W	W	18 - 25 UG
Taylor	G1	1,2,4,3,5	W	W	18 - 25 UG
Rick	G2	2,4,5	M	W, AI/AN	26 - 34
Carla	G2	1,2,5	W	B/AA	26 - 34
Vivi	G2	1,2,3,5	W	A	26 - 34
Shiqing	G2	1,2,3,5	W	A	26 - 34
Brandon	G2	1,2,4,5	M	A	26 - 34
Nancy	G2	1,2,3	W	W	26 - 34
Rebecca	G2	1,2,4,5,8	W	W	26 - 34
Mallory	G2	1,2,4,3,5,7,9,13,14,15,16	W	W	26 - 34
East	G3	2,5,12	M	B/AA	35 - 44
Andy	G3	2,4,5	M	W, ME	35 - 44
Jean	G3	1,2,4,5	M	W	35 - 44
Dan	G3	1,2,4,5	M	W	35 - 44
Angela	G3	1,2,3,5,6,9,11	W	W	35 - 44
Brad	G3	1,2	M	W	35 - 44
Nicole	G3	2	W	W	35 - 44
Jane	G3	1,5	W	W	35 - 44
Elizabeth	G4	2,5	W	W	45 - 54

Paige	G4	1,2	W	W	45 - 54
Chris	G4	1,5	M	O	45 - 54
Alex	G4	1,2,3,5	M	W	45 - 54
Claire	G4	1,2,4,5	W	W	45 - 54
Molly	G4	1,2,4	W	W	45 - 54
Yan	G5	1,4,5	M	A	55-64
Savannah	G5	1,2,4,3	W	W	55-64
Maeve	G5	1,5	W	W	55-64
Gillian	G5	1,2	W	W	65-74
Michael	G5	1,5, 6	M	W	65-74

Social Media Sites:

1 = Facebook	5 = YouTube	9 = Pinterest	13 = Marco Polo
2 = Instagram	6 = LinkedIn	10 = FetLife	14 = Untappd
3 = Snapchat	7 = Reddit	11 = Strava	15 = Hoodreads
4 = Twitter	8 = TikTok	12 = Tumblr	16 = Nextdoor

Gender: W = Woman; M = Man

Race:

W = White

B/AA = Black or African American

A = Asian

ME = Middle Eastern

AI/AN: American Indian or Alaskan Native

O = Other

Figure 1. Sample eye-tracking output (with red dots indicating gaze)

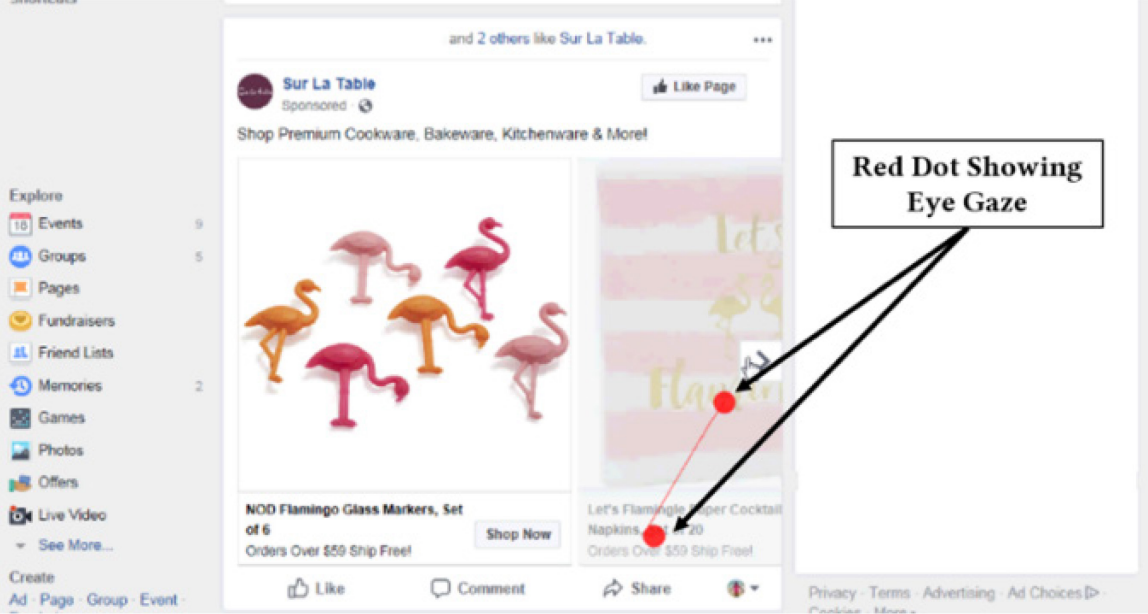


Figure 2. Two Way Interaction between Engagement Types and Social content

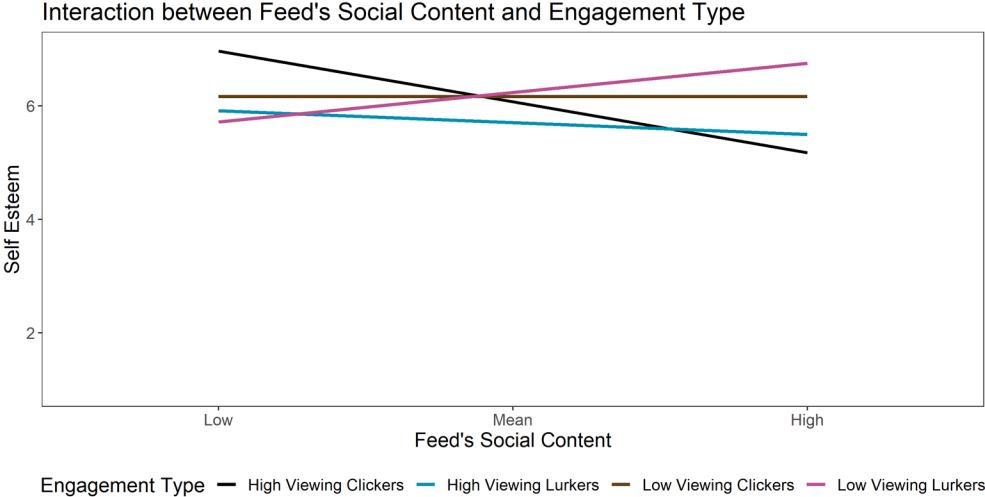


Figure 3. Highlighted circles signal that an Instagram user has a new Stories posting, which viewers click on to see (similar to Snapchat)

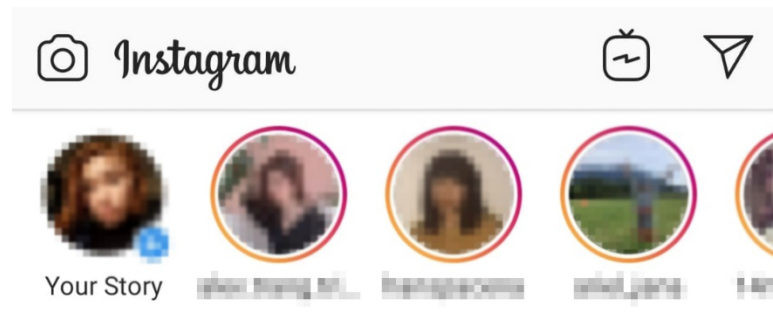


Figure 4. Snapchat Stories postings are displayed on phone's entire screen (similar to Instagram)

