"I Don't Even Remember What I Read": How Design Influences Dissociation on Social Media

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ABSTRACT

Many people have experienced mindlessly scrolling on social media. We investigated these experiences through the lens of normative dissociation: total cognitive absorption, characterized by diminished self-awareness and reduced sense of agency. To explore user experiences of normative dissociation and how design affects the likelihood of normative dissociation, we deployed Chirp, a custom Twitter client, to 43 U.S. participants. Experience sampling and interviews revealed that sometimes, becoming absorbed in normative dissociation on social media felt like a beneficial break. However, people also reported passively slipping into normative dissociation, such that they failed to absorb any content and were left feeling like they had wasted their time. We found that designed interventions–including custom lists, reading history labels, time limit dialogs, and usage statistics–reduced normative dissociation. Our findings demonstrate that interaction designs intended to capture attention likely do so by harnessing people's natural inclination to seek normative dissociation experiences. This suggests that normative dissociation may be a more productive framing than addiction for discussing social media overuse.

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CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; **HCI theory, concepts and models**; **Social media**.

KEYWORDS

social media, design, social media addiction, dissociation, normative dissociation

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1 INTRODUCTION

People sometimes experience reading a page of a book and then realizing their mind was elsewhere, engrossed in an unrelated train of thought. Similarly, many have experienced becoming completely absorbed in a movie or video game, resulting in an omission of external stimuli. Daydreaming and other pastimes can also capture attention and dislodge self-awareness. All of these experiences share a commonality: they are experiences of *normative dissociation* [10].

Normative dissociation is a phenomenon that encompasses many seemingly disparate mental states, including daydreaming, flow, and becoming absorbed in watching a movie [9, 10]. What these experiences have in common is a narrowing in attention that results in the exclusion (dissociation) of other content from a person's field of awareness, such as thoughts, feelings, memories, and/or

awareness of the external world around them. When dissociating, people experience a diminished sense of volition (i.e., willful choice) and loss of self-awareness and reflection. As a result, people typically only come to realize they have experienced dissociation in retrospect; they come into awareness once self-reflection is reengaged [9]. To appreciate the range of experiences that fall under the umbrella of normative dissociation, consider the following two scenarios. When reading a book, one may turn the page only to realize, in hindsight, that one did not take in or remember any of the content on the previous page. The mind was elsewhere, absorbed in thoughts, feelings, or memories unrelated to the actions taken (reading the book). Equally, one could become so deeply absorbed in what they are reading, that one's personal thoughts and feelings are excluded from attention. These instances are united by a deep and narrowed focus, in either one's own daydreams or the book, such that anything outside of this focus is excluded.

Prior literature hints at a connection between normative dissociation and social media use. For example, "The 30-Minute Ick Factor" describes a sense of disgust people report upon suddenly noticing they have spent a notable amount of time on social media when they only meant to check in briefly [73]. In prior work, users describe experiencing "Internet blackout" [41] and compare browsing social media to entering a "trance" [47]. Similarly, Olson et al. [53] found that smartphone addiction positively correlates with hypnotisability, and hypnosis is generally agreed to be a dissociative state [10, 11, 25, 36, 69]. This suggests that normative dissociation may be related to people's experiences of technology overuse. The loss of awareness and control users describe and the internal question of "what just happened" after browsing social media are all characteristic of normative dissociation.

Of course, these social media experiences are created by design. Tasked with maximizing metrics like time on site and return visits, designers strive to turn social media use into an automatic habit that requires little conscious control [19, 65]. At the same time, digital well-being researchers have found that changing specific design features of social media apps can promote a greater sense of agency [27, 44], which is not accessible during normative dissociation. This suggests that design can influence experiences of normative dissociation while browsing social media.

Therefore, we set out to investigate: 1) people's experiences using social media through the lens of normative dissociation, and 2) how, if at all, design influences normative dissociation. To accomplish this, we deployed four design interventions on a novel Twitter client, Chirp, created by the research team. These included: custom lists, reading history labels, time limit dialogs, and usage statistics. In a four-week study, 43 participants used each of four versions of Chirp for one week. Participants completed experience sampling questionnaires in-app [18] to measure their level of normative dissociation in the presence and absence of these features. At the end of the study, we conducted interviews with 11 of these participants to further understand user experiences of normative dissociation on Chirp and other social media.

We found that users' self-reported experiences browsing Chirp were consistent with the normative dissociation model. Participants described becoming "lost" in the content, disconnecting from their surroundings, and "zoning out" or entering a "zombie"-like state. We also found that our design interventions had a significant effect on users' levels of normative dissociation; all of the designs that we introduced (including features to organize content into lists, indicate reading history, notify users of their time onsite, or show users their usage statistics) significantly reduced normative dissociation for our participants.

Our results indicate that designers have the power to both encourage normative dissociation and to disrupt it. While the attention economy incentivizes designers to capture user attention for as long as possible [7], which has lead to a contested narrative of "technology addiction," [56] our work suggests that people's natural tendency toward normative dissociation, coupled with designs that encourage it, may be a more productive way of describing social media overuse. Further, this work contributes a set of features that influence the likelihood of normative dissociation, supported by empirical evidence. We hope that our findings can help future researchers, practitioners, and users of technology gain more nuanced understanding of the role normative dissociation plays in social media overuse and how to address it.

2 RELATED WORK

Here we define normative dissociation and describe how it relates to social media use and "addiction."

2.1 Dissociation in Everyday Life

Many scholars believe that dissociation exists on a continuum from ordinary, everyday experiences to more distressing, trauma-based symptoms that define dissociative mental health disorders [6, 9, 26, 43]. In this study, our focus is specifically on everyday experiences of dissociation. Although some work refers to these routine experiences as "normal dissociation" (e.g., [69]), we adopt Butler's terminology of *normative dissociation* so as not to imply that some dissociation is "not normal" and to avoid stigmatizing already misunderstood disorders. Across the spectrum, all dissociative experiences share: (1) absorption, the focusing of the lens of attention to a narrow range of experience; and (2) diminished self-awareness, often accompanied by a reduced sense of time and control and a gap in one's memory [10]. As Krippner and Powers [38] say,

> "*'Dissociative' is an English-language adjective that attempts to describe reported experiences and observed behaviors that seem to exist apart from, or appear to have been disconnected from, the mainstream, or flow of one's conscious awareness, behavioral repertoire, and/or self-identity. 'Dissociation' is a noun used to describe a person's involvement in these reported dissociative experiences or observed dissociative behaviors.*"

One common form of normative dissociation is "highway hypnosis," in which, on a long stretch of highway with few demands on conscious awareness, people can drive a car, respond to external events in an expected and safe way, and have no conscious recollection of doing so [20].

An increasing body of research has shown that experiences of normative dissociation are more common than previously thought [9, 10, 12]. Butler [9, 10] identifies two ways in which people enter normative dissociation, which we describe in Fig. 1. People *passively enter dissociation* when they spontaneously slip into an unplanned

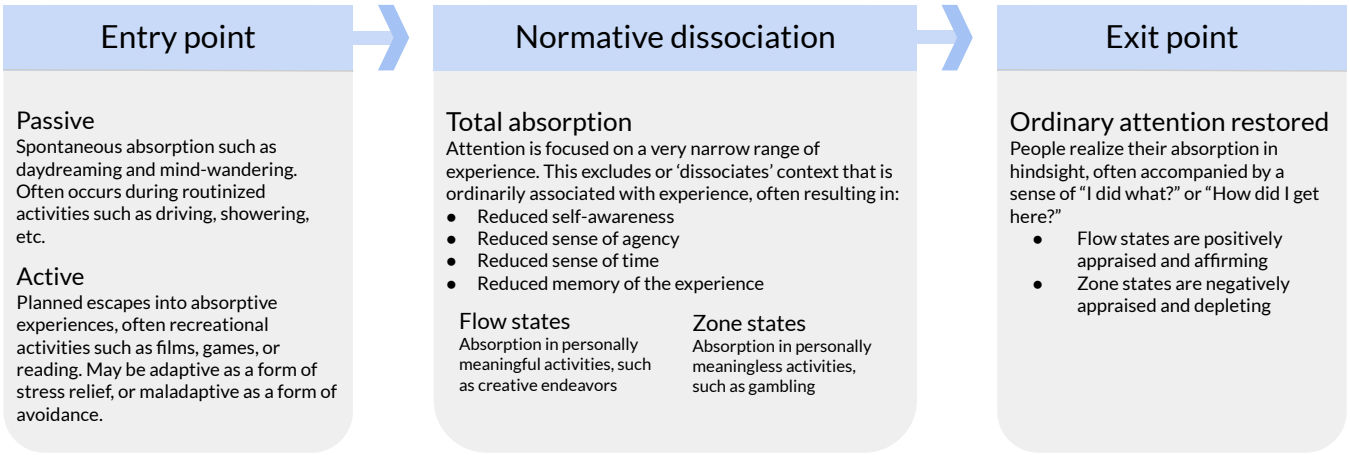

Figure 1: Normative dissociation can be understood as a process [8]. It can begin either as an active choice or passively, through spontaneous absorption. Once totally absorbed, the individual's attention is focused on a very narrow range of experience. It is typically only once ordinary attention is restored that people realize they have dissociated.

experience, such as daydreaming. This is often described as "spacing out" and can be secondary to another activity that is low in cognitive demand, for instance, driving on a highway (i.e., highway hypnosis), taking a shower, or playing a simple computer game. The resulting experience involves absorption in an internal world, along with a loss of self-awareness and awareness of the passage of time. These moments are a common and beneficial part of everyday life, and engaging in simple activities that allow for daydreaming (i.e., normative dissociation) can promote creativity and problem solving [4]. Daydreaming also allows for "dishabituation" which enhances learning by providing short breaks from tasks [62].

In contrast, when people *actively enter normative dissociation* they intentionally seek an escape in an absorbing activity that pushes the concerns of daily life to the periphery of awareness. Many people "actively" dissociate by listening to music, watching movies, or reading [5, 12, 21]. This may serve an adaptive function, as becoming absorbed in a recreational activity can reduce stress and improve mood [9, 10, 43, 66]. It is possible that people encounter both forms of dissociation through their social media use: People may use social media to actively enter a dissociative state or passively slip into a dissociative state while scrolling.

A third and rarer experience according to Butler [9, 10] is *positive dissociation*. These experiences involve intense absorption with activities of personal significance. Flow states [9, 51] are an example, as an individual is challenged just up to the limit of their abilities and must be totally absorbed to realize peak performance [51]. Digital game designers have found flow theory to be a helpful guide to creating immersive experiences that provide pleasure and happiness [14–16].

Yet, dissociation is not always a positive and self-actualizing experience. For example, Schüll [64] cautions that Las Vegas gambling devices are designed to draw people into "the machine zone," a state that gamblers experience as nearly identical to a flow state, except that in the end they feel depleted instead of affirmed. The journalist Alexis Madrigal extends this to "The Facebook Zone," describing the feeling of being hypnotized and regretting lost time in its aftermath [48]. Rather than conceptualizing "flow" and "the zone" as two separate experiences, it is useful to recognize that they are *both* forms of normative dissociation. The crucial difference and question is how the interaction between the user and design results in a feeling of positive affective valence and intrinsic value in the case of "flow" and a negative valence with little to no intrinsic value in the case of "zone" experiences.

Butler and Palesh [12] note that people spend substantial time participating in potentially dissociative recreational activities, which may be appealing because of the relief and restoration they can sometimes offer. They state that the pursuit of dissociative activities is so common and second-nature, "*that its role in our lives has not been fully appreciated or examined empirically.*" Therefore, we examine people's experiences mindlessly scrolling and becoming absorbed in social media through the lens of normative dissociation.

2.2 Social Media Breaks: Tool for Mood Regulation or Harmful Compulsion?

Mood management theory [77] proposes that media content has a strong effect on affect and arousal, and selective exposure to media can lead to mood optimization [59], which is similar to the idea of normative dissociation as a form of escape that helps in mental recovery [9]. Research has demonstrated that media consumption can help in the restoration of depleted resources [60], and that the effects of media-induced recovery are linked to outcomes such as increased vitality, enjoyment, cognitive performance, and subjective well-being [59–61]. Lukoff et al. [45] found that smartphone apps are sometimes used as a micro-escape from unpleasant situations and provide helpful recovery, even when the user themselves deems the content of the app "mindless" (e.g., playing a game like Candy Crush). Therefore, it appears that in at least some instances, social media consumption can help people recover and improve their well-being and subsequent task performance.

However, social media also tempts procrastination and is a frequent source of self-control struggles [47, 59]. Many people procrastinate through their use of social media [58, 59], because procrastination can provide a short-term mood boost [67]. However, the boost in momentary happiness that people receive from yielding to temptations that conflict with another goal is considerably smaller than when there is no conflicting goal. This "spoiled pleasure" effect is attributable to the negative self-evaluation and guilt that follows when people snap back to reality and realize that their original goals remain unaccomplished [30]. Researchers have linked procrastination to dissociative absorption [68]. As Butler [9] states, "*Dissociation may be seen as a psychological crutch that allows the individual to disengage from the tension and action of the present. Those with the capacity to dissociate can evade awareness of aversive... inputs... and the burden of volition.*"

Social media may be a particularly attractive avenue for escape from the burden of volition due to various aspects of its design that are intended to keep users "hooked" on the experience [19]. Ritualistic gratifications are introduced by design through "variable rewards" which keep users "on the hunt" for new content [19]. Oulasvirta et al. [55] found that platforms that give users quick access to information rewards encourage a "checking habit," in which the user frequently and mindlessly checks back on the experience. This is explained by the fact that information can engage the brain's reward system similarly to anticipation of winning a lottery or eating food [37]. Variable rewards cycles are facilitated through interface design patterns that are common across social media platforms, including infinite scrolling [57] and auto-play [44].

The abundance of design features which encourage a "checking habit" [55] and ritualistic gratification [19, 28, 37] have led many researchers to debate whether social media use is addictive [73]. Some studies have found that weaker impulse control predicts heavier smartphone use, which supports the addition hypothesis [75, 78]. However, other work argues everyday leisure activities like social media use should not be considered "addictions" unless they also lead to distress and functional impairment [33, 56], and the narrative of technology addiction needs to be carefully examined within scholarly communities [40]. Across the board however, it is generally agreed that social media design does encourage compulsive use [19, 37, 45, 55, 57], and many users are not satisfied with ritualistic usage patterns [44, 45, 73].

Fortunately, design can play a role in helping people reduce their ritualistic and meaningless technology use [44, 46, 47]. For example, designs can discourage overuse by adding micro-frictions on top of an existing design [17], e.g., nudges [52, 57] or lockout mechanisms [34, 35]. Popular screen time tools, like Apple's Screen Time on iOS and Google's Digital Wellbeing on Android, apply these approaches to all apps on their platforms. Prior work labels these standalone tools *external supports* [44]. In contrast, another promising approach to reduce meaningless technology use is to provide *internal supports* [44] to prevent the features within an app from inhibiting awareness and reflection in the first place. Design researchers have explored removing the newsfeed from Facebook [47], removing autoplay [44], and helping users plan out their content consumption in advance [27]. These design interventions have found success in increasing users' sense of control and satisfaction when using social media. Here we ask how social media design might also influence the experience of normative dissociation.

3 METHODS

To evaluate if people dissociate while using social media and how design decisions might systematically affect normative dissociation, we developed four versions of a custom Twitter client, which we called Chirp[1], based on the open-source project *Twidere*[2]. Below we describe our deployment, including the experience sampling and interview data which informed our findings.

3.1 The Chirp Twitter Client

Chirp allowed users to login to their own Twitter accounts and interact with their regular Twitter content, as shown in Fig. 2. We created four versions of Chirp through a user-centered design process with the goal of improving users' sense of agency over their Twitter use. We conducted (1) a Twitter user survey, (2) an interview and sketching activity with a panel of four expert designers, and (3) an analysis of alternate Twitter platforms' designs. Through these processes, we developed a set of "internal" and "external" design interventions to increase users' sense of agency. As dissociation is defined by a decreased sense of volition, it is fitting to use these same designs to evaluate if and how design impacts normative dissociation on social media.

[1]https://github.com/uelab/Chirp
[2]https://github.com/TwidereProject/Twidere-Android

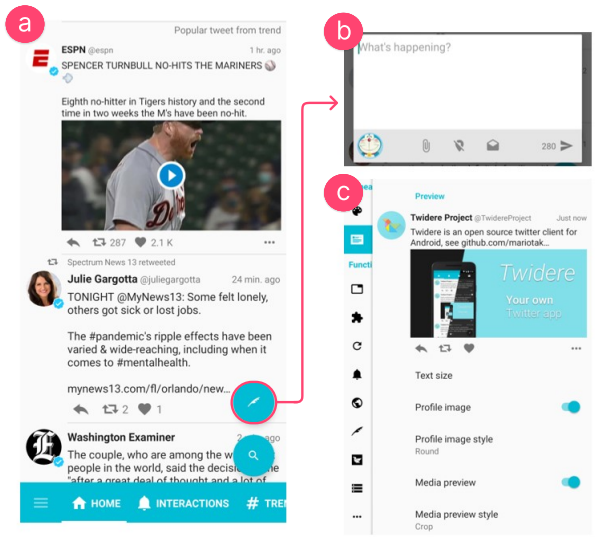

Figure 2: Interfaces of Chirp: a) the home page, which shows tweets from all accounts followed. Tweets are displayed in chronological order; b) interface for composing a tweet; c) settings page, where the user can configure the user interface and other options provided by Twidere.

The internal interventions fundamentally changed how users consume tweets, whereas the external interventions gave users tools to monitor their use [44]. We created two separate collections of internal and external interventions, such that each collection could be independently added to Chirp. This produced four different versions of the app: (1) one with only the internal interventions enabled, (2) one with only the external interventions enabled, (3) a control version in which no interventions were present, and (4) a combined condition with all internal and external interventions enabled.

Internal Interventions. When internal interventions were present, a *reading history label*, indicated when a user had scrolled to a point where they had already seen tweets below the label (Fig. 3a). Users had to create *lists* to conceptually organize subsets of accounts they follow (Fig. 3b, c), creating an interface that segments tweets into separate, organized feeds. We also removed popular tweets (which were present in the baseline version) and enabled users to filter out retweets and replies.

External Interventions. These included a *usage statistics page*, a side pane users could opt to view which displayed time spent on Chirp, number of tweets consumed, and other usage information (Fig. 3d). Separately, we implemented a *time limit dialog* feature (Fig. 3e) which appeared every 20 minutes, displayed the cumulative time spent during the current session, and asked the user if they would like to continue using Chirp. The user could ignore this time limit by selecting "continue" or exit Chirp by selecting "exit."

3.2 Procedure

Each participant used Chirp for a total of four weeks, using each of the four versions of Chirp for one week. At the end of each week, Chirp automatically adjusted its interface and functionality based on the participant ID. We used a Latin square design to counterbalance the ordering of app versions participants used. At the beginning of each week, Chirp would change its interface and functionality based on the participant ID. We also sent out an email that included a tutorial (in video and pdf formats) about features for that week and encouraged participants to use the features. To ensure participants successfully used the features, we required them to upload a screenshot of each feature at the start of each week. At the conclusion of the deployment, we conducted interviews with 11 participants via Zoom. We selected this number of participants to reach data saturation; as our n of 11 is consistent with the average sample size required to elicit stable themes [22] and with the average sample size in published studies in HCI [13]. We probed users for their experiences mindlessly using Chirp or using Chirp and realizing they hadn't paid attention to their surroundings for several minutes. We also asked if users had these experiences on other social media sites, and how it impacted their relationship with social media. We closed with questions about whether design features helped them recognize when this was occurring. These interviews lasted roughly 30 minutes.

3.2.1 Metrics. We recorded users' behavior at two levels of granularity. All of the data displayed in the Chirp usage statistics interface (Fig 3d), such as time spent on Chirp, number of app opens, number of times the Chirp usage statistics page was viewed, and number of times the time limit dialog was ignored or used to exit Chirp were recorded as daily totals. We recorded 476 logs of user activity.

We also recorded the time spent viewing the various feeds (home or lists) and time spent viewing feeds after the user has crossed into their history of previously read tweets. Unlike the other logged

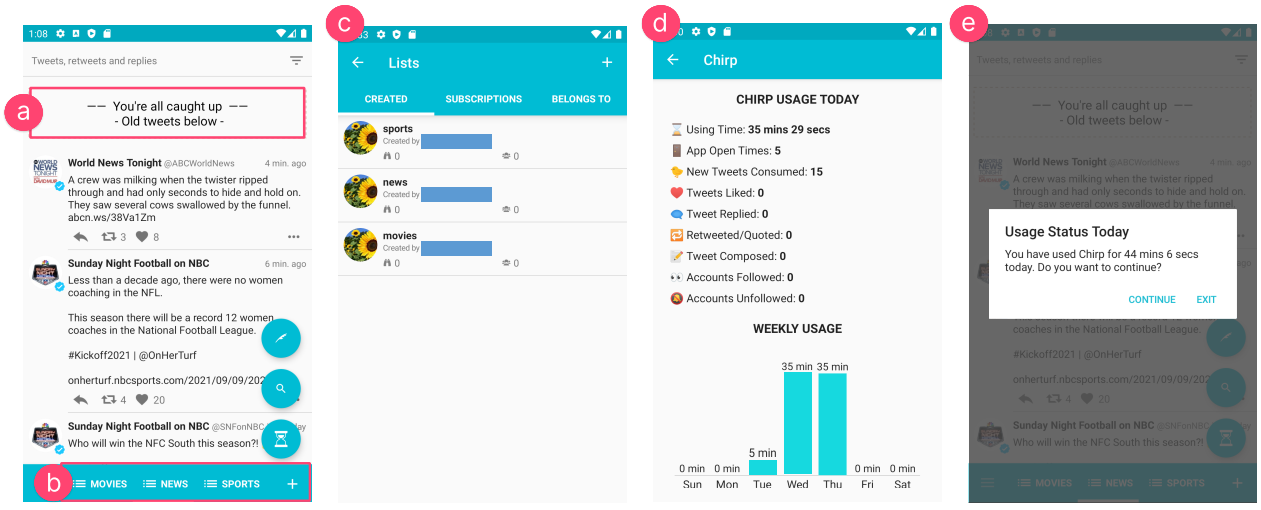

Figure 3: Implementation of the design interventions to reduce or disrupt normative dissociation. Internal interventions included (a) reading history labels and (b, c) custom lists. External interventions included (d) usage statistics and (e) a time limit dialog.

data, these were recorded per session and were not aggregated. We collected 8880 logs of activity related to reading tweets.

We also implemented notification questionnaires based on the experience sampling method (ESM) [18] to collect *in situ* feedback from the users. The ESM questions first appeared to users after three minutes of use and appeared again every 15 minutes. Of these ESM questions, several were used in a separate project and are not analyzed here. One was of interest to our project, which stated "*I am currently using Chirp without really paying attention to what I am doing.*" Participants could respond on a Likert scale of 1 (Strongly Disagree) through 5 (Strongly Agree). This question was adapted from the Dissociative Processes Scale [23] (DPS), in which an item states, "*I often seem to do things without really paying attention to what I am doing*" and allows people to respond on the same scale. Unlike other instruments for measuring dissociation, which are designed for dissociative disorders, the DPS is designed to assess common, everyday dissociative tendencies. It consists of three subscales: obliviousness (automaticity and mindlessness), detachment (depersonalization and derealization), and imagination (absorption and fantasy). Our question is from the "obliviousness" subscale. If the participant submitted multiple ESM responses per day, the average daily score was recorded.

3.3 Participants

We recruited English-speaking participants across the U.S. via email, online forums, and Mechanical Turk. In recruitment emails, we stated, "*We are interested in features that lead people to spend their time in ways that align with their personal goals*," or "*We want to study how different features affect your experience and sense of control when using Twitter.*" Participants were required to: 1) live in the U.S., 2) own an Android smartphone with the Twitter app installed, 3) spend a minimum of 10 minutes per day on Twitter, and 4) spend 10% or more of their time on Twitter on their smartphone. The participants recruited from Mechanical Turk were additionally required have a task approval rating greater than 99%, with over 1000 approved tasks.

Those eligible received an Android apk file via email to install Chirp on their phone. In total, 51 participants enrolled the study by installing Chirp on their phone, and 43 of them (19 women, 23 men, 1 non-binary person) finished the month-long deployment. Of these 43, 39 were recruited from Mechanical Turk, and 4 were recruited from an email list. The age range was 18 to 63 years old ($mean = 33.7$, $sd = 9.4$). All participants had used Twitter for over one year except for one person who had used it between 6 months to a year. Twenty six participants used Twitter for 5-60 mins per day, ten for 1-2 hours per day, and seven for more than 2 hours per day. Participants received $10 for finishing the first week, $10 for the second, $20 for the third, and $80 for the last week (in total $120). The 11 participants we interviewed were selected because they used Chirp more than three days per week during the deployment. They were compensated with an additional $15 Amazon gift card. Ten of the interviewees were from Mechanical Turk, and one was from an email list. We interviewed participants 3, 13, 15, 16, 27, 28, 30, 31, 33, 35, and 43. All participants were compensated at the same compensation rate regardless of where they were recruited from.

3.4 Analysis

3.4.1 Experience Sampling Datasets. To analyze how user behavior correlated with the ESM question, we generated two datasets of user behavior in Chirp. The first dataset contained 8,880 logs of reading activity, including whether they were scrolling through a home feed or a custom list, how long they had been scrolling, and if they had scrolled past the reading history label. The second dataset contained 476 aggregated daily logs of user clicks, such as clicks on the usage statistics page and time limit dialog. For each of these datasets, we joined the rows of data with the daily average score (from 1 (strongly disagree) to 5 (strongly agree)) in response to the ESM question: "*I am currently using Chirp without really paying attention to what I am doing.*" In the quantitative results discussed below, "normative dissociation" refers to participants' responses to the ESM question. In all cases, we evaluated Gaussian (linear) and inverse Gaussian models for fit, using the Tisane [32] tool as a guide, as well as a Shapiro-Wilk test on the residuals of the model. In all cases, the inverse Gaussian mixed model had the best fit based on the analysis of the residuals, so we report on these models' results. The dataset and R analysis notebook are available on GitHub.[3]

3.4.2 Interview Data. In the interviews, we asked our participants about their experiences mindlessly scrolling and/or becoming deeply absorbed on Chirp and other social media sites. We asked for descriptions of these experiences, probed for their emotional reactions, and asked them to reflect on the impact of design. In our analysis, we then mapped these responses to the normative dissociation model when relevant. As part of the larger deployment study, the interview also included some questions unrelated to normative dissociation that were excluded from this analysis. The interview questions are available on GitHub.[3]

We began our analysis with open coding of interview responses, during which two authors coded and memo-ed any items related to dissociative experiences on social media. We then met to discuss, compare, and refine codes. Next, we met with a third researcher whose area of expertise is in normative dissociation, who helped further refine our codes. We then agreed on a closed coding structure, with which we recoded the same set of interview data. We focused on recurring themes using grounded theory analysis [54]. We determined that participants who described mindless scrolling or becoming completely absorbed in social media use, coupled by a loss of sense of time or self-awareness, were experiencing normative dissociation. In the discussion that follows, "normative dissociation" is operationalized through this lens for the qualitative results. Quotes below have been edited for readability by removing filler words (ums, uhs, you know, like), false starts, and self-corrections.

4 RESULTS

Here we detail the results of our mixed-methods investigation into people's experiences of normative dissociation on social media and the impact of design.

[3] https://github.com/uelab/normative-dissociation.

4.1 Experiencing Normative Dissociation while Using Social Media

Seven of the 11 interviewees described experiencing normative dissociation when using social media. Eighteen of the 43 deployment participants responded at least once to an ESM prompt by agreeing or strongly agreeing with the statement that they were using Chirp without paying attention to what they were doing, for a total of 58 instances of normative dissociation. Participants said they regularly had moments where they "*lost track of time*" (P30), became "*all-consumed*" (P28), and stopped paying attention to the world around them. These included instances in which they actively sought out dissociative experiences and instances in which they passively slipped into them.

Sometimes, our participants found themselves using Chirp on autopilot, while their minds were absorbed in thoughts unrelated to their actions, a form of passive dissociation. One participant said, "*Well, you know when you do that thing where you're driving, and you forget you're driving and then you snap back? But you're still on the road, you know? It's like that kind of thing, where you don't realize you're doing something*" (P33). Without having received any information related to normative dissociation in our study, this participant naturally connected their experience on social media to the common dissociative experience of highway hypnosis [20]. They continued, saying, "*I'm on here reading Twitter, and I don't even remember what I read.*"

Many participants described getting "lost" in the experience or losing track of time. In these instances, participants described their use of social media as wholly absorbing, such as when P28 said, "*I [was] all-consumed in what I was looking for…[and] just forgot about everything else.*" One participant reported experiencing a "*snowball effect*" (P13) of clicking through tweets and their responses, saying they "*did get lost in it sometimes.*" Many participants had similar experiences, such as P29, who said "*I lost track of time and what was going on around me.*" Others also described how they disconnected from their surroundings, saying, "*It's like you get tunnel vision on it. You just block out your surroundings while you're using it. Then I guess I come back, and I realize I was on it for two hours or something*" (P30). Another participant said "*I was tuning things out. This was usually at the end of the day, where I…didn't really have anything major going on*" (P15).

They also described how this affects their relationships with others, with one participant saying their partner would become frustrated because "*sometimes I'll be like, 'Oh sorry, I wasn't listening to you. I was tweeting'*" (P35). These experiences reflect normative dissociation: users become so entranced in either the content of the site, or their own thoughts while scrolling on auto-pilot, that their self-reflection and self-awareness is suspended.

Some participants saw value in actively seeking dissociative experiences on social media. For example, P35 said:

> "*In a way, I almost hate to treat it as a mindless activity because…It wouldn't be too popular for me to say this, but it can be like reading a book, too. And that is an activity that you're sitting down to do for 30 minutes, and you're going to come out of it when you're done…But I think sometimes [treating] tweeting, spending a lot of time staring at a screen, as if it's somehow like you're in another dimension and you're neglecting your responsibilities is just kind of unfair. Because there's real content and real voices I'm reading and interacting with when I do. There's real people behind everything.*"

Participants also described how these experiences can provide a relaxing break: "*While I have my coffee after lunch, I generally go to YouTube, and I have very specific channels that I watch. But it's not rare that the recommendations would always suggest something for me to watch later, or watch now, which is the problem. So what generally saves me is the calendar, so something's going to beep and say, 'Hey, you have something to do'*" (P31). They explained that focusing intently on other people and content they care about—even to the point of tuning out their surroundings and losing track of time—can be worthwhile, because of the meaning they derive from these interactions. However, as P31 illustrated, their calendar was a necessary interruption to "save" them from endless normative dissociation on social media.

4.1.1 ***Relationship of Normative Dissociation to Compulsive Technology Use.*** P16 described how dissociating played a role in their compulsive social media use:

> "*Start with, I get some notification…[then] I go to the home thread, and I just start scrolling. Maybe sometimes I'll find a topic that's interesting and read the replies…I'm more of a consumer, and I don't engage too frequently. But my signal for mindlessly scrolling is I'm either seeing the same thing over and over…or I'm just scrolling through the main thread and exploring this breadth of topics, and then it becomes mindless when I realize this breadth of topics is not meaningful to me, and perhaps it makes me feel bad that I'm wasting this time doing something that's not actually has no bearing or is not meaningful to my life.*"

This participant continued to explain, "*[It] very much feels like this endless battle of my self-regulation and self-control versus Twitter's evolving design to get me hooked.*" P30 echoed this, describing how the "*infinite feed of posts*" allowed them to "*scroll on for a long time and kind of lose track of time easily.*" However, P16 felt that because they also used Twitter for their professional online presence, they could not simply stop using it. Another participant described how a similar phenomenon occurred on Reddit:

> "*When I'm bored, I'll go to read [my Reddit] feed of stuff that I'm subscribed to, then realize I've caught up with what I care to consume. Then I'll switch over to the r/all feed…And that's where I end up mindlessly scrolling, there might be stuff that's interesting, there might not be, but I just scroll through it, with the hope of finding something that's interesting. So I lose track of time when I'm scrolling through junk. Just to get to something that might trigger an interest point or something to go read more about.*" (P3)

This shows that while notifications or custom content may initially draw users to a social media site, they can become unsatisfied with their use and regret how they spent their time "on the hunt" [19] for more content.

4.1.2 ***Emotional Responses to Normative Dissociation: Inevitable, A Waste, or a Relaxing Break.*** People responded to realizing they had dissociated on Chirp in a number of ways: two users were generally happy with their use and did not think it fit the "mindless" label, some saw it as inevitable, and others felt shame and anger after realizing how much time they had "wasted."

Those who had negative appraisals of their time dissociated on Chirp described it as a waste of time. P33 said, "*It's just like, 'Oh, I've wasted however long.'*" They continued to explain, saying that when they don't remember what they read, "*It makes it a waste of time, kind of wear[s] on my eyes.*" Similarly, P16 said that the experience was "*unfortunately familiar; 'Oh man, I've wasted another half hour' or something like that using social media for no gain whatsoever.*" P16 also said, they blamed themselves, because they know that "*our attention is [social media's] profit.*" They considered, "*On the other hand, maybe I will start blaming the social media companies for their evil design practices.*"

Others felt even stronger emotions in response to realizing they hadn't used their time how they had wanted. P30 explained, "*Sometimes I might be angry that I wasted that time on there, when I could have done something else more productive.*" Some mentioned how they would prefer to spend their time or manage their social media use, e.g., "*I'd rather not spend more than an hour on any platform every day. I'd rather read a book or go on a bike ride*" (P30), and "*I don't think that it's worth having a habit of opening this specific app and scrolling for a little every single day. I'd rather have it be more like 'I'm interested in going into Twitter, to try and find something new or learn something' and have it as a burst of interest instead of a habit of opening it and consuming stuff*" (P3).

Other users were resigned to spending time mindlessly using social media, describing it as inevitable and citing other platforms where they have similar usage habits, including Twitter, Facebook, Reddit, and YouTube. As P35 explained, "*Anything on a phone will do that to you... There's just a certain percentage of my day that I'm going to be zoned out at a screen no matter what... if it weren't [Chirp], it would have been another platform.*" This user explained that because of the social limitations of the global pandemic, they were better able to justify their use of social media, saying "*I think that's also a weird function of COVID, honestly. If I were out more in the real world tweeting and not paying attention to my surroundings, [that] could be much less comfortable.*"

4.2 Design Influences Normative Dissociation on Social Media

Our qualitative and quantitative data provided evidence that the different designs we tested were effective in reducing normative dissociation: custom lists, reading history label, time limit dialogs, and usages statistics.

4.2.1 ***Internal Interventions: Custom Lists Reduce Normative Dissociation.*** Many users said that the lists and reading history label helped them to reduce their mindless consumption of Chirp. For instance, P16 contrasted scrolling on custom lists and home feeds, saying, "*There probably was [a time I was mindlessly scrolling] when I was looking at the main thread, definitely not when I was looking at lists.*" They continued, saying "*I really like the idea of looking at lists... I want to look at this topic that someone worked hard to curate.*" Similarly, P43 said, "*With Chirp, I felt like I had a lot of control because I was able to list the things that I wanted to see and get rid of the garbage I didn't want to see.*"

Table 1: An inverse Gaussian mixed model demonstrated a negative correlation between normative dissociation, measured as whether they were using Chirp without paying attention to what they were doing, and using custom lists.

	β	std. err.	t	p
(Intercept)	0.566	0.117	4.857	<0.001
Lists (categorical)	**-0.027**	**0.006**	**-4.763**	**<0.001**
Time spent reading (hours)	-0.053	0.082	-0.642	0.521

These users' reflections were also supported by statistical analysis. When lists and reading history labels were present, we collected 236 ESM scores from participants ($mean = 1.71, sd = 1.19$) and 4,364 logs of reading behavior. We ran an inverse Gaussian mixed model to evaluate the impact of custom lists on normative dissociation, which was measured as the response to the ESM question, "*I am currently using Chirp without really paying attention to what I am doing.*" We used the following as independent fixed variables: 1) a categorical variable of whether they were reading from custom lists or their home feed and 2) time spent reading a feed. Participant ID and date were added as random effects. 8880 logs of reading activity were used in this model. As shown in Table 1, lists significantly reduced normative dissociation compared to home feeds ($\beta = -.027, t = -4.763, p =< .001$).

P16 also discussed how both lists and the reading history label together created an environment that safeguarded their time and attention:

> "*The list plus the 'you're all caught up now'... felt safer compared to some other social media, because... My mental model is like the 'down the rabbit hole of I can never be done with consuming a social media app by design.' So it's like I go there realizing I will need to exert some self regulation to put it down. Whereas with the list [and reading history label]... I go there with some knowledge that there will be a stop... I know that there will only be couple minutes worth of tweets in this list, or maybe if I want to go crazy, go look at a second list. But at the end of the day, I'm all caught up now, that's it... The stop criteria is built into the list.*"

4.2.2 ***Internal Interventions: Reading History Labels May Reduce Normative Dissociation.*** When asked if there were any design features in Chirp that helped them realize when they were not spending time on the app in the way that they wanted, P3 said, "*The reading history label helped me stop going through and scrolling to a point where I get into that mindless state. It put a barrier there to say, 'this is all that there is for today, maybe it's time to log off' as sort of a personal hint.*" Similarly, P33 said, "*I think it's the most useful thing I found using Chirp, just that... it put into focus how much you just open up something like this, or I mean like Facebook or whatever, and just scroll and scroll just out of boredom... It broke out of the 'zombieness,' of using social media.*"

To quantify the effects of reading history labels on normative dissociation, we ran another inverse Gaussian mixed model on

the 8880 logs of reading activity. This model used: 1) a categorical variable of whether reading history labels would be shown due to internal interventions being activated, 2) a categorical variable of whether participants scrolled into their history of previously read tweets, and 3) the interaction of these variables. Participant ID and date were added as random effects. Our model showed that the interaction of the reading history label and scrolling into previously read tweets had a significant effect on normative dissociation ($\beta = -0.046, t = -4.158, p < .001$), as shown in Table 2. Pairwise comparisons using Z-tests, corrected with Holm's sequential Bonferroni procedure, [31] shown in Table 3, showed that people reported less normative dissociation when scrolling into previously read tweets if the reading history label is shown, compared to not shown ($Z = 4.413, p < .0001$). People also report less normative dissociation when they scroll through tweets and then see the reading history label, compared to when they do not scroll for long enough to view it ($Z = 3.791, p < .001$). This supports the idea that regardless of circumstances, people dissociated less when they viewed the reading history label. However, because the ESM scores were aggregated daily measures, and we do not know when the ESM score was collected relative to seeing the reading history label, it is difficult to determine the causality.

Table 2: Inverse Gaussian mixed model demonstrating the relationships between users scrolling into their history of previously read tweets, the reading history label being shown, and reported daily average scores for normative dissociation. There was a positive correlation between normative dissociation and scrolling into previously read tweets. We did additional *post hoc* analysis to understand the relationship between normative dissociation and the interaction effect.

	β	std. err.	t	p
(Intercept)	0.548	0.117	4.692	<.0001
Reading History Label Shown	0.002	0.005	0.376	0.707
Scrolled Into History	**0.021**	**0.009**	**2.381**	**0.017**
Reading History Label *Scrolled Into History	**-0.046**	**0.011**	**-4.158**	**<0.001**

Table 3: Post hoc pairwise comparisons using Z-tests of the interaction between showing a reading history label and scrolling into previously read tweets demonstrate that reading history labels may disrupt and lower normative dissociation for our participants.

Reading History Label	Scrolled Into History	Estimate	std. err.	Z	p
Shown vs. Not Shown	**Yes**	**0.044**	**0.01**	**4.413**	**<0.001**
Shown	**Yes vs. No**	**0.024**	**0.006**	**3.791**	**<0.001**
Not Shown	Yes vs No	0.021	0.009	2.381	0.052
Shown vs. Not Shown	No	0.002	0.005	0.376	0.706

4.2.3 ***External Interventions: Time Limit Dialogs and Usage Statistics Can Disrupt and Reduce Dissociation.***

Other users reported that external interventions were very helpful in managing their normative dissociation while using Chirp. Across the entire study, 13 participants used the time limit dialog to exit Chirp a total of 28 times over the two weeks that this feature was available. Six of those 28 times, users exited Chirp as soon as they saw the dialog the first time. In all other cases, the users ignored the dialog at least once, and as many as nine times before using it to exit Chirp. Of the participants we interviewed, only one (P30) used the time limit dialog to exit Chirp on two separate occasions, after ignoring the dialog 3 or 4 times beforehand. In their case, it was tied to their goals, and they said "*I would ignore [the dialog] and keep using [Chirp]. Sometimes it was annoying. But there were a few times when that popped up and said I had used the app for an hour that day. At that point I just decided to close out. It didn't always make me close out, but definitely a handful of times I realized I had used the app for a long time that day. I set a goal for myself to try not to go over an hour every day.*" P30 further explained that, "*The timeout feature sometimes would pop up and . . . if I did have that zoning out feeling, it would just kind of pull me back and remind me I can close it out.*"

This theme was also reflected in our statistical analysis. We constructed an inverse Gaussian mixed model in which the independent fixed variables were: 1) clicks to exit Chirp via the time limit dialog, 2) clicks to ignore the dialog, and 3) clicks to view the usage statistics. We also added total time spent using Chirp as an independent fixed variable. Participant ID and date were added as random effects in the model. The 476 aggregated daily logs of user behavior and ESM scores were used for this model, of which 249 were collected when external interventions were activated ($mean = 1.45, sd = 0.84$). As shown in Table 4, users who exited Chirp via the time limit dialog reported higher levels of normative dissociation before doing so ($\beta = 0.172, t = 2.616, p = 0.009$). It appears that the time limit dialog allowed them to realize their normative dissociation and take action to stop scrolling.

Other users also liked the time limit dialog, but wanted more control over the time intervals than Chirp provided. P31 said,

> "*One of the features that you proposed was the alarm. . . so if Chirp could understand [my] patterns [of using Chirp], and kind of smartly alert me of, 'You're following a different pattern than I'm expecting,' and asking me, 'Are*

Table 4: The inverse Gaussian mixed model demonstrated that there was a positive correlation between people agreeing that they had been using the app without paying attention to what they were doing (normative dissociation) and using the time limit dialog to exit Chirp, and a negative correlation with usage statistics views and normative dissociation.

	β	std. err.	t	p
(Intercept)	0.618	0.121	5.090	<0.001
Consume Time (Hrs)	-0.014	0.079	-0.172	0.863
Exit via Time Limit Dialog	**0.172**	**0.066**	**2.616**	**0.009**
Ignore Time Limit Dialog	0.019	0.010	1.855	0.063
View Usage Statistics	**-0.016**	**0.005**	**-2.898**	**0.004**

you okay with doing what you are doing for this amount of time right now? If you are okay, go on my friend, but if you're not, it's a good time to stop.' "

This user felt that automatic detection of deviating from their normal pattern of use could help them gain control over how they used social media. However, some users simply found the time limit dialog annoying; as P33 said, "*It was just another thing I had to click to get it out of my way. On the internet, there so many popup things, like cookies, you have to just click on, to get out of your way. Just it was another one of those. I probably didn't really consciously pay that much attention to it.*"

Some users liked the usage statistics page and how it allowed them to track their time spent. P3 said, "*That bar graph is what spurred sort of that desired change of, I don't want Twitter to just be a habitual open scroll and then call it a day, I want to only be on there when there's a reason to be.*" P30 said, "*Definitely the usage stats page, because that let me see all the information about how many tweets I had consumed... and of course the usage time... I think that was the most important part, because I would check that.*" Our model also revealed a significant negative correlation between number of views of the usage statistics page and normative dissociation ($\beta = -0.016, t = -2.898, p = .004$). This demonstrates that surfacing this feature to users may lead them to dissociate less on social media, if they decide to use it.

Finally, some users wanted all features present and felt like that was most effective. P13 said, "*I feel like all the features, as long as they are there, then it's kind of how I want it to be... like every time something was taken away, I felt myself missing that you know because they work so well together with everything else.*"

5 DISCUSSION

Our research demonstrates that many people dissociate while using social media, whether that means becoming fully absorbed by the content they are consuming, or mindlessly scrolling while absorbed in a different line of thought. Recognizing these experiences as instances of normative dissociation enables us to better understand the cognitive processes that are engaged when users browse social media and to design for this context.

5.1 Normative Dissociation as an Alternative to the Internet Addiction Narrative

Social media overuse appears to sit in a paradoxical position: a large body of prior work operationalizes and models technology addiction [3, 39, 42, 55, 76], while other work cautions against pathologizing everyday behaviors and pushes back on the addiction narrative [40]. And while scholars question whether an "addiction" framing is appropriate for this context [40], products openly leverage techniques to engage and keep users' attention [19, 37]. This has led to an environment in which many people, including our participants, feel shame around their social media use.

Recognizing absorbed and distracted social media use as instances of normative dissociation offers an alternate framing from the addiction narrative. Seeking escape from the present moment through deep absorption—including absorption in social media—is a natural, common, and often beneficial cognitive process. Instances of normative dissociation have the capacity to provide a restful break and a forum for mental processing [9, 10]. However, once in a dissociative state, people cannot simply "self-control" their way out of social media scrolling. Becoming deeply absorbed to the point of normative dissociation *by definition* means that an individual will have a diminished capacity for self-awareness and sense of volition—the very tools they need to stop their use.

Thus, social media companies cannot assume that users will come and go freely: users will not always have the ability to leave of their own free will. In fact, it may be this tension between becoming "lost" in scrolling social media and engaging self-control that leads to so much dissatisfaction with social media use. Users are given an impossible choice: they can either lean in to the experience of browsing social media and reap the benefits of normative dissociation or they can resist and maintain their self-awareness. The former leads to a frustrating time sink, as the design of the platform encourages extended normative dissociation that prevents the user from returning to the present moment. Meanwhile, the latter requires additional mental energy and robs users of the benefits they would accrue from mind-wandering and absorption. This suggests that it is possible for users to have healthy and satisfying relationships with social media, even while dissociating, if the platforms providing intentionally absorbing experiences also provide a pathway to disengagement.

5.2 Designs that Disrupt Normative Dissociation

Design practices that are common in current social media platforms led to more normative dissociation for our participants. Specifically, infinite feeds that defaulted to show all content together led users to feel more dissociated and less in control of their scrolling than when content was segmented into custom lists that informed them when they had exhausted all new content. And our data also suggests that time limit dialogs and usage statistics pages are effective tools for minimizing and disrupting normative dissociation if users choose to use them. All of these designs have parallels that users can begin to take advantage of, depending on the platform. Below, we outline concrete steps platforms can take to build trustworthy experiences that allow users to reap the benefits of normative dissociation while meeting their holistic goals for time management.

5.2.1 Cater to Users' Narrowed Attention: Default to Small Portion Sizes and Curated Experiences. Our users liked that custom lists gave them a smaller amount of content to consume. As one user said "*I know there will only be a couple minutes worth of tweets in this list, or maybe if I want to go crazy, go look at a second list.*" Users knew that they could have a sense of being caught up with new content in a matter of minutes rather than having to continuously scroll to find what they were looking for. This demonstrates that users appreciate having content served in manageable portion sizes [73] that allow them to disengage quickly and easily. Similarly, users said that looking at a list that "*someone worked hard to curate*" was ideal. Lists are already a feature of Twitter [1], however, most of our participants either were not aware of it or had never used it. This demonstrates that adding this feature as an option is not enough: platforms need to default to categorized, curated experiences for users to reap the benefits.

5.2.2 Re-engage Self-Awareness: Add Meta-Commentary to the Feed. People discussed how reading history labels alleviated their inner conflict between their desire to consume content and need to self-regulate to stop their use. As one user said, "*the stop criteria is built into the list.*" This directly contradicts much of the current state of social media which encourages users to scroll for as long as possible [19]. In scenarios where a user may never "catch up" on all content (or where doing so might be undesirable), we suggest displaying a line in their feed that says, "You've been scrolling for [X] minutes." Based on past work, notifying users in their feed every 15, 20, or 30 minutes of use may allow them to re-engage their self awareness, without the "ick factor" [73] of having spent too much time online. TikTok has already incorporated a similar feature, in which users see a video in their feed encouraging them to take a break after an hour of scrolling [70]. Reading history labels have already been adopted by Instagram too [2], but otherwise this style of intervention remains largely absent from social media platforms. Both of these design concepts (a reading history label and passive broadcasts about scrolling) are a natural fit for re-engaging self-awareness, as they offer commentary on the current interaction and invite the user to reflect on it.

5.2.3 Encourage Self-Reflection: Allow for In-App Self-Tracking. Allowing people to easily self-track with time limit dialogs containing cumulative daily time on site allowed people to disrupt their normative dissociation. However, this feature received mixed feedback, and even participants who used the time limit dialog to exit Chirp said things like, "*sometimes it was annoying.*" Some users suggested ways to make this feature more effective, for instance, by allowing users to set the time intervals, or having the platform automatically predict when they were using the platform for longer than than they usually do. And still others said it was just another thing to "*get out of your way.*" This shows that while time limits can make users aware of their normative dissociation, they can also intrude and disrupt the experience. There is an opportunity for further research to investigate how to make time limits an effective design friction [17]. Similarly, the number of times participants viewed usage statistics was positively correlated with the extent to which participants dissociated. This suggests that giving users an easy way to monitor and track their use of a social media platform will lead to less normative dissociation during social media use. These features are already present on some social media such as TikTok and Instagram [50, 72], and users can also take advantage of existing external tools such as Apple's Screen Time on iOS and Google's Digital Wellbeing on Android [24, 71].

5.2.4 Augment Self-Regulation: Remind Users about Their Next Activity. While it was not an aspect of our study, encouraging users to plan their use and their next activity afterwards may be effective for allowing users to dissociate safely during social media use. Hiniker et al. [27] found that pre-planning an activity to transition to after watching online videos was one of children's favorite parts of their use. Planning and purposeful decision-making can increase people's ability to self-regulate their behavior [63], and serving reminders in-app of their next activity after a user-determined amount of time would likely help people break out of normative dissociation and self-regulate.

5.2.5 Users Empowering Users: Supporting Community Disengagement. Even without support from social media companies through the examples above, users can disrupt normative dissociation for each other. To some extent, this already occurs online. As discussion of "doomscrolling" has increased [74], some online accounts have encouraged users to "stop scrolling," "log off," and "rest" [29, 49]. These user-driven interventions alert others to potential dissociative and mindless scrolling, and encourage re-engaging self-awareness, much like a time limit dialog or reading history label might alert users to how much time they have spent on social media in a session. Future work could consider sociotechnical interventions that include how other users—rather than design interventions alone—can disrupt normative dissociation online.

Limitations and Future Work

While we are confident in our findings, there are several limitations to note and ways future work could build on our results. First, our investigation did not evaluate how content influences normative dissociation online. Certain types of content may trigger different engagement and normative dissociation patterns, which could be explored in future work. Similarly, we only studied normative dissociation on Twitter, which is generally a public-facing, text-based social media platform. Effective design interventions may vary based on the type of platform, and future work could investigate experiences of normative dissociation and designs to disrupt it on other platforms.

Additionally, our quantitative investigation modeled daily average ESM scores, rather than per session, which limits the granularity with which we could explore our data. We also were continuously prompting users to consider how they were using Chirp throughout the four week study, which may have influenced how they used it. Similarly, we specifically asked participants if they could recall moments of mindless scrolling, although we did not mention dissociation, define it, or prime them with examples at any point during the study. Asking explicitly about experiences of mindless scrolling was necessary to answer the research questions in our study, but our results should be interpreted in light of the fact that we raised the topic explicitly.

Finally, our ESM initially appeared to users after only three minutes of active use. This may have caused a sampling bias towards fewer moments of normative dissociation. Future work may benefit from a longer timeline before displaying the ESM and incorporating questions from each of the three subscales of dissociation in the DPS.

6 CONCLUSION

We find that people describe their social media use in ways that fit the normative dissociation model: people named experiences of both becoming deeply absorbed in their content consumption and mindlessly scrolling on autopilot, while their mind was absorbed in other thoughts. These instances of normative dissociation online are accompanied by a decreased sense of volition, which can be harnessed through current designs to maximize user time spent on site. This means that social media platforms cannot assume they are neutral artifacts from which people will come and go freely; there are instances in which users' volition is not accessible to them,

which may prevent them from disengaging. However, design can reduce and disrupt normative dissociation; we provide example features that are effective in doing so, including custom lists, a reading history label, time limit dialogs, and usage statistics. This indicates that designing for positive disengagement experiences can maximize the benefits of normative dissociation on social media and prompt self-awareness. With the lens of normative dissociation, we bring greater precision to understanding habitual social media use and how to design for more beneficial online user experiences.

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