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Regrets, I've Had a Few: When Regretful Experiences Do (and Don't) Compel Users to Leave Facebook

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ABSTRACT

Previous work has explored regretful experiences on social media. In parallel, scholars have examined how people do not use social media. This paper aims to synthesize these two research areas and asks: Do regretful experiences on social media influence people to (consider) not using social media? How might this influence differ for different sorts of regretful experiences? We adopted a mixed methods approach, combining topic modeling, logistic regressions, and contingency analysis to analyze data from a web survey with a demographically representative sample of US internet users (n=515) focusing on their Facebook use. We found that experiences that arise because of users' own actions influence actual deactivation of their Facebook account, while experiences that arise because of others' actions lead to considerations of non-use. We discuss the implications of these findings for two theoretical areas of interest in HCI: individual agency in social media use and the networked dimensions of privacy.

Author Keywords
social media; Facebook; regret; non-use; privacy.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
Social media serve a variety of valuable functions. People use social media for keeping in touch with friends [20], forming social groups [25], cultivating social capital [30,31,32], facilitating social grooming [63], and receiving positive social feedback [15,68].

At the same time, social media use can also have a variety

of less positive impacts. Making personal information available online (however privately) has the potential for embarrassment [43,58], regret [67], loss of face [43], bullying [13], addiction [28] and inadvertent social consequences [21, 22]. Such events, in turn, may lead to or exacerbate mental health conditions such as depression or bipolar disorder [40]. The social dimensions of these experiences have a variety of forms, depending both on whose takes action (self or other) and who is the potential recipient of the harm (self or other).

Simultaneously, a parallel strand of research has explored the non-use of social media. Notably, researchers have studied social media refusal [27], voluntary disconnection [45], reversion and relapse [13], differences between users and non-users [2, 24], motivations behind non-use [6, 48], and different experiences of non-use [14]. One common theme inferred from these studies is that social media non-use is not a strictly binary either-or proposition [7, 8] but can take a variety of forms. This line of research expands our scope of inquiry to include those who do not directly use, but may still be in some relationship with, the technologies we study and design.

This paper explores the intersection of these two research areas. Specifically, we ask: *What is the relationship between different types of regretful experiences on social media and forms of social media non-use*? This coalescence of research areas provides an important contribution in at least two ways. First, the current literature on regrets is driven by narratives around privacy [43,66]. However, other aspects of regret, both in terms of causes and in terms of effects, warrant examination. Second, people derive important value from social media. Our results speak to issues about how people balance this value with potential harms from regretful experiences.

To answer these questions, we analyzed data from an online survey (n = 515) with a demographically representative sample of US Internet users employing a mixed computational-qualitative approach. Doing so allowed us to test how different types of regretful experiences relate to different forms of non-use. Our main findings are:

1. Using computational topic modeling [11], we identified two salient themes described in open-ended survey

responses about regretful experiences. One topic deals with *actions taken by the respondent* that cause regrets, while the other deals with *actions taken by others*, regardless of whom those actions impacted.

2. Second, we examined how the occurrence of each of these two themes in respondents' data predicts different forms of use and non-use. We find that those whose regretful experiences are associated with *their own actions* are more likely to have *actually deactivated* their Facebook account, while those whose regretful experiences are associated with *others' actions* are more likely only to have *considered deactivating* their account. Thus, *different sorts of negative experiences lead to different forms of non-use* on Facebook. This finding is corroborated by analysis of closed-ended responses in our survey data.

3. Finally, we make inferences about implications to two larger theoretical areas: (a) the role of individual agency in social media (non)use [54,70], and (b) expanding beyond the individual as the unit of privacy-aware behavior to more collective, social, or networked dimensions of privacy [12,35,36,42].

The rest of this paper is organized as follows. First, we summarize the current literature from two broad areas: harms that can arise from experiences and uses of social media, focusing particularly on regret, and the literature on social media non-use. Second, we describe our study design, data collection process, and mixed computational-qualitative analytic approach. Finally, we illustrate our main findings in greater detail and define how they contribute to existing HCI scholarship.

BACKGROUND
This section is divided into three broad areas. First, we review literature from social media that concentrates on regretful aspects of social media use. Second, we review literature on social media non-use that unpacks the different forms, modalities, experiences, and effects of not using social media. Finally, we explore how frameworks of privacy have been used to explain such phenomena and bring all three threads of literature together.

Regrets on Social Media
In contrast to much prior work examining the benefit of social media use [15,20,25,30,31,32,63,68], this paper focuses on potential harm from social media. Specifically, we focus on regretful experiences. Work in social psychology [51, 52] defines regret as "a negative emotion" and states that "regret feels bad because it implies a fault in personal action." Inherently, "self-blame is a component of regret." Studying regret is important because it can lead to depression and other mental conditions [52]. Such mental health issues have also become a recently important area of study in HCI [16].

The narrative around regretful experiences in HCI is dominated by privacy [21, 43, 59, 67]. That is, experiences become regretted because they involve perceptions of individual privacy violations, in line with the social psychology literature on regret [51].

In one seminal paper, Wang et al. [66] found that regretful experiences among Facebook users primarily occurred in four different ways: mismatches between desired and actual perceptions by others on Facebook, unanticipated social consequences, audience mismanagement (e.g. accidently sharing content to work colleagues that are more suitable for significant others), and highly emotional states while posting. Similarly, Patil et al. [43] studied (as part of a larger project) regrets in the context of location sharing by Foursquare users. They find that the three primary causes of regret are audience mismanagement, being caught lying, and dealing with an actual physical encounter after checking into its digital counterpart. Similarly, Sleeper et al. [58] found that, among Twitter users, primary causes of regret included audience mismanagement, cathartic/expressive tweets, and mismanagement of personal information. Thus, some commonalities emerge in characterization of regrets, particularly in terms of the audience's role.

Regretful experiences can subsequently impact the ways the people engage with and through social media. Wohn and Spottswood [69] studied adult Facebook users and found that regretful experiences can change the perception of ties between users depending upon the experience and its subsequent reactions. In another study, Sleeper et al. [59] found that negative experiences such as regret can lead users to reconsider how they use (or do not use) social media, but they did not study this interaction in great detail. Stern [60] studied a convenience sample of college students on Facebook and found that in that particular demographic, regretful experiences were more closely associated with self-presentation issues. While participants did not feel that these experiences represented their true self, they reported that these experiences had been valuable and had changed their online behavior in significant ways. Studying teenagers, Xie and Kang [72] similarly found that both frequency and differential patterns of social media (non) use were associated with regretful experiences. Kaur et al. [29] studied adolescents on Facebook and found that regretful experiences do influence how they use Facebook. However, they did not specifically focus on non-use.

In terms of non-use, Sleeper et al. [57] found that users would self-censor (i.e., avoid posting) certain content on Facebook if they felt that it would lead to future consequences, such as job or friendship loss. Moore and McElroy [38] studied undergraduates on Facebook and found that the Big 5 personality traits (other than openness) predict the level of regret for posting inappropriate Facebook content. Other work has linked personality with Facebook non-use [52], but connections among personality, regret, and non-use have not yet been examined.

To summarize, prior work on regret has focused primarily on the individual. This focus includes both individual

attributes (personality, emotional state, demographics, etc.) and individual actions (posting content, usage frequency, self-censoring, etc.). It is not just privacy but *personal* privacy that dominates [21, 43, 58, 66]. However, significant work has highlighted the social or networked dimensions of privacy [12,35,36,42]. Similarly, regret also deals with interpersonal relationships – audience perceptions and reactions, social tie strength, etc. Thus, we may benefit from considering networked dimensions of privacy in relation to social media regret.

Social Media and (Networked) Privacy

Research on privacy in HCI taken multifaceted approaches [12,35,41, 42]. One framework [41] conceptualizes privacy as a phenomenon where information exchange between two or more parties is mediated by common norms, perceptions, and contexts. A change in any of these usually constitutes a violation of privacy. Palen and Dourish [42] call for understanding privacy beyond the individual level and in the group or network level for an increasingly intertwined and connected world.

Recently, scholars have increasingly studied the social dimensions of privacy. Some call this networked privacy [12, 35]. Networked privacy aims to treat considerations of and decisions arising from privacy concerns as a network level phenomenon. What this means is conceptually simple – we all look at our friends' activities on social media at various times and for various purposes. This practice is known as a social surveillance [34]. Networked privacy suggests that we focus on concerns arising from social surveillance, which may manifest in different ways. For instance, my friends may post embarrassing pictures of me [34,35,36] on Facebook (without my permission). My friends' privacy settings may shape my audience as much as my own privacy settings do. I may observe my social media friends engaging in regretful behavior [12]. These types of phenomena have been well studied [64], and they represent an increasingly important area of work in HCI.

Social Media Non-Use

As noted above, there has been a growing trend in the non-use of social media, especially around Facebook [6,45,48]. Calls for non-use can take many different forms. For instance, in May 2010, a campaign called Quit Facebook Day [47] encouraged Facebook users to stop using the site and to delete their accounts. Another campaign called 99 Days of Freedom [1] involved a less permanent call to action. It asked Facebook users to stop using Facebook for 99 days and to publicly signal to their networks that they were taking part in this effort. Both campaigns elicited over 45,000 responses. Moreover, there has been a slow but steady increase in more general practices of social media refusal, digital detoxification, and voluntary disconnection from social media in recent years [27, 45]. Indeed, we have also seen a few instances of public figures or "internet famous" people taking publicized breaks from social media

(or from the entire Internet) for different periods of time ranging from 25 days [62] to a full year [37, 50].

These developments have been of particular interest to researchers in HCI [7,8,53]. Many studies compare users and non-users [2,24,32,53,61,63], try to understand the motivations behind why someone would choose not to use social or communication technologies [6,45,56], or explore the different modalities and experiences that non-use can entail [2,6,14,71].

Collectively, this work has identified certain traits that set various types of non-users apart. For instance, Tufekci [63] compares college students who use SNS and those who do not. She finds that users focus more on what she conceptualizes as the "expressive internet," which is inclusive of phenomena such as social grooming, self-presentation, and other social factors. In similar work using a more generalized sample, Stieger et al. [61] found that people who quit using Facebook tend to usually have higher privacy concerns, are liable to score higher on the Internet addiction scale [74], and tend to be more conscientious in their personalities. Lampe et al.[32] find that social capital among heavy Facebook users is higher than that among both light users and non-users.

It is also important to understand social media non-users' reasoning and motivations. For instance, non-use may (or may not) be a voluntary choice [54,70]. Non-use might also be a way to make a statement about one's political identity [45] or an attempt to make better decisions about one's privacy [6,48,61]. In some cases, it might be an intentionally short term break for socio-cultural or otherwise reasons [9,56] or perhaps an option which may be desirable but not (perceived as) viable [6].

Our survey of the existing literature on social media non-use identified no prior work examining potential relationships between regretful experiences and non-use. One might expect there to be relationships between these two phenomena, since regretful experiences are often related to privacy [21, 43, 59, 66], and social media non-use is often motivated by privacy concerns [6, 45, 61].

Summary

Synthesizing across this literature review, we come to the following conclusions:

1. People have regretful experiences on social media [66]. We know how people feel about and react to these experiences, but we do not know about the longer term repercussions of such experiences on social media.
2. Many of these regretful experiences are related to privacy. Prior work on regret has examined individual aspects, but less work has considered how the networked dimensions of privacy [65] may relate to regretful experiences.
3. As a result of regretful experiences, people may stop using social media. We have some hints that this might

happen [43] but we don't really have strong evidence of the ways in which it does.

This paper fills these gaps in the literature by asking the following research questions:

RQ1: How do regretful experiences on social media relate to social media non-use?

RQ2: What role is played by the interpersonal, networked dimension of regretful experiences?

METHODS
In this section, first, we describe the overall data collection process and IRB approval. Next, we briefly summarize the online survey design, concentrating on the parts directly relevant to this paper. Finally, we describe our participant recruitment and their demographics.

Survey Design
This section briefly describes the major sections in the survey, but it focuses on the questions analyzed for this paper. The survey included three groups of questions. First, a series of questions determined the type of user for each respondent. Specific to this study, we asked each user the following two questions described below. These particular questions are theoretically important (especially in relation to Facebook) and have been described and validated in prior work [6]. The number in square brackets after each yes/no represent the total counts of such users in our sample. The text embedded in angle brackets after each question are labels for simplicity in future references.

1. Have you ever *considered deactivating* your Facebook account (yes [128]/ no [60]) <*Considered*>
2. Have you ever *deactivated* your Facebook account? (yes [70]/ no [188]). <*Deactivated*>

Note that not every question was asked of every respondent. If a respondent has never had a Facebook account, it would be meaningless to ask if she has ever deactivated it. Similarly, asking a respondent who has actually deactivated her account whether or not she has considered deactivating it would provide little to no additional information. For the respondents who did see and respond to them, these questions allow for examining the difference between *thinking* about or considering non-use (i.e., deactivating one's Facebook account) and *actually* following through.

Second, existing, well-validated scales were used to measure four constructs that may influence types of non-use First, we used the well-known Facebook Intensity Scale (FBI) (8 items) [20] to assess the overall intensity of Facebook usage. Second, the Bergen Facebook Addiction Scale (BFAS) (18 items) [3] was used to capture the six main components of addiction on Facebook, i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse. Third, for questions around Facebook Privacy Behaviors and Experiences (PBE) (10 items), we drew upon Wang et al.'s [66] prompts for examining regretful experiences on Facebook as well as their relationship to

privacy-aware behavior. Finally, we also asked questions around demographics, namely age, gender, household income, marital status, ethnicity, education, and political views. We focused on PBE questions for this study as we didn't believe that FBI or BFAS were relevant for our RQs.

Third, the survey also included several open-ended, free-text response questions. Many of these involved expanding upon responses to closed-ended questions, described below.

For the analysis of these particular research questions, we focus on a portion of the PBE section (adapted from [66]). Three questions were asked to the respondent about regretful experiences (1) that she had because of her own actions, (2) that others had because of their own actions (and which she'd seen on social media), and (3) that she had because of others' actions. We term these as "Self", "Social" and "Networked" respectively. To reiterate, "Self" refers to regretting my own actions, usually posting content. "Social" refers to someone else regretting their own actions. Finally, "Networked" refers to regrets that I had because of someone else's actions. The constructs "Social" and "Networked" are often written about in networked privacy scholarship [12, 35]. Table 1 shows the wording of each question and provides further clarification.

Since the person taking action in the Self question differs from that in the Social and Networked questions, we expect that they will have differing impacts on different types of non-use. Furthermore, since the recipient of the harm in the Social and Networked questions differs, we expect that these two types of regretful experiences will also have differing impact on non-use. Since this is exploratory work, we are reluctant to construct formal hypotheses to describe these expectations but want to acknowledge our intuition behind our data analysis strategies.

Question	Construct	Explanation
Have **you** ever posted something that **you** regretted?	Self	Content that **I** posted about **myself**.
Do you know **someone else** who posted something **they** later regretted?	Social	Content that **someone else** posted about **themselves**
Has **someone else** posted something **about you** that they later regretted?	Networked	Content that **someone else** posted about **me**.

Table 1. Description of PBE Questions

If participants responded yes to one or more of these questions, one was selected at random, and respondents were asked "Please tell us a story about this experience." These open-ended questions generated substantial textual data. On an average, each participant wrote 2 sentences containing a total of 24 words. Overall, we collected 767 sentences with a total of 19,308 words.

Participants and Data Collection

To acquire a representative sample of US internet users, we contracted with a survey and sampling agency, Qualtrics, whose recruitment and sampling procedure is outlined on their website [46]. Qualtrics' staff assembled a web panel of participants using demographic criteria derived in part from Pew's omnibus internet survey [44]. The demographic screening criteria used included gender, race/ethnicity, age, and income. At the beginning of the survey, demographic questions were used to screen respondents. For example, once we received 89 respondents age 25-34 (i.e., 17.8% of our target sample size of 500 respondents), age was used as a screening criterion for subsequent respondents, such that respondents in the age 25-34 did not pass the age criterion. Respondents who did not pass any of the screening criteria were excluded.

Recruitment continued until we had accumulated sufficient numbers of respondents for each demographic category. Ultimately, we collected a web panel of 515 participants, for which we paid $2,750. Of them, 379 participants either currently have or previously had a Facebook account.

ANALYSIS AND RESULTS

The analysis here takes a mixed methods approach. First, we start with a simple 3 x 2 contingency analysis, calculating the proportions for each type of regret (Self, Social, and Networked) versus each form of non-use (Deactivated, Considered). Second, we apply topic modeling [11] to analyze the free-text survey data. Finally, we use binary logistic regression to link these computationally identified topics about regret with forms of non-use.

The results show not only that experiences of regret increase the likelihood of non-use, but that different types of regret are more strongly associated with different forms of non-use. In short, we find that the three-way distinction among Self, Social, and Networked collapses to a two-way distinction between self-action and other-action. What matters is who takes action, *regardless* of whether the person feeling regret is the respondent or someone else.

**Different Types of Regret Predict Different Forms of Non-Use**

First, we consider the varying relationships between each type of regretful experience about which we asked (Self, Social, and Networked) and different forms of non-use. To do so, we first compared whether the respondent indicated that she had undergone each of the three types of privacy experiences against whether the respondent had actually deactivated her Facebook account. Figure 1 presents a visualization of this contingency table analysis. Of those respondents who indicated having Self type regret experiences, 33.7% deactivated their account. However, for those who indicated having Social type regret experiences, only 25% deactivated their account. Similarly, of those who indicated having Networked type regret experiences, only

22.7% deactivated their account. This difference is significant (Pearson's χ^2=0.404, p=<0.001).
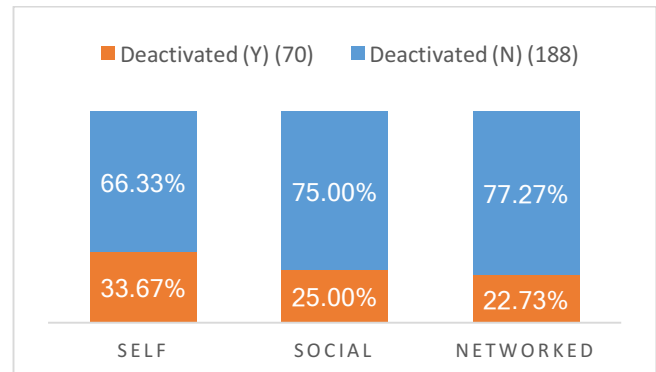
Figure 1: Deactivation is predicted by Self type of regret. The difference between Social and Networked regret is not statistically significant.

When comparing regretful experiences against whether the respondent had *considered* deactivating her Facebook account, a similar but opposite trend occurs. Self type regret experiences lead to slightly higher considered of deactivation (34.7%) than actual deactivation (33.67%). However, Social type regret experiences and Networked type regret experiences lead to much higher rates of considering deactivation (38.3% and 39.6%, respectively) than actual deactivation (25.0% and 22.7%, respectively). Figure 2 visualizes the relevant contingency table. Again, the difference among the three types of regret experiences is significant (Pearson's χ^2=0.398, p=<0.001).
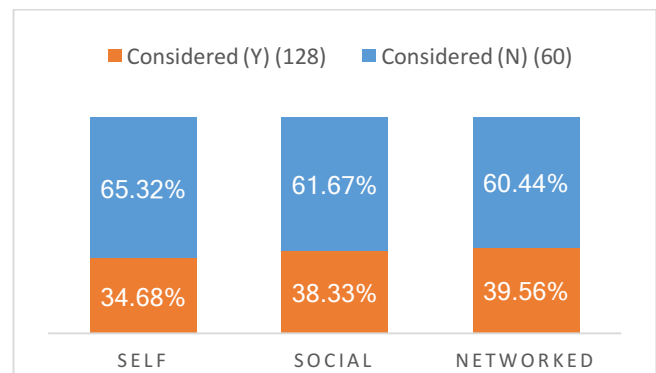
Figure 2: Consideration of deactivation predicted by Social and Networked regret. There is no significant difference between the proportions of "Social" and "Networked".

These results provide evidence that who experiences regret is not as influential as who took action to cause someone regret.

Topic Modeling and Qualitative Analysis: From Three Types of Regrets to Two Types

In recent HCI scholarship, topic modeling [11] has become a popular method [16, 17] to analyze large scale qualitative data. Briefly, topic modeling is an unsupervised approach that takes as input a collection of unlabeled documents (such as survey responses [55]) and identifies a number of

underlying themes or "topics." Topic models represent each topic as a probability distribution of words that deal with that topic. Documents are represented a combination of topics in different proportions. Topic modeling algorithms attempt to infer these underlying topics from a set of unlabeled documents. Despite omitting word order, syntax, and other structural relationships, resultant topics often capture recognizable themes surprisingly well.

When applied to free-text survey responses, we can think of automatically extracted topics as "codes" that have been assigned by an algorithm rather than by human coders. Although it forgoes the linguistic and contextual knowledge of human coders, in return this approach provides a much more scalable means of analyzing large data sets.

Recent work [9, 10, 26, 39] has also advocated for combining topic modeling and related computational approaches with close qualitative reading. Thus, the work presented here uses statistical topic models, specifically Latent Dirichlet Allocation (LDA) models [11], combined with a close qualitative reading. For each topic, we inspect the top 20 words most likely to occur in documents about that topic, as well as the 50 documents (i.e., survey responses) that have the highest proportion of that topic. Doing so allows us to regain some of the human contextual knowledge often given up in topic modeling analysis.

Text Processing: Obtaining Stable Topic Models
In our analysis, each free-text response is treated as a single document. Of the three possible yes/no questions about regret (from Table 1), 100% of the participants responded yes to at least one, 62% responded yes to at least two, and 37% responded yes to all three. To reiterate, each participant wrote a free-text elaboration for only one of these questions (randomly chosen if multiple questions were answered "yes"). This leaves a total of 379 documents, one for each respondent.

We split each document into a series of tokens (words separated by punctuation and/or whitespace) and changed all the words to lowercase. In line with existing best practice on topic modeling, we removed all stopwords [33], i.e., a small set of high frequency determiners, conjunctions, and prepositions (e.g. "the", "and", "for"). Note that, because of our focus on personal and social experiences, the stopword list did not include common pronouns, such as "I", "you," "we," or "they."

We used LDA [11] to train topic models over our entire textual corpus. LDA is an approximate algorithm and can produce different results based on different initializations. Thus, we ran 10 independent instances of LDA with a consistent number of starting topics (n=5), thereby generating 10 different topic model solutions. The number of topics was chosen after experimenting with anywhere between 2 and 10 topics. We manually examined the top 100 words of each topic for each solution to determine which topics were essentially distributions of the same

words with small variations attributable to the different random initializations. We excluded all topics that exhibited more than 50% variation in word distribution across different solutions. At the end of this process, which closely resembles that used by [9], we obtained two stable topics.

For the two stable topics, we used a close qualitative inspection to understand what each topic was about. Doing so involved examining the top 50 most representative responses for each topic, i.e., the 50 documents with the highest proportion of that topic. The following two subsections provide, for each of the two stable topics, the top 20 most probable words in documents about that topic. These are followed by a selection of 5 representative responses (with each one's rank in terms of topic score) selected based on our close qualitative reading. Finally, we also assigned a high-level topic descriptor (Other-Action and Self-Action) for each topic for reference and simplicity.

Topic: Other-Action
Top 20 words: *someone, post, friend, safe, regret, else, acquaintance, upset, embarrassed, don't, want, personal, herself, himself, seen, back, posted, private, bullied, people, group.*

This topic refers to content posted by other members of the participant's social network that caused regretful experiences either for the poster (e.g., O4 below) or to the participant (e.g., O2 below). High probability words include words referring to other people (someone, friend, else, acquaintance), several third person reflexive pronouns (himself, herself), as well as verbs about specific kinds of behavior (post, embarrassed, regret, bullied). This topic suggests that participants may have used highly similar language when describing both Social and Networked experiences. In addition, representative responses for this topic occurred primarily in the questions we asked about Social and Networked types of regrets. Some exemplars:

- **O1:** "someone was bullying someone else about their weight" [rank 2]
- **O2:** "A posting about an extra marital affair was embarrassing for someone I once knew in the past" [rank 6]
- **O3:** "know someone who posted something that ended up ruining their relationship" [rank 11]
- **O4:** "Yes. Someone posted a picture of me without my permission. The picture was not an explicit picture, but I still didn't appreciate the person posting it without me knowing." [rank 18]
- **O5:** "Family member posted pictures of herself and her 'boytoy' while her husband was out of the Country on business. She announced a divorce and then wanted to stay married. Many family members were upset and embarrassed by the exposure of such personal matters." [rank 19]

Topic: Self-Action

Top 20 words: *left, never, post, stay, deleted, go,back, regretted, embarrass, quit, drama, stand, I, we, private, intrusive, comment, relationship, shared, no*

This topic refers to content and behavior posted by the participant that caused herself regrets or embarrassment (e.g., S1 below). First person pronouns appear prominently (I, we), as do numerous action verbs (left, stay, deleted, quit). The combination of first person pronouns, active voice, and the representative responses suggest individual agency as a central concept in this topic. In addition, representative responses for this topic occurred primarily in the questions we asked about Self type of regrets. Some exemplars:

- **S1:** "Okay I posted something about my relationship that I later regretted. Relationship problems or non-problems should be kept within the relationship I hate facebook for that." [rank 19]
- **S2:** "Deleted my account over some silly drama. I left because I couldnt stand it any more. I posted some stupid things and my friends started over that. After that there was not point to stay." [rank 4]
- **S3:** "posted some silly stuff about another person who used to be my friend. I was harsh in my comment so i deleted it." [rank 12]
- **S4:** "I posted about my ex and it totally blew up. I just left facebook after that and i will never go back again." [rank 2]
- **S5:** "After we informed our church family that I was pregnant with my first child we informed my mother in law that she could "tell who you want", we meant within the church, instead she posted it to Facebook. Instead of having the joy of calling out of town family and sharing the news, we were cheated of that and in return had some of those family called US asking why we didn't share the information with them. We were upset and my mother in law greatly regretted posting it. We not [*sic*] have a standard "don't post about us unless you ask" policy." [rank 9]

Topics for Different Types of Regret Predict Different Forms of Non-use

In line with the contingency analysis, topic modeling suggests that the key feature in discriminating types of regret is who takes action. We also wanted to understand if the topics obtained through the described process predicted different forms of non-use.

To recall, we asked participants two binary response questions, one about whether they had considered deactivating their Facebook accounts (*Considered*), and one about whether they had ever actually deactivated their Facebook accounts (*Deactivated*). For each participant, we

know what proportion of each topic (Other-Action or Self-Action) is prevalent in their free-text response. Therefore, we used binary logistic regressions to model the relationship between topics and non-use. We used a mean-centered log transform of the topic proportion for each topic as predictors [as in 9]. These were used in two separate logistic regression models, one with *Considered* as the dependent variable and one with *Deactivated*. Demographic variables were used as control variables in initial models. However, their absence increased the predictive power, so we selected the most parsimonious model for reporting. The procedure to calculate the mean-centered log transformed topic proportion metric is outlined in [74, equation 13]

We find that different topics affect different forms of non-use. High proportions of the topic Self-Action significantly predict Deactivated (SE=0.563, OR=1.142). In other words, a Facebook user is more likely to have *actually* deactivated her account if she experienced regretful situations caused by *her own* actions. On the other hand, high proportions of the topic Other-Action significantly predict Considered (SE=0.546, OR=1.262). This means that a Facebook user is more likely to have *considered* deactivating her account if she has experienced regretful situations caused by others' actions. The results of these models are presented in Table 2.

Model	Variables					
	Other-Action			**Self-Action**		
	Std. β	CI	Odds Ratio	Std. β	CI	Odds Ratio
Deactivated (Y)	0.41	(0.324, 0.508)	1.027	0.56	(0.409, 0.688)	**1.142****
Considered (Y)	0.55	(0.432, 0.652)	**1.262 ****	0.38	(0.218, 0.593)	1.071
Fit Statistics	AIC = 481 BIC = 463			AIC = 507 BIC = 496		

Table 2. Regretful experiences arising from a respondent's actions (the Self-Action topic) increase the probability of deactivation. Regretful experiences arising from someone else's actions (the Other-Action topic) increase the probability of considering deactivation.

Summary of Results

Across the different analysis above, the results provide a coherent answer to our two research questions. First, we find that regretful experiences arising from the respondent's actions increase the likelihood of deactivation. We also find that regretful experiences arising from others' actions increase the likelihood of considering deactivation. These results are consistent across the contingency analysis of closed-ended questions and the topic modeling analysis of open-ended questions. This relationship between regret and non-use addresses **RQ1**.

Second, our survey included separate questions about other people experiencing regret (the Social questions) and

others' actions causing the respondent regret (the Networked questions). Interestingly, we find that these two different experiences have the same impact on non-use – they both increase the likelihood of considering deactivation. Furthermore, our topic modeling analysis suggests limited differences, if any, in the ways that respondents described experiences related to Social types of regrets compared to Networked types of regrets, thus addressing **RQ2**.

Thus, in the relationship between regret and non-use, we find that *it matters less who experiences regret*. Instead, *it matters more who takes action* to cause regret.

DISCUSSION

The design of this study was based on the expectation (from prior work [66]) that regret oriented experiences on social media fall into three major types. First, regret experiences could originate from my own actions ("Self"). Second, I could observe others having experiences that they find regretful ("Social"). Finally, experiences may originate from content created by others about me that I find regretful ("Networked"). However, our findings suggest not only that the Social and Networked types of regret have similar impacts on non-use, but that participants' language provides little differentiation between these two types.

These results extend the foundational scholarship outlined in this paper by speaking to two main questions. First, much prior work on social media regrets emphasizes individual behavior, but our results show that many regretful actions are out of an individual's hands. How is individual agency, in terms of control and volitionality of non-use, affected by different regretful experiences? Second, prior work has established a relationship between privacy concerns and non-use [6,9,49]. How can we account for the networked dimensions of privacy as a factor influencing non-use under different regretful conditions?

Individual Agency, Control, and Volitionality of Non-use

As seen above, the Other-Action topic focuses primarily on others' actions and the Self-Action topic focuses primarily on the respondent's actions. In the former case, the respondent is often not even implicated, such as in "second-hand reports" (O3) or when "someone was bullying someone else" (O1). In the latter case, even when the response deals with other people taking action on Facebook, it often stemmed from the respondent's own actions. For example, the respondent whose mother-in-law posted on Facebook about the respondent's pregnancy did so because the respondent told her she was pregnant (S5).

These findings are particularly interesting in light of Wyatt's [70] arguments about voluntary and involuntary non-use [see also [53] on "disenfranchisement"]. Specifically, we extend the umbrella of volitionality, arguing that similar distinctions can be made among technology *users*. Consider again the examples of responses with high proportions of the Other-Action topic (O1-O5).

These statements do not place much agency in the hands of the respondent. The locus of control is elsewhere, diminishing the personal responsibility component that comprises regret [51,52]. In contrast, the representative statements for the Self-Action topic (S1-S5) describe the respondent's own actions; they may have been regretful actions, but they were the respondent's to take.

This distinction may help explain the relationship we see between each of these topics and different forms of non-use. Respondents who describe themselves in a more agentic manner (i.e., whose responses contain a higher proportion of the Self-Action topic) are more likely to have actually deactivated their Facebook account. In contrast, those who focus on the actions of others (i.e., whose responses contain a higher proportion of the Other-Action topic) are more likely to have considered deactivating their account but not actually done so. This result directly answers RQ2 and partially answers RQ1. Elsewhere, these individuals are referred to as "reluctant users" [anon under review], people who continue using a technology even though they might rather not do so. These findings suggest volitionality and sense of agency as central constructs to explaining why individuals engage in different forms of social technology use and non-use. This point applies not only to regret but also play a broader role in experiences on social media more generally.

Networked Privacy

This work also carries important implications for how we conceptualize and design for privacy in social media. In many situations, we see that regretful experiences arise not from actions of the respondent but from actions of others. Examples include the respondent who described how a "Family member posted pictures of herself and her 'boytoy'" (O5) and how this caused regret and embarrassment to the user. In another example, a respondent noted that "someone posted a picture of me without my permission" (O4) and this led to feelings of regret. Even in some situations where responses highlight their own actions (i.e., in the Self-Action topic), others' actions play a key role, such as the respondent and her church family (S5). Again, both **RQ1** and **RQ2** are intertwined here.

In recent work, some scholars have pointed to the social or "networked" aspects of privacy [35]. For instance, some teenagers "try to achieve privacy through technical means" while others socially control access by "demanding that adults keep out" [12]. However, many "have given up on controlling access to content." Instead, people try to "limit access to meaning" rather than "limit access to content," using code switching, dog whistles, and other sociolinguistic devices. Non-use, in its various forms, is one manifestation of this strategy. For example, some users leave their account deactivated at all times except when they are logged in [12]. Doing so makes it easier for these users to police content posted about them. Thus, privacy is

enacted through a complex amalgam of access to meaning, use, and interpretation of actions.

Even an incredibly savvy user, a master of all possible configurations of privacy settings, does not have full control over her privacy. The interpersonal and networked nature of social media leads to situations that are not only unanticipated but, in many cases, could not have been anticipated. This is further exacerbated when people monitor each other's' activities in networks, a phenomenon termed social surveillance [22,34]. Social surveillance leads to (sometimes incorrect) impression formation [22] and unanticipated (sometimes negative) social consequences [21]. Thus, given the connectedness of modern life [12], we should position groups, communities, and networks at the center of privacy research and privacy debates, whether about regret or about other harms.

This is not to say that designers should simply throw up their hands or that we live in an era of the death of privacy. Indeed, our results show that individual action is still very important. However, they also show that the networked aspects of privacy related experiences are becoming increasingly important. Nor do we suggest that the non-users have the best strategy for ensuring their privacy. Indeed, non-users may have even *less* influence over information posted by others about them. Rather, we argue that the meaning of privacy in networks has altered. Networked privacy issues cannot be "solved" [5] through a series of configuration options and dialog boxes. In addition to novel technological interventions [65,66], which *should* be pursued, designers must *also* consider interpersonal, normative, or social interventions [4, 23] in the sociotechnical processes of boundary negotiation [42].

As a concrete example, Wang et al. have explored the idea of privacy nudges [67], which shows a randomly selected subset of the audience for a post before the post is shared. These small interventions can, and often do, encourage users to reconsider the content of their social media posts before sharing them. The framing of privacy nudges focuses on personal action, informing users that, e.g., "These people, your friends, AND FRIENDS OF YOUR FRIENDS can see your post" [68:2369]. As an alternative, one might prompt users with questions such as, "How would these people, your friends, and friends of your friends feel about seeing this post?" or "Would these people, your friends, or friends of your friends want to edit this post?" Doing so may encourage people not only to think about the individual but also the interpersonal ramifications of their actions. This provides one example of how we might design around networked privacy.

LIMITATIONS AND FUTURE WORK
This project is based on self-reported survey data on a demographically representative sample of US internet users. As in such studies, there are a number of limitations which we describe here along with proposals for future work to remedy some of these inadequacies. First, self-

report data is based upon past recollection of use. This may be inaccurate to varying degrees. A future project could remedy this by combining self-report survey data with Facebook log data. Second, we studied two forms of non-use – deactivation and consideration of deactivation – but not some of the other types such as reversion or partial use. Future work should look at a comprehensive understanding of potential harms from social media versus other kinds of non-use. Finally, this work is based on static snapshots of data in time. A dynamic, temporal analysis would uncover other nuanced patterns of how the relationship between non-use and harmful experiences plays out over time.

CONCLUSION
In this study, we investigated the link between potentially harmful experiences on social media and non-use of social media. More specifically, we investigate the link between experiencing regret and deactivating one's social media account. Using a representative sample of US internet users (n=515) and their use of Facebook, we adopted a mixed computational-qualitative method approach (contingency table analysis, topic modeling, and binary logistic regression). We find that different types of regretful experiences lead to different types of non-use. Regrets stemming from *one's own actions* increase the probability that a user will *deactivate* her account. In contrast, regrets stemming from *others' actions* increase the probability that a user will *consider* deactivating her account but not actually do so. In the latter case, it doesn't matter who experiences regret but who takes the regretful action.

These findings carry implications for at least two areas of usable privacy research. First, non-use is intimately linked with individual agency, control, and volitionally of use [23]. We show that the perceived locus of agency in regretful experiences has bearing on subsequent decisions about forms of non-use. Second, this work adds to the growing literature on networked privacy. The results here compel us to reimagine how we think about and design privacy-aware features in social media. Moving beyond the individual, the analysis here can inform designs that account for the social and networked privacy.

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