# Automatic Archiving versus Default Deletion: What Snapchat Tells Us About Ephemerality in Design

**Bin Xu[1], Pamara Chang[2], Christopher L Welker[3], Natalya N. Bazarova[2], Dan Cosley[1]**
[1]Department of Information Science
[2]Department of Communication
[3]Department of Psychology
Cornell University
Ithaca NY 14850 USA
[bx55, pfc46, clw222, nnb8, drc44]@cornell.edu

**ABSTRACT**
Unlike most social media, where automatic archiving of data is the default, Snapchat defaults to ephemerality: deleting content shortly after it is viewed by a receiver. Interviews with 25 Snapchat users show that ephemerality plays a key role in shaping their practices. Along with friend-adding features that facilitate a network of mostly close relations, default deletion affords everyday, mundane talk and reduces self-consciousness while encouraging playful interaction. Further, although receivers can save content through screenshots, senders are notified; this selective saving with notification supports complex information norms that preserve the feel of ephemeral communication while supporting the capture of meaningful content. This dance of giving and taking, sharing and showing, and agency for both senders and receivers provides the basis for a rich design space of mechanisms, levels, and domains for ephemerality.

**Author Keywords**
Ephemerality; ownership; permanence; privacy

**ACM Classification Keywords**
H.5.3. Information interfaces and presentation (e.g., HCI): Group and Organization Interfaces;

**INTRODUCTION**
With the ongoing rapid drops in price for storage, including cloud technologies, retaining data has never been so easy. In most online systems, permanent data retention is the default. Our chat log is saved on Facebook Messenger, and when we post pictures in Instagram, they will stay there "forever." Besides its business value to the companies for modeling users' interests, such automatic archiving has useful features for users, supporting coordination, collaboration, reminiscing, and life-logging [5, 8, 23, 38].

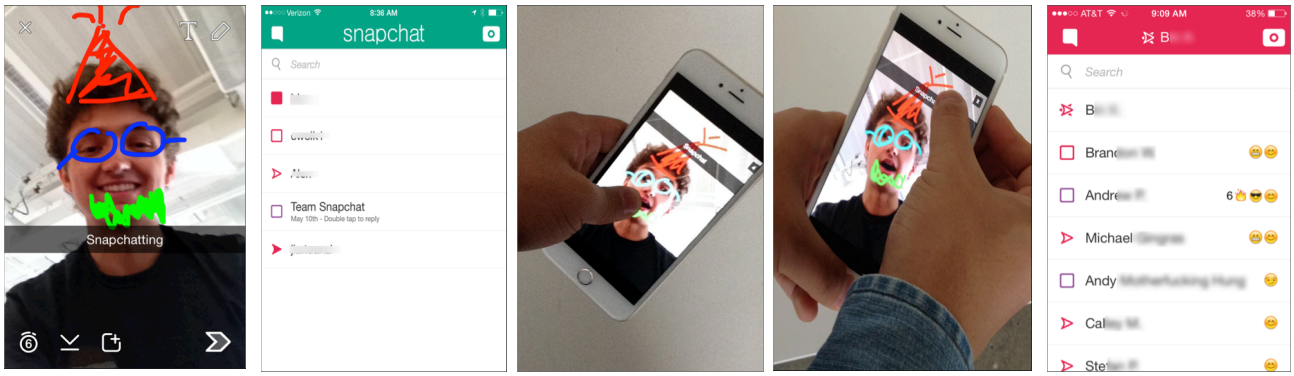
Automatic archiving also creates challenges. In particular, there are tensions between self-presentation and archiving, in part because systems might "exhibit" data in unintended ways [19]. Such older data can cause conflicts with the presentation of the current self and lead to serious issues and active work to remove data from the archive [43]. Studies of digital possessions also found that users need to actively decide what data to preserve and dispose of in order to maintain a meaningful collection of digital artifacts [29, 35]. Overall, automatic archiving requires active self-management about which data should be persistent.

**Ephemerality as an Alternative to Permanence**
Recent academic scholarship has used these challenges to call attention to the opposite of persistence: ephemerality. Bannon calls out *forgetting* as an important human activity and ability, arguing that HCI and ubiquitous computing researchers should think about when forgetting in systems is "a feature, not a bug" [1]. Mayer-Schönberger further argues that persistence of data without users' control can lead to serious personal consequences, both in terms of others' perceptions and their own ability to remember the past in ways that support their evolving personal and social needs [26].

Thus, a design alternative to automatic archiving arises: default deletion. Mayer-Schönberger proposed to let users set an expiration date for digital information [26], while Bannon proposed the notion of self-destructing data [1]—an idea realized in Chi et al.'s prototype "burning your memory away: a matchstick-like video recording and storage device that burns itself away after being used [6]." Here, rather than protecting future selves' identity, the idea is that scarcity has value: less available objects are more special [6, 7]. That prototype was never implemented,


CSCW '16, February 27-March 02, 2016, San Francisco, CA, USA

ACM 978-1-4503-3592-8/16/02 $15.00
DOI: http://dx.doi.org/10.1145/2818048.2819948




**(a)** **(b)** **(c)** **(d)** **(e)**

**Figure 1. Key Snapchat interface elements. (a) Users can take photos ("snaps") and draw on them or add captions. They can also set an expiration time in seconds, save a copy of the photo to the phone, or add the snap to their Story. (b) Receivers get notifications through their snap list, which shows unopened snaps, opened snaps, and sent snaps. (c) Receivers must hold the screen to view the snap; a countdown on the upper right corner shows when snap will be deleted. (d) Receivers can also take a screenshot while viewing the snap; here for example, by pressing the power button and home buttons of an iPhone. (e) When a screenshot is taken, senders are notified via their contact list (the arrow with three dots next to "B" at the top).**

although Odom et al. did build a device that provided limited access to past digital content and showed that in family life contexts such scarcity was seen as valuable [29].

These ideas have also percolated into industry, with tools like Snapchat, Wickr, and iDelete making data ephemeral through default deletion. Among these, Snapchat has grown quickly among younger users, and as of August 2014, is the third most popular social medium behind Facebook and Instagram [36]. The adoption of these systems suggests that people find real value in ephemeral communication.

In this study we explore this value, and how the affordance of default deletion supports it, by interviewing Snapchat users about their practices and goals in using the system. Their responses indicate much of the value of the system comes from its support of mundane, everyday conversation among close friends; ephemerality plays an integral role in this by preventing the accumulation of meaningless and potentially embarrassing content. This, in turn, affects self-presentation. With fears of inadvertent distribution reduced, behavior on Snapchat has less front-stage self-censorship and more "be-yourself" back-stage performance [14]: being fun, funny, informal, and interesting are key values that ephemerality affords. Still, sometimes both performances and particular mundane-but-meaningful moments are worth saving. People who receive content can capture it with screenshots, circumventing default deletion—but the system notifies senders when this happens. This selective saving with notification leads to a complex set of norms around what should be captured and shared, by and to whom. Taken together, these findings suggest both theoretical lenses for how ephemerality affects interaction and ideas for system designs that use it as a feature.

## THE DESIGN OF SNAPCHAT

To ground the discussion, we start with a brief overview of the Snapchat interface as of March 2015, focusing on elements that interview participants commonly mentioned.

Snapchat is a mobile application that can only be used on iOS and Android phones; there is no web or desktop version. Its core feature allows users to send pictures to other Snapchat users that they have added as friends. Users can only add friends by entering their Snapchat username or by searching through their mobile phone contacts for other Snapchat users. This design limits people's ability to add acquaintances, leading in general to smaller networks of closer friends than most other social media.

### Sending Snaps and Stories

When a user wants to send a picture to a friend (a *snap*), they use their phone camera to take a picture from inside the app: pictures stored in the phone can't be sent as a snap[1]. Senders then choose a receiver, and can optionally customize the snap by adding a brief caption or drawing on it (Figure 1a). They can also set the lifespan of a snap, how long the receiver has after opening it before the picture is automatically deleted, to between 1 and 10 seconds; the default is 10. Senders can also send a short video instead of a picture, although this is less common.

In addition to snaps sent to individuals, Snapchat also provides a Story function that allows users to send snaps to their whole network. Story snaps last for 24 hours—similar to the default expirations proposed by Mayer-Schönberger [26]—and any friend of the user can view the snap during

[1] Another interface named Chat allows users to send pictures saved in their phones, but it cannot be done in the Snap interface.

that time period. Stories, and notifications of Stories, live in a separate part of the app from person-to-person snaps.

Snapchat has other, less commonly used features, including Chat, Video Chat, Snapcash, Discover, and Our Story. Chat provides text messaging, but conversations disappear after users leave the chat. Video Chat allows users to video chat simultaneously. Snapcash permits users to send money to each other. Discover is similar to Stories, except that they are from news and entertainment companies like CNN; Our Story allows people to post snaps for location-based Stories that Snapchat curates.

### Receivers, Ephemerality, Deletion, and Selective Saving

Receivers are notified when they receive a snap individually or when someone posts a snap to a Story they follow. To see the snap, the receiver must press the notification icon and hold the screen for the duration of the snap (Figure 1c). After the sender-set time expires, the snap is deleted from the receiver's view and cannot be retrieved, much as in the burn your memory away idea [6].

However, this ephemerality is not absolute. Mobile phones can take screenshots, and although in Snapchat this is not easy because receivers must also hold the screen, it is possible (Figure 1d). In addition to being physically awkward, it can be socially awkward, because Snapchat detects the screenshot and notifies the sender (Figure 1e).

Summarizing the overview of the Snapchat interface, we see its ephemerality as strongly emphasizing the affordance of *default deletion*, while screenshots afford *selective saving with notification*. These affordances are quite different than other media, where persistence [5, 38] and permanence [39] typically afford recordability, reviewability, and replicability [8]. Thus, we would expect practices in Snapchat to be quite different than in other social media, and in fact a recent study identified one key difference of Snapchat is to allow people to "share the moments" with close relationships [2]. Our goal is to understand why and how this occurs, focusing on these affordances around deletion and selective saving.

## METHOD

Snapchat's ephemerality makes it difficult to collect actual message content; further, analyzing the content itself would give limited insight into users' perceptions of Snapchat affordances, their motivations for using Snapchat, and their subjective experiences with it. Thus, we chose to conduct a series of semi-structured interviews about people's Snapchat use and motivations.

### Participants

Participants were recruited from a large east coast U.S. university in Spring 2015. We chose college students because they are the most frequent Snapchat users. Participants were recruited through an online research recruiting system, and received either 2 experimental participation credits or $10 as compensation for their time. We recruited 25 Snapchat users, 8 male and 17 female, all aged 18-24, 60% Caucasian, 16% Asian, 12% South or Central American, 8% European, and 4% African-American.

### Data Analysis

Through a number of pilot interviews, we developed an interview guide that asked participants general questions about their Snapchat use, characteristics of their contacts on Snapchat, communication content and goals in Snapchat, comparisons of Snapchat to other tools and social media, and reflections on why and how they use Snapchat.

Interviews lasted from 28–54 minutes ($M$=42:31, SD=7:01). They were audio-recorded, transcribed verbatim, and edited to remove identifiers and other references that may identify the participants and/or anyone they mentioned during the interview. Each transcript was then numbered, and quotes are reported as (Pn) in the sections below.

After reading the transcripts multiple times to become acquainted with the data, transcripts were imported into the Dedoose qualitative data analysis tool and divided into meaningful units. Two of the authors then did a close reading of the transcripts while writing memos and identifying key themes, as a part of an open-coding process [35] in which we coded distinct concepts and categories in the data. The two authors met several times to discuss and reconcile these codes[2].

After open-coding, the two authors did axial coding where they examined relationships between key themes, to help refine categories as well as ensure a close association between participants' responses and emerging analyses. This axial coding process allowed us to organize and re-organize the codes based on the relationship between the codes and themes that connected them; in this process, we also drew on existing theories to inform the organization and interpretation of the themes. Lastly, we did selective coding [7, 35] to illuminate themes and organize the results.

## PRACTICES AROUND EPHEMERALITY IN SNAPCHAT

Four main themes emerged that were both connected to ephemerality and frequently mentioned by participants: the presence of more intimate networks; the prevalence of mundane communication with those close contacts; the reduction in self-consciousness in such communication; and the negotiation around saving what is normally ephemeral content. We discuss each in turn.

[2] Once the final codebook was set, two authors independently coded a random subsample of the interviews to determine interrater reliability. Cohen's kappa on the sample was .806

### Smaller, More Intimate Networks

Perhaps because people must have a screen name or phone number of another Snapchat user in order to be able to add this person as their contact, Snapchat contacts are closer on average than they are in most other media [2]: "*Facebook is a lot more acquaintances. Mostly people in my sorority that I'm not trying to be friends with, I think...Snapchat is more close friends and romantic interests. (P10)*". Snapchat contact networks are also much smaller in size: *"I only have 50 friends on Snapchat but on Facebook I have over 1,100 "friends," acquaintances… I use that as more of a networking site. (P1)"* These differences help shape the way participants saw Snapchat versus other channels:

*E-mails are for professors. E-mails are for presidents, vice presidents, or an e-board member that I do need to reach out to. E-mails are for a kid in the library or something. Text messages are for my family or my best friend who I can always reach out to. Text messages or calls you expect them to get back to you within hours, you know?...Snapchat is definitely for just my age group, especially ones who are close to me and who know me very well. Facebook is just for everyone else. (P16)*

Overall, participants use Snapchat for interacting with a select group of people, those with whom they are closely connected. As the above quote suggests, Snapchat is not the only way close relations connect, but is common: participants considered Snapchat as one of their most frequently used social applications on their mobile phones, along with Facebook, messaging tools like GroupMe and other social media like Instagram.

### Everyday Talk with Close Relationships

Compared to those tools, participants described Snapchat as particularly well-suited for everyday talk. The idea of everyday talk is closely related to "the mundane, everyday interaction between two partners" that constitutes a majority of offline conversations in daily life [9, 16]. Such talk takes many forms, but can be broadly classified into supragenres of superficial talk, informal talk, task talk, and deep talk [9, 40]. Participants described using Snapchat primarily for superficial and informal types of talk, types of talk that are associated with close relationships [16, 40].

Superficial talk refers to conversation focused on the discussion of topics of limited depth with the purpose of passing time. Examples of superficial talk include topics like current events, the weather, or a kind of talk to avoid being rude. Superficial talk on Snapchat can be a catalyst for initiating and maintaining connections:

*[Snapchat interactions mostly are] just one or two snaps back and forth, you see their face, you exchange a laugh even though it's not like personally … A little with just keeping connected but like I said before it's I think it's kind of on superficial level. (P11)*

Informal talk refers to conversation devoted to topics such as catching up on daily events, joking, and other light conversations between friends. Informal talk is also common in Snapchat: "*I don't know. I feel like texting is a bit more formal, where Snapchat … is a lot less formal like, "Oh, I sent you this." (P17)"*

Participants were much less likely to use Snapchat for kinds of talk that require more intense coordination or communication. Task talk refers to conversation regarding decision-making and instructions for accomplishing a task. Such talk occurs less on Snapchat than on text-messaging platforms like iMessage or GroupMe:

*I don't plan through Snapchat. I definitely do more plans through text, or GroupMe. Or, if I have a funny comment to say, I'll post it to the group. Mostly plans. (P18)*

Deep talk refers to conversations involving sharing problems, complaining, and having serious conversations about personal and important topics. Participants highlight the lack of deep talk on Snapchat and explain that most deep talk occurs in other systems like SMS: *"If something was actually wrong, someone would like, you would text someone about it versus snapchatting them about it. (P6)"*.

#### *Deletion Makes Space for the Mundane*

One reason for the prevalence of everyday, informal communication in Snapchat is that default deletion supports sharing mundane things. Knowing that content will disappear quickly gives people the license to share more than they would in a more 'permanent' medium:

*If I really think I look good on that day, I will send it to everyone. Snapchat is only five seconds long and I feel it's more acceptable than Facebook. (P16)*

Default deletion also matches well with the idea that not all digital possessions are equally worth saving [22, 24, 25, 30]. Some preserved digital objects are valuable for triggering reminiscence [22, 24], but in daily family life, digital objects are perceived as less salient [25]. This may be because much digital content has its primary value in the moment:

*I won't look back at someone's old photos. I don't do that frequently. I'm just interested in the moment and I don't care about it after I see it, so Facebook, I'm not going to look back on someone's old photos. A Snap story will go away. I don't really want to see it again. In a week from now I don't really care what someone did last weekend, but in the moment it's nice to see what they're doing. (P23)*

Automatic archiving takes up both device and mental resources [29]. People don't want to accumulate meaningless content in their digital collection, making Snapchat more appropriate than more permanent media for this sort of everyday talk: "*I wouldn't want all those*

*random pictures or messages taking memory space...it's a little overwhelming sometimes I guess. (P22)."*

It is also considered inappropriate to fill others' digital collections with less meaningful artifacts; Snapchat helps here because *"Snapchats only last for around ten seconds and then you can choose. If you found something really funny, you can choose to screenshot it and save it but for a Facebook post or a message, it lasts forever pretty much. It's always on the list of all the posts so it just can get a little overwhelming with the long long list of posts. (P22)"*

#### *Few Affordances for the Meaningful*

Default deletion also acts as a *constraint* to discourage more involved communication. It restricts archiving, which supports reference and grounding activities that are important to task talk and deep talk:

*I feel like, if I'm going to have like, a real conversation over text with someone, or like a more, a relatively more serious conversation or like, even organize or plan something. I'd rather do it over text, just because like, it's there to like, look back at. Or reference. (P06)*

Other Snapchat affordances also work against task and deep talk. Pictures are not seen as well-suited for the longer conversations that can accompany these kinds of talk: "*I usually won't have a long conversation through pictures. (P23)"*, and in the text accompanying pictures people "*only have space of one line to talk (P11)*".

#### *Mundaneness Supports Relationship Maintenance*

The relative prevalence of mundane talk points to the kinds of communication functions Snapchat supports best. In particular, mundane talk is important for maintaining close relationships because it helps to create a feeling of interactional co-presence [9, 16], even when partners are not physically co-present [33]. This type of talk enables people to implicitly participate in one another's lives and keep relational continuity [9]. The very occurrence of such talk, not only its content, can create a sense of connection and closeness, which can lead to deeper interpersonal relationships [36, 37]. Participants described using Snapchat for these connection functions:

*To inform others who you're with, where you are. To share information. To make someone laugh. Reconnect with somebody. It's easy for long distance to keep in touch with my friends from other schools, to keep them updated with what's going on without me having to take a lot of time out of my and explain what's new. (P23)*

The point about laughing is also important, as participants often described wanting to share fun, humor, or creativity, to make people laugh and "*smile throughout the day (P03)*". Sharing enjoyable content has value for both self and others, especially in close relationship contexts [13]. In Snapchat, mundane content like a funny face becomes a powerful vehicle to deliver these positive emotions.

*We have a thing where we send each other really really ugly faces and we'll do it a couple of minutes at a time, send each other time photos. That's really fun. (P08)*

Through sharing mundane content and funny everyday moments, these conversations support relational continuity, acting as "symbolic forces for creating, sustaining, and manifesting relationships" [9]. Ephemerality's support of mundane interaction and the friend adding interface that encourages people to articulate mainly close relationships work together to meet user goals of relationship maintenance:

*Snapchat is more like a convenient easy way to tell your really good friends what you're doing right now, quickly, easy, because they're your friends you care about it. (P14)*

### Performance with Less Self-consciousness

Sending ugly faces is an example of a more general theme that emerged, that Snapchat allows people to "*let [their] guard down (P02)"*. Concerns over self-presentation were less salient than in other communication tools:

*There are definitely things on Snapchat that people will video or take a picture of me that I wouldn't want on Instagram or Facebook. ... Especially Facebook, I want to take cute photos to make them think that I'm somewhat put together… (P10)*

We use Goffman's dramaturgical "front stage/back stage" metaphor [15] and Hogan's exhibition metaphor [19], which have been used to conceptualize self-presentation and image management in social media [42, 43], to better understand the relationship between affordances of Snapchat and users' goals.

#### *Letting Guard Down with Familiar Audiences*

Goffman conceptualizes self-presentation as a "front stage" performance for audiences where people selectively present themselves based on social norms, expectations, and audience preferences. In contrast, the "back stage" refers to a behavioral setting in which people rehearse what goes on a front stage and are comfortable lowering their guard. Developed for face-to-face interactions, the metaphor has been applied in social media with friends and followers playing the role of audience [3].

One factor that influences participants' lowered concern of self-presentation in Snapchat is the composition of a network. As discussed earlier, audiences in Snapchat are typically people they know well and who are specifically targeted for particular snaps: *"I feel a lot of self-presentation on Snapchat is like it's not as much a priority when you're just sending individual snaps to people just because the people I usually send to are people I'm really*

*comfortable with talking to and also the stuff I send is going to be gone after a while. (P8)"* In other media, audiences are much broader, leading to self-presentation concerns:

*Yeah, there's definitely things you put on Snapchat …and you might be a little drunk or something or just you wouldn't want that to be on Facebook for employers and family members. (P2)*

#### *Ephemerality Mitigates Long-term Exhibition Concerns*

Ephemerality also plays a key role in people's self-presentation, as indicated by P8's comment above that sent stuff disappears. The typical social media affordance of automatic archiving means that communication content, such as posting a status on Facebook, uploading a picture on Instagram, or writing a tweet on Twitter, will leave records in the system unless users intentionally delete them. Hogan distinguishes between ephemeral act and recorded act, and argues that digital traces also have presentation functions [19]. He uses an exhibition metaphor to make an ontological distinction: a performance in a strict sense is a real-time synchronous presentation of behaviors, while an exhibition is an asynchronous presentation of digital artifacts. The metaphor highlights that that system is usually in charge of the presentation situation, which incites fear of permanent display that leads to self-censorship at the performance phase [43]:

*Comparing it to Snapchat, I would say you need to be much more careful about how you use Facebook messenger than Snapchat, because, like, [on] Facebook stories, you can scroll through the log with everyone you ever talked to on Facebook, and look what was said. (P7)*

If we strictly abide by Hogan's definition of exhibition, all asynchronous viewing practices, including Snapchat, would be considered "exhibitions". However, several aspects of the design and use of Snapchat lead these exhibitions to be read as performances. First, even though the snap is viewed later, it is situated in sender's present status: "*[Snapchat] is just like I'm here right now, it's I'm doing this right now. (P14)"*. We argue that this is in part because pictures must be captured through the Snapchat interface and thus reflect current, situated activities [2], and in part because although people do view the snap asynchronously, the delay is often short because people tend to attend to snaps quickly: *"I check [Snapchat] periodically throughout the day …when I receive a snap chat, and then I'll send one back (P18)"*.

Second, default deletion makes Snapchat unlike most social media systems where users' content persists and other users might access it or the system might re-present it. Instead, the user has control of the display duration of the exhibition; the system enforces the user's decisions. This combination of short-term display and enhanced control is another factor that reduces self-consciousness:

*If it's for let's a boy you like, you don't want to send just a picture [through text messaging], because he's gonna have it and he's like oh, girl, if I look at it for a longer time, she doesn't look that—whatever, you know, but if it's Snapchat, you can even put like oh three seconds only and then they're oh and it's already gone. (P14)*

In this sense, the affordance of ephemerality makes Snapchat communication more similar to an ephemeral rather than a recorded act, and this expands people's range of potential performances. People described being at liberty to do things they might do in other situations, even face to face—*"When I'm Snapchatting my friends I would just make silly faces and break out of my own shell. Outside of my comfort zone. Whereas when I go out in regular clothes, interacting with regular people, I would keep it together (P16)."*—and even at their own expense, such as the "ugly faces" mentioned earlier. This level of freedom provides additional support for the kinds of everyday talk and relationally oriented communication described earlier.

At a theoretical level, Snapchat helps illuminate the boundary between performance and exhibition. The nature and duration of the content, along with the locus of control over presentation and audience, all help in shaping people's understanding and use of communication tools.

### To Screenshot or not to Screenshot: Selective Saving

So far we have focused on the ephemerality that is built into Snapchat by the default deletion affordance and how it influences people to enact mundane communication while lowering concerns of self-presentation. However, the potential for screenshotting in Snapchat clearly violates the promise of ephemerality and the sender's control over the interaction. Why, then, do people still largely behave as if the data were truly ephemeral?

One answer is that, because people recognize the value of the ephemerality and practices that we have described, the default norm is to not screenshot: *"Snapchat is to send things that get deleted, disappear after five, eight seconds. If you screenshot it then you defeat the purpose of it. (P24)"*. However, this norm is not absolute:

*If [the snap] is of some funny contents I took a snap of a funny poster, that's completely fine, or if it's something else that's funny or something's name, there's nothing they can do with that to cause any kind of harm or anything bad to the sender but as soon as it involves any kind of information that you wouldn't want someone else to have saved, then it's bad. …And then it also depends who does the snapshot. If it's one of your best friends and snapshots one of that, you're not really worried. But then if it's someone random, that's—by random I mean a friend that you're close with but not that close with, it doesn't, or someone that you're not even that friendly with, it doesn't make sense for them to Snapchat something personal to the sender. So then it's,*

*it would mostly require you to text them like yo, why'd you—you'll delete that, or why'd you snapshot that? Why'd you snapshot that? (P12)*

In this section, we unpack this norm, and the exceptions to it, through the lens of Nissenbaum's framework of contextual integrity [27]. Nissenbaum posits that norms are highly context-specific and that individuals move in and out of distinct contexts that pose different norms for information sharing. "Distribution," which refers to the movement or transfer of information between parties, is a key concern of these norms, influenced by three main forces: "actors (subject, sender, recipient), attributes (types of information), and transmission principles (constraints under which information flows) [28]."

#### *Ephemerality Drives the Default Norm: Don't*

The default deletion affordance leads to a key transmission principle that drives the no-screenshots norm: snaps are meant to be temporarily seen but not saved, in part because of the risk of distribution to third parties: "*If someone takes a Snapshot of my photo, then I can guess…that they'll most likely show it to someone else. (P23)"*

When this norm is violated and the receiver saves the information without the sender wanting them to, this violates the transmission principle. In response, participants often reported confronting the violator, which is also in line with the contextual integrity framework [27].

*I would confront the person, either text them or in person, just in a mature way say, 'It's really important to me that you delete that photo,' and hope that they delete it. (P23)*

However, ephemerality is not the only factor defining the context in terms of privacy management in Snapchat; in many cases screenshotting is allowed or even expected.

#### *Screenshots are for Closer Friends*

The main actors around screenshotting norms are senders and recipients, and the nature of their relationship helps determine whether the no-screenshotting norm applies. Participants reported that for the same snap, it would be okay for some contacts to take a screenshot but not others. Relationship closeness was the main criterion, because although on average Snapchat friends are close, not of all them are: "*I wouldn't screenshot if it was someone I was not close with. That's reserved for close friends (P10)."*

Other actors' factors, such as the gender of the sender and receiver, could also affect these norms:

*I would never screenshot something a boy sent me. That's weird, they're going to think I'm weird because I screenshotted it. (P10, Female)*

#### *Selective Saving is for Meaningful, Appropriate Content*

Participants also reported that content attributes influenced norms around screenshotting. In general, saving mundane content was inappropriate, even for close friends: *"If they're boring, just saying 'hello,' then I wouldn't have any use for screenshotting that. (P15)."* Instead, saved content should be *"out of the ordinary. Not just a picture of someone's face and hello. Either like a funny message or a cool picture... Something that you want to look at in the future (P15)."*

Thus, content with archival value was more likely to be fair game. This might include fun or creative content: "*I would [screenshot] a personal message if I thought it was funny, assuming that it's not super personal (P1)"*, or content that needed to be remembered later: *"if there's some information that probably should have been sent as an iMessage like a location or something then I would screenshot it just to remember it. (P22)."*

#### *Archival Value Versus Respecting Others' Rights*

Overall, these norms around screenshotting are generally aimed at balancing the value of saving with the potential for harm to the sender. When the potential for harm is high, as with personally revealing content[3], the norm is clearly not to share: "*If anyone sent me anything of them naked or something, I would never [screenshot] (P2)."*

Otherwise, as with P1 above, people weighed the value of the content with the concerns of the sender: *"another case is when someone sends … something you'd want to have at a later date, but not necessarily something that was unflattering to the person that was sending it, or anyone else. (P7)."* The fact that information could, in principle, be transmitted was in the back of people's minds:

*I feel like a lot of people will do that. Like send gross pictures because it's funny which I wouldn't do otherwise. So I guess that's kind of fun and you can send whatever. But you can also screenshot it so it's not that reassuring that they go away. (P25)*

#### *Granular Alignment of Affordances with Norms*

Still, Snapchat users walk this line and usually succeed. We believe this is because the affordances of Snapchat—default deletion and selective saving with notification—help people negotiate these values more seamlessly than in most systems.

For example, Hull et al. [20] applied the contextual integrity framework to analyze how Facebook's interface and access control features lead to privacy management issues. There, violations of norms happen most often in joint contexts, such as when a user shares a photo that also

[3] We did not see evidence supporting media critiques about Snapchat encouraging activities like sexting. Participants did not report any sexting in their use and stated that no-sexting is a norm for appropriate use of Snapchat, consistent with findings from a recent survey [34] and recent media reports.

has her friends in it. In this case, privacy concerns are not just with the person who shared the photo, but also with her friends, especially if they have been tagged by the photo owner. From the perspective of contextual integrity, distribution norms indicate that it is generally acceptable to share photos of one's social life with one's friends. However, tagging her friends and putting the photo on her newsfeed results in much wider revealing of information than the friends may expect. The problem is that although this could be perceived as a violation of expectancy, it is not clearly a violation of the norm of the system [20]—and this is hard to disentangle in a system like Facebook with design goals around sharing in social networks.

These kinds of situations can arise in Snapchat as well: photos may contain third parties—and, in fact, the distribution norms of Snapchat suggest these sometimes *should* be shared if those third parties would get value out of it: *"I think that's okay, in a basis that the person who screenshots that is showing the third person in order to prove something good about this person (P16)"*. But the norms that arise from default deletion mean that information about third parties disappears quickly unless there are real reasons to keep the photos and keeping them is unlikely to harm others.

These norms, combined with the directedness of snaps and the smaller networks in Snapchat versus Facebook, make the affordances and effects of information sharing much more transparent in Snapchat than Facebook. Ephemerality defines the default information flow, where sharing does not imply co-ownership, with the default of not to screenshot. If a receiver assumes ownership, which opens a possibility of transmitting it to others, the original owner is notified. In this sense, sharing and information flows are similar to face-to-face because of shared awareness around shared content: everyone knows who knows what. This translucence around ownership and transmission rules [10], plus its relatively direct mapping to the way people negotiate sharing information in face-to-face settings, helps explain why many people have adopted Snapchat to have frequent informal but personal communication with friends they have offline.

### Summary and Limitations

In this section, we presented our findings on communicative practices in Snapchat and how they are influenced by ephemerality: the co-existence of default deletion by the system and intentional archiving by users shapes social interaction, affecting users' motivation, self-consciousness, and privacy management behavior. Snapchat's ephemerality is perceived as less effective for formal conversations, so participants tend to share everyday, mundane talk for maintaining relationships. Default deletion is perceived to avoid unintended audiences and long-term exhibition of content, encouraging kinds of sharing rare in other social media. The closer contact network in Snapchat also encourages everyday talk and self-unconsciousness.

Note that, as Bayer et al. also did [2], we recruited college students at one university, and although several of our findings align well with theirs, it's possible that both studies are biased by this sampling strategy. In particular, several participants remarked about differences in use between college students and teenagers; younger users may think of risks and norms differently and studying this would be an interesting avenue for future work. Second, a few participants mentioned they used Snapchat differently with close friends versus romantic partners. Looking more closely at how perceptions and norms differ based on the specifics of particular relationships would be another interesting line of future work.

## DESIGNING EPHEMERALITY

Using Snapchat as a lens, our findings show how ephemerality and default deletion lead to different practices and values than most systems, which implement permanence. However, ephemerality is not new: most of our offline interactions are ephemeral. What is new is the intentional design choice of ephemerality in an era when persistence is common. By deleting messages quickly and automatically, Snapchat implements a straightforward notion of ephemerality. However, ephemerality is a nuanced concept that can be realized in many different ways. In this section we discuss three main dimensions: mechanisms for implementing ephemerality, degrees of ephemerality, and ephemerality not of content, but of articulated network ties.

### Mechanisms of Ephemerality: Interfaces vs. Data

Instead of deleting data, many systems make it essentially ephemeral through aspects of their interface design. For example, the reverse chronological scrolling of Facebook newsfeed interface makes it hard to retrieve old content. In other parts of the Facebook interface, the view is less ephemeral: Graph Search and Timelines both provide more access to past data [21]. However, because the newsfeed is the primary interface element, its *temporal limitation*-based ephemerality encourages people to perceive data that crosses beyond recent feed as "the past" and less interesting [43]. Temporal restrictions also play a role in increasing value and specialness in Odom et al.'s digital heirlooms work [29] and Chi et al.'s memory matchstick [6].

Another natural way to implement ephemerality—one that might align well with our experiences of older physical content—would be to degrade the precision of older data. This is sometimes proposed as a privacy-preserving mechanism in the database domain [12], but is largely un-explored in user interfaces. Gulotta et al. designed a series of prototypes that presented digital data as decaying over

time, with portions fading out or being literally replaced by their constituent bits [17]. In their context of digital legacy, participants were confounded by these interfaces, wondering why they would be appropriate—but in a design context where temporary showing has value, interfaces like this that make data permanent but limited start to make more sense. Snapchat, for instance, could choose to highly blur expired snaps rather than delete them entirely. This might better support the conveyance of connection and positive emotion that make everyday talk powerful for maintaining relationships, while still being a safe platform for performative communication that minimizes long-term worry about information leakage.

We can imagine other ways to implement ephemerality. Snapchat deletes snaps after one view: what about a system "You Only Live Twice" that affords viewing content a small number of times?[4] Would being able to preview the nature of the content, then review it once at leisure before it disappears, be helpful? Confusing? Redundant with screenshots? A more speculative idea would be to add an explicit cost for looking into the past, especially at data created by other people. Like YouTube, a system might ask people to watch a five second ad; many systems ask people to complete microtasks via captchas; a very popular business model for apps is to encourage purchases that increase one's access or capabilities (Candy Crush, anyone?). People might use these in ways that might help systems identify more meaningful older content; they might avoid them, which would in practice increase the ephemerality of systems; or might see them as the worst of worlds, where they can't view the past but future employers can. The point isn't that these particular ideas are good or bad; the point is that there is a large design space to explore around exhibition interfaces [19].

### Degrees of Ephemerality

Ephemerality can also be a matter of degree. In Snapchat, where ephemerality is implemented through default deletion, the range is fairly wide: person-to-person Snaps last less than 10 seconds, while snaps on stories last 24 hours. Even in the range of 1 to 10 seconds, people perceived differences: "*If you're putting a picture, don't make it 10 seconds long. I think that's annoying. I used to do 5 but now I'm down to 3 because even 3 seconds, that's a long time. No one's going to look at my picture for 3 seconds. (P25)*". Participants also reported setting very short times for particular snaps to indicate that they were not for screenshotting.

This raises the question of what the effect of ranges of time (or rates of blur, or cost) would be. When should a message

[4] Snapchat recently added a "replay" feature that allows users can replay an opened snap, but only once per day per user.

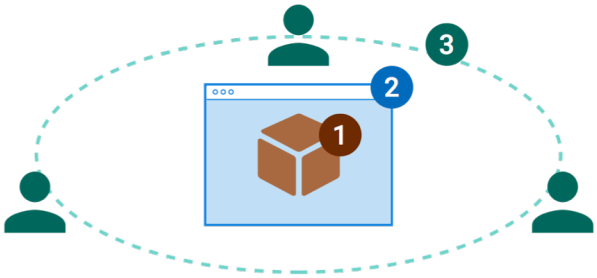



**Figure 2. Ephemerality as a nuanced concept can be realized in different dimensions, including (1) data ephemerality, (2) interface ephemerality and (3) contact/network ephemerality. Further, these are not binary choices, but matters of degree.**

disappear in one hour, one week, one month, or one year? What does that mean to users, and what kinds of content are appropriate for which lifespans? More generally, the idea of degrees of ephemerality, or fidelity, or access, might be a better fit for the way humans actually experience memory. Associations and details fade, while recall is altered by current circumstances and psychological needs [4]. To fully explore this space, not only prototyping and user studies are needed, but also theoretical work on psychological and sociological meanings of physical versus digital belongings, as well as human memory versus digital memory.

### Ephemeral Contacts and Other Spaces for Ephemerality

So far we have discussed ephemerality primarily around data, and in so doing assumed that contacts are permanent. However, in our daily life, contacts and networks are often not persistent but ephemeral, especially at the beginning. We might talk to strangers in social events like conferences, parties, and workplaces and build an acquaintance—but not interact with them until next we meet. Many people articulate these connections in networks like Facebook, Twitter, or LinkedIn. However, for all the reasons described earlier around exhibition, context collapse of large, diverse networks, and risks of unwanted information distribution, this can negatively affect people's ability to communicate on these networks. Further, this can lead to unwanted or inappropriate communication: imagine that a person you meet in a conference keeps sending you pictures about what she is doing—which Facebook actually affords, but which the focus on closer relationships in Snapchat largely avoids.

One potential solution is to bound the interaction by connecting only in relevant contexts, around relevant data and issues; here, ephemerality may play a role. Imagine a context-based social networking system where a digital connection (following, friending) only exists in the current context where the connection has meaning, and disappears outside of the context. Such a design may make the interactions in the current context more salient, and help people manage their audiences in Goffman's metaphor [15].

Facebook Groups and Google+ Circles offer these benefits, but in a persistent way that requires user effort.

Instead, systems might automatically create ephemeral networks or ephemeral connections to networks. Location-based networks such as YikYak demonstrate the potential value of ephemeral connection to a group. The automatic creation of networks or groups specific to locations, times, or events might more effectively support people's needs to both separate audiences and to communicate with them. For example, it might be interesting to have a "newsfeed view" of the people in a group, or at an event, to give members a glimpse into the lives of other members before, during, and perhaps after the event or task the group was created for.

Designing for contact ephemerality also raises questions of mechanism and extent. Should ephemeral contacts be deleted, de-emphasized, or hidden? When should the system do this: based on expiration time—for example, 1 day after the context is over—or based on interaction inactivity? And, as with saving meaningful content in Snapchat through screenshots, designing for ephemeral contacts should consider how to help people move ephemeral contacts to persistent, articulated ties. Some ephemeral interactions are associated with more permanent goals like relationship development, collaboration, and building social capital. For instance, a newly met acquaintance in a conference would be a potential future friend or collaborator, and we might want to save her as a permanent contact, at least at a certain point. Secondly, even in situations where networking goals are not salient initially, inadvertent but repeated interactions could be a foundation of social networking, as represented in the "everyday encounter" concept. Motorcyclists build a sense of community belonging based on traffic encounters on the road [11], and company employees tend to become online friends if they encounter each other more frequently in the workspace [41].

Thus, we argue that careful designs that help people articulate ephemeral contacts into permanent ones is important. Systems like Facebook and LinkedIn support this, but at a coarse level. What we emphasize here is designs that support the ephemeral stages that most relationships are developed from, and thus help people increase the value and reduce the problems that come from digitally articulating relationships.

## BE EPHEMERAL OR BE PERSISTENT: OWNING, GIVING, SHARING, SHOWING, AND TAKING

So far, we have focused on the value of ephemerality, addressing why people value it and how designers might achieve it. But we don't argue that we should all start to design for ephemerality and replace persistence as a system default. We see ephemerality as a feature, a property or a "materiality" of a system, which exists independent of users, but whether and how it works relies on its perceived utility, as seen and acted on by users. This is captured through the affordance perspective [14], which we use next to discuss theoretical implications of this tension between ephemerality and persistence that go beyond specific systems (which eventually become obsolete).

Previous research has shown that persistence affords recordability [18] and reviewability [8], which influence information sharing in an organizational context [38], the ability to pass on digital artifacts in families [29], and long-term exhibition of self on social media [19]. What does ephemerality afford in these processes? This question needs more study to have a clear answer; here we outline an ownership perspective for thinking about the role and nature of ephemerality in a given context.

In traditional media like text messages or email, the content generator is the original owner, and when she sends a message to a receiver, a digital copy is sent to the receiver's mailbox, SMS client, or other data repository. This *giving a copy of the object* makes the receiver also an owner of the object [32]. In data-persistent social media like Instagram, uploading a picture creates a data access point in the system's server. The picture uploader as the original owner *shares persistent access to the object* with others rather than giving them a digital copy. In this situation, it is not clear whether sharing access to the object also means *giving* (in Facebook, tagging a photo with someone who later accepts and puts the photo in her Timeline page is more like *giving*, though the original owner still has right to delete it, removing it from others' Timelines). As long as it is visible to others, however, they can *take a copy* anytime without letting the original sender know (for example, taking a screenshot of a picture in Facebook does not notify the original poster).

However, the flow is different in Snapchat. Here we point out a distinction between temporary access and persistent ownership. By default snaps disappear quickly for both the sender and receiver. Therefore in the default situation, both sides will have a very short *temporary access* to the data and neither has persistent ownership. Instead, the sender is just *showing* the data to the receiver. The sender can convert her temporary access to *persistent ownership* by saving the snap to her mobile phone memory. The receiver can also *take persistent ownership* and become an owner of their own copy by screenshotting the snap, though, unlike Facebook, the sender is notified that the receiver has become an owner.

Figure 3 illustrates how system features like copying, access control, and saving afford a number of different data distribution practices: giving ownership by sending a copy, sharing by granting persistent access, showing by granting temporary access, and taking ownership by saving

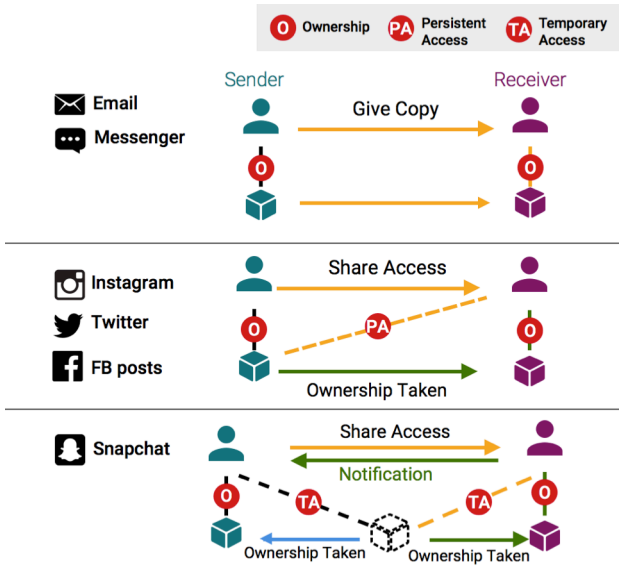



**Figure 3. In Email and SMS, the sender is the owner; sending a message creates a copy that gives the receiver ownership of the copy. In Instagram, or Facebook Wall, the uploader is the owner, who can share persistent access with the receiver. The receiver can take ownership of a copy of the digital object (e.g., save function, screenshots), but the sender is not notified. In Snapchat, the digital object is ephemeral, and both sender and receiver only have temporary access, unless they screenshot to take ownership and the sender is notified.**

accessible data. These practices have different values. For example, *showing* practices in Snapchat encourages mundane communication between close relationships, provides less pressure on self-presentation, and motivates users to perform for values they described such as being funny and interesting.

By highlighting sharing versus giving, temporary versus permanent, and receiver versus sender agency, Snapchat helps to both illustrate and ameliorate some of the issues Odom el al. unpack around the ownership of digital possessions [31]. Most such work around information sharing in social media focuses on the agency of the sender; Snapchat makes plain the space for receivers to take agency as well, leading to complex distributional norms around *taking ownership* by screenshotting. How these ideas translate to other contexts is an interesting direction for future work in both theory and design.

## CONCLUSION

To summarize our findings: first, ephemerality as instantiated in Snapchat has a number of effects on communication. Default deletion of content makes it easier to share everyday, mundane talk that is valuable in the moment for maintaining relationships but not worth saving. Knowing that content disappears by default also reduces self-consciousness in communication: with less need to worry about unintended audiences and long-term exhibition of content, people are freer to "let their guard down" and share creative, funny, even self-deprecating content they would hesitate to put on other social media. The fact that content disappears makes Snapchat less useful for task-oriented talk around coordination, information sharing, and "deep" kinds of relationship talk—further cementing it as a place for informal, everyday interaction. The fact that Snapchat's design leads to a network populated mostly with closer relationships also contributes to these findings around everyday talk and self-unconsciousness.

These effects of ephemerality persist despite the potential for screenshots, in which receivers come to own their own copy of content. This is because Snapchat notifies senders when the copy is made; such awareness supports nuanced norms around who is allowed to capture which data, and when, and leads to repair activities when norms are violated. The combination of default deletion and selective saving with notification raises a number of useful distinctions around ownership of digital content: the difference between sharing and showing information, and between senders giving and receivers taking ownership.

Finally, although default deletion is a big departure from automatic archiving, it only scratches the surface of how ephemerality might support users' goals and interactions. Designs might vary the duration, fidelity, and cost of accessing data, modifying either the data itself or views of the data. In addition, communication content is not the only domain that might benefit from ephemerality; group memberships and interpersonal relationships, too, might productively fade over time. Building on other work around ephemerality and digital possessions, this study helps to illuminate a rich design space for people and systems to work together in sharing data to support individual, platform, and social needs.

## ACKNOWLEDGMENTS

This work is supported in part by the National Science Foundation (IIS-0910664 and IIS-1405634). We acknowledge research assistance from Jessie Taft, Olivia Wherry, as well as helpful comments on previous versions of this document from three anonymous reviewers and the Associate Chair.

## REFERENCES

1. Liam J Bannon. 2006. Forgetting as a feature, not a bug: the duality of memory and implications for ubiquitous computing. CoDesign 2, 01 (2006), 3–15.
2. Joseph B. Bayer, Nicole Ellison, Sarita Y. Schoenebeck, Emily B. Falk. 2015. Sharing the Small Moments: Ephemeral Social Interaction on Snapchat. 65th Annual Conference of the International Communication Association (ICA) 2015.
3. Natalya N. Bazarova, Jessie G. Taft, Yoon Hyung Choi, and Dan Cosley. 2012. Managing impressions

and relationships on Facebook: Self-presentational and relational concerns revealed through the analysis of language style. Journal of Language and Social Psychology 32.2 (2012), 121-141.

4. Susan Bluck and Nicole Alea. 2002. Exploring the functions of autobiographical memory: Why do I remember the autumn. Critical advances in reminiscence work: From theory to application (2002), 61–75.
5. Alvan Bregman and C Haythornwaite. 2001. Radicals of presentation in persistent conversation. In Proceedings of the 34th Annual Hawaii International Conference on System Sciences. IEEE.
6. Pei-Yu Chi, Xiao Xiao, Keywon Chung, and Carnaven Chiu. 2009. Burn your memory away: one-time use video capture and storage device to encourage memory appreciation. In CHI'09 Extended Abstracts on Human Factors in Computing Systems. ACM, 2397–2406.
7. Robert B Cialdini. 1993. Influence: The psychology of persuasion. New York, Morrow. 1993.
8. Herbert H Clark and Susan E Brennan. 1991. Grounding in communication. Perspectives on Socially Shared Cognition 13, 1991 (1991), 127–149.
9. Steve Duck, Deborah J Rutt, Margaret H Hurst, and Heather Strejc. 1991. Some evident truths about conversations in everyday relationships: All communications are not created equal. Human Communication Research 18, 2 (1991), 228–267.
10. Thomas Erickson and Wendy A Kellogg. 2000. Social translucence: an approach to designing systems that support social processes. ACM Transactions on Computer-Human Interaction (TOCHI) 7, 1 (2000), 59–83.
11. Mattias Esbjörnsson, Oskar Juhlin, and Mattias Östergen. 2003. Motorcycling and social interaction: design for the enjoyment of brief traffic encounters. In Proceedings of the 2003 international ACM SIGGROUP conference on Supporting group work (GROUP '03). ACM, New York, NY, USA, 85–94. DOI=10.1145/958160.958174 http://doi.acm.org/10.1145/958160.958174
12. Benjamin C. M. Fung, Ke Wang, Rui Chen, and Philip S. Yu. 2010. Privacy-preserving data publishing: A survey of recent developments. ACM Comput. Surv. 42, 4, Article 14 (June 2010), 53 pages. DOI=10.1145/1749603.1749605 http://doi.acm.org/10.1145/1749603.1749605
13. Shelly L Gable, Harry T Reis, Emily A Impett, and Evan R Asher. 2004. What do you do when things go right? The intrapersonal and interpersonal benefits of sharing positive events. Journal of Personality and Social Psychology 87, 2 (2004), 228.
14. William W. Gaver. 1991. Technology affordances. In Proceedings of the SIGCHI conference on Human factors in computing systems. ACM, 1991. 79–84.
15. Erving Goffman. 1959. The presentation of self in everyday life. (1959).
16. Daena J Goldsmith and Leslie A Baxter. 1996. Constituting relationships in talk a taxonomy of speech events in social and personal relationships. Human Communication Research 23, 1 (1996), 87–114.
17. Rebecca Gulotta, William Odom, Jodi Forlizzi, and Haakon Faste. 2013. Digital artifacts as legacy: exploring the lifespan and value of digital data. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 1813–1822.
18. Jeffrey T Hancock, Catalina Toma, and Nicole Ellison. 2007. The truth about lying in online dating profiles. In Proceedings of the SIGCHI conference on Human factors in computing systems. ACM, 449–452.
19. Bernie Hogan. 2010. The presentation of self in the age of social media: Distinguishing performances and exhibitions online. Bulletin of Science, Technology & Society (2010).
20. Gordon Hull, Heather Richter Lipford, and Celine Latulipe. 2011. Contextual gaps: Privacy issues on Facebook. Ethics and Information Technology 13, 4 (2011), 289–302.
21. Anne Kaun, and Stiernstedt Fredrik. 2014. Facebook time: Technological and institutional affordances for media memories. New Media & Dociety 16, 7 (2014), 1154–1168.
22. David S Kirk and Abigail Sellen. 2010. On human remains: Values and practice in the home archiving of cherished objects. ACM Transactions on Computer-Human Interaction (TOCHI) 17, 3 (2010), 10.
23. Paul M Leonardi and Diane E Bailey. 2008. Transformational technologies and the creation of new work practices: Making implicit knowledge explicit in task-based offshoring. MIS Quarterly (2008), 411–436.
24. Michael Massimi and Ronald M Baecker. 2011. Dealing with death in design: developing systems for the bereaved. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 1001–1010.
25. Michael Massimi, William Odom, Richard Banks, and David Kirk. 2011. Matters of life and death: locating the end of life in lifespan-oriented HCI research. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 987–996.

26. Viktor Mayer-Schönberger. 2011. Delete: the virtue of forgetting in the digital age. Princeton University Press.
27. Helen Nissenbaum. 2009. Privacy in context: Technology, policy, and the integrity of social life. Stanford University Press.
28. Helen Nissenbaum. 2011. A contextual approach to privacy online. Daedalus 140, 4. 2011. 32–48.
29. William Odom, Richard Banks, David Kirk, Richard Harper, Siân Lindley, and Abigail Sellen. 2012. Technology heirlooms?: considerations for passing down and inheriting digital materials. In Proceedings of the SIGCHI Conference on Human Factors in computing systems. ACM, 337–346.
30. William Odom, James Pierce, Erik Stolterman, and Eli Blevis. 2009. Understanding why we preserve some things and discard others in the context of interaction design. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 1053–1062.
31. William Odom, Abi Sellen, Richard Harper, and Eno Thereska. 2012. Lost in translation: understanding the possession of digital things in the cloud. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '12). ACM, New York, NY, USA, 781–790. DOI=10.1145/2207676.2207789 http://doi.acm.org/10.1145/2207676.2207789
32. Sandra Petronio. 2012. Boundaries of privacy: Dialectics of disclosure. Suny Press.
33. Artemio Ramirez and Kathy Broneck. 2009. 'IM me': Instant messaging as relational maintenance and everyday communication. Journal of Social and Personal Relationships 26.2-3 (2009), 291-314.
34. Franziska Roesner, Gill T. Brian, and Tadayoshi Kohno. 2014. Sex, lies, or kittens? Investigating the use of snapchat's self-destructing messages. In Financial Cryptography and Data Security. Springer Berlin Heidelberg, 2014. 64–76.
35. Abigail J Sellen and Steve Whittaker. 2010. Beyond total capture: a constructive critique of lifelogging. Commun. ACM 53, 5 (2010), 70–77.
36. Stuart J. Sigman. 1991. Handling the Discontinuous Aspects of Continuous Social Relationships: Toward Research on the Persistence of Social Forms. Communication Theory 1, 2 (1991), 106-127.
37. Victoria Schwanda Sosik and Natalya N. Bazarova. 2014. Relational maintenance on social network sites: How Facebook communication predicts relational escalation. Computers in Human Behavior 35 (2014), 124–131.
38. Jeffrey W Treem and Paul M Leonardi. 2012. Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association. Communication Yearbook 36 (2012), 143–189.
39. Steve Whittaker. 2003. Theories and methods in mediated communication. The Handbook of Discourse Processes (2003), 243–286.
40. Scott Wright. 2012. From third place to third space: Everyday political talk in non-political online spaces. Javnost-the Public 19, 3 (2012), 5–20.
41. Bin Xu, Alvin Chin, Hao Wang, Lele Chang, Ke Zhang, Fangxi Yin, Hao Wang, Li Zhang. Physical Proximity and Online User Behavior in an Indoor Mobile Social Networking Application. In Proc. of the 4th IEEE International Conference on Cyber, Physical and Social Computing (CPSCom 2011), 273–282.
42. Xuan Zhao and Sian E Lindley. 2014. Curation through use: understanding the personal value of social media. In Proceedings of the 32nd annual ACM conference on Human factors in computing systems. ACM, 2431–2440.
43. Xuan Zhao, Niloufar Salehi, Sasha Naranjit, Sara Alwaalan, Stephen Voida, and Dan Cosley. 2013. The many faces of Facebook: Experiencing social media as performance, exhibition, and personal archive. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 1–10.