Understanding Social Media Disclosures of Sexual Abuse Through the Lenses of Support Seeking and Anonymity

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ABSTRACT

Support seeking in stigmatized contexts is useful when the discloser receives the desired response, but it also entails social risks. Thus, people do not always disclose or seek support when they need it. One such stigmatized context for support seeking is sexual abuse. In this paper, we use mixed methods to understand abuse-related posts on reddit. First, we take a qualitative approach to understand post content. Then we use quantitative methods to investigate the use of "throwaway" accounts, which provide greater anonymity, and report on factors associated with support seeking and first-time disclosures. In addition to significant linguistic differences between throwaway and identified accounts, we find that those using throwaway accounts are significantly more likely to engage in seeking support. We also find that men are significantly more likely to use throwaway accounts when posting about sexual abuse. Results suggest that subreddit moderators and members who wish to provide support pay attention to throwaway accounts, and we discuss the importance of context-specific anonymity in support seeking.

Author Keywords
Identity; reddit; self-disclosure; sexual abuse; social media; well-being; social support; stigma; anonymity; throwaway.

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

INTRODUCTION
Opportunities for anonymity are central to decisions about self-disclosure [14,47]. According to sociologist Gary Marx, anonymity "means that a person cannot be identified according to any of seven dimensions of identity knowledge," including legal name, location, behavior patterns, social group membership, identifying personal characteristics, or pseudonyms that can be linked with these [44]. In computer-mediated communication, anonymity has been linked to less accountability [35] and more disinhibition [37,64]. Increased disinhibition might lead to negative behaviors such as bullying and flaming [35], but may also be therapeutic by allowing disclosures of taboo or stigmatized topics [6,8].

Abuse in general, and sexual abuse and rape in particular, is one context that is socially stigmatized and difficult for people to talk about in both non-computer-mediated and computer-mediated contexts. Different countries have different definitions of rape and sexual assault, so statistics are difficult to compare globally. In the United States, there are on average 293,066 victims (age 12 or older) of rape and sexual assault each year [53,63] and it is estimated that 68% of sexual assaults go unreported to authorities [53]. The negative long-term impacts of sexual assault are well documented and include immediate and enduring emotions such as anger, anxiety, depression, self-blame, guilt, shame, humiliation, fear, a sense of loss, helplessness, isolation, low self-esteem, and interpersonal difficulties [27,33].

Sexual abuse disclosures are often difficult and delayed, causing additional emotional distress [52]. Sometimes survivors never disclose their sexual abuse, or disclose it years later [52] and when they do disclose, the response that some survivors endure often make them more reluctant to further disclose [68]. Non-disclosure of abuse has negative health outcomes [61], while disclosure and support seeking has good psychological effects [55].

Although seeking support can be helpful for sexual abuse survivors, people have difficulty doing so for many reasons. One risk of seeking support is losing "face," in Goffman's terms; "face" being the positive self-image that people present in their social interactions, wish to maintain, and feel discontent without [31]. People seek support directly or indirectly [5]. Direct disclosures are more likely to lead to support while indirect methods could be misunderstood or ignored [5]. Those dealing with stigmatized problems are more likely to seek support indirectly [7].

Despite the importance of sexual abuse-related disclosure and support, there is little HCI work that investigates the experiences of sexual abuse victims who seek support online, or the kinds of online cultures and technical affordances that support or inhibit such disclosures. This

paper fills an important gap by building on previous work about online support seeking and self-disclosure in the context of psychologically vulnerable disclosures [4]. Similar to this previous work, our study examines support seeking through the lens of self-disclosure; additionally, we examine the role that anonymity plays in sexual abuse-related disclosures.

While there is increasing debate around whether people have a "right" to anonymity (e.g., [22]), some major social media sites require people to use "real" or legal names. reddit is a social media site that not only does not have a "real name" policy and allows pseudonyms, but also allows "throwaway accounts:" temporary accounts that a user can create without any link to their primary reddit identity [42]. Because many of these accounts are used exactly once [29], user behavior can be untraceable over time, and different throwaway posts by one person are not linkable to each other or to content that that user might share using their primary reddit identity. Although throwaway accounts do not match rigorous definitions of anonymity such as that of Marx [44], research suggests they are perceived to provide an acceptable level of anonymity [29,42,70]. Following [50], we use the terms "identified" and "throwaway" to distinguish pseudonymous from anonymous identities.

Since people make both anonymous and identified (though often pseudonymous) posts on forums like reddit, we set out to understand support seeking on the site in the context of sexual abuse. There exist several subreddits (reddit forums focused on specific topics) dedicated to the topics of abuse and rape. We investigate whether and how these subreddits provide an opportunity for self-disclosures by sexual abuse survivors and explore relationships among anonymity, disclosure, and support seeking by analyzing content from both anonymous (throwaway) and identified (non-throwaway) accounts. Specifically, we ask:

RQ1. What do people disclose in abuse-related subreddits?

RQ2. What factors are significantly associated with a post being from a throwaway rather than an identified account?

RQ3. What factors are significantly associated with support seeking? How do these factors differ between direct and indirect support seeking?

RQ4. What post-related factors are significantly associated with first-time disclosures (i.e., disclosures happening for the very first time offline and online)?

PRIOR WORK

Seeking Support
Goffman posits that people need "sympathetic others:" those who share the same social stigma, have had similar experiences, and those who "share with him the feeling that he is human and 'essentially' normal in spite of appearances and in spite of his own self doubt" [13:31].

Even though people who are struggling or are in distress could benefit from seeking and receiving support and interactions with "sympathetic others" might be of help, many factors make it hard for individuals to reach out. Support seeking difficulties include the fact that people may look weak or less competent by admitting that they have a problem and need help, and in so doing they present an undesired image of self [31]. Additionally, information may be disclosed that makes the discloser feel vulnerable, and sometimes the problem for which help is required is already stigmatized or leads to stigmatization [10]. Another reason one might be inhibited from seeking support or self-disclosure is being concerned about the potential effects on the relationship between the confidant and the abuser [40]. Finally, people might feel pressured to reciprocate or be called on to do so if they seek support and receive it [2].

On the other hand, in offline contexts, factors that contribute to seeking social support include perceptions of trustworthiness, stigma attached to the issue, proximity to sources of support, availability of support, gender norms, and cultural norms [7]. With respect to gender norms, in many cultures men are socialized to believe that they should be able to handle problems on their own, while women are socialized to believe that it is okay to be emotional, talk about their problems, and seek help [45].

Barbee's [5] typology of support seeking behavior posits that there are both verbal and non-verbal ways, as well as direct and indirect ways, of seeking support. Direct support seeking is requesting help and indirect support seeking is hinting a problem exists. In this paper, we categorize support seeking in terms of direct versus indirect seeking.

The Social Support Behavioral Code [16] is also a categorization schema that we employ in this paper to characterize the nature of support being sought. This schema includes *informational support* (providing information or advice), *instrumental (tangible) support* (express willingness to help in a tangible way or actually do so such as offer to talk to someone or do something for them), *esteem support* (communicating respect and confidence in abilities by acts such as complimenting one), *network support* (communicating belonging to a group of people with similar concerns or experiences), and *emotional support* (communicating love, concern, or empathy).

Different people might prefer different types of support [65]. Understanding people's preferences for support is important because received social support that matches one's needs and preferences improves psychological adjustment, efficacy, ability to cope with distressing events, resistance to illness, recovery from illness, and life expectancy [11,45].

Anonymity and Seeking Support Online
When they feel anonymous, people are more likely to disclose personal information [38]. Anonymity, along with the absence of nonverbal cues in online environments,

facilitates more intimate disclosures [66]. With the increasing presence of Internet in people's lives, many have started to utilize online support groups. Online support groups need not worry about gestures, facial expressions, voice or physical appearance; as such they can better control and articulate their message [71]. Social distance, anonymity, interaction management, and access are some of the major attractions of these groups [25,71]. In fact, the most frequently mentioned advantage of online support groups is the perception that less stigma is attached to one's condition by other group members due to heightened feelings of anonymity compared to offline settings [73].

Online social platforms are widely used for health-related discourse [28], and prior work has shown that online spaces can be useful resources for those seeking help and support with mental health issues (e.g., [48]). Research suggests that online health support group users benefit from information and support exchange [26,30,59]. Some researchers have used content analysis to understand the type of content shared in online support groups [17,25,51]. Posts on an online anonymous forum for moms discuss situations and issues about being a mom that are not in line with societal and cultural norms [58]. A recent study investigated depression-tagged posts on Instagram and found that people often disclose personal narratives and stories, negative emotions, and self-appearance concerns, and seek social contact [4]. Others have used computational techniques to infer mental health conditions from social media data [18,19], such as using classifiers to detect posts discussing domestic abuse on reddit [54].

On reddit, throwaway accounts are used as a proxy for anonymity [42]. Prior work on mental-health related reddit posts suggests that throwaway posts are more disinhibited and are associated with increased negativity, lowered self-esteem, cognitive bias, and self-attentional focus [50]. We follow up by investigating how abuse-related posts and help seeking differs between throwaway and identified accounts.

Disclosure and Sexual Abuse
Self-disclosure is defined as a "willful disclosure" where the "aim is to let another person know with no shadow of a doubt what you have done, what you feel, etc." [34]. Self-disclosure involves navigating the boundary between safely hiding and making one's self vulnerable. It is a tactic that people use, especially online, to find similarly stigmatized others with the hope of benefiting and receiving support [12]. The Disclosure Processes Model (DPM) [12] examines when and why interpersonal disclosure may be beneficial and focuses on people with concealable stigmatized identities (e.g., abuse, rape) in non-computer-mediated contexts. This model identifies depth, breadth, duration, and emotional content as critical aspects of disclosure. Self-disclosure is the central concept underlying our framing of social support and we employ the dimensions of DPM in our qualitative analysis of posts in the subreddits we study.

A majority of rapes and sexual assaults occur prior to adulthood, yet individuals are more likely to not disclose their experiences until they are adults [41]. There are substantial gender differences in disclosures. Although sexual abuse is under-disclosed and under-reported in general, women are more likely to disclose than men [69]. One reason why male sexual abuse is under-reported and under-disclosed is due to stigma and the "male ethic of self-reliance" [57]. Reasons for men's lack of disclosure or struggle with disclosure may be personal (e.g., unawareness, avoidance, difficulty articulating, shame, lack of emotional safety), relational (e.g., fear of negative response and repercussions, potential for disruption, possible isolation), and sociocultural (e.g., social unacceptability) [62]. Among survivors of childhood sexual abuse, women are more likely to receive positive reactions, but report more distress, more self-blame, more withdrawal, and more attempts to forget than men [69].

Limited research exists focused on online sexual abuse disclosures. One study of sexual assault-related questions and answers on Yahoo! Answers (a non-anonymous site on which users must be registered) found that help-seeking occurred, but only rarely, and mostly involved seeking emotional support [47]. The study suggested that such posts are about naming the incident as sexual assault, recounting one's story, expressing emotions, and seeking help.

Characteristics and patterns of abuse-related self-disclosure and support seeking in online social media is an understudied area in HCI research. By employing mixed methods and studying self-disclosure, nuances of support seeking, and anonymity in this population, we can better understand the ways that online platforms can enable positive and therapeutic disclosures, potentially leading to healing in a wide array of contexts.

METHODS AND STUDY DESIGN
To address our research questions, we report on two study phases. In the first phase, we characterize the content of abuse-related posts in three subreddits through a self-disclosure lens by applying qualitative content analysis methods. In the second phase, we use statistical methods to investigate the differences between throwaway and identified posts in terms of the themes we find in the first phase. We also employ a text mining approach to investigate differences between throwaway and identified accounts. Finally, we report on factors linked to direct and indirect support seeking and first-time disclosures of abuse.

Data Collection
Obtaining Sexual Abuse Data. We used reddit's official API [74] to collect posts, comments, and associated metadata from several communities (subreddits) focused on sexual abuse. The subreddits were identified using prior work on mental health, well-being and psychological distress-related concerns on reddit [20,50]. We manually examined the subreddit descriptions and goals as well as posts shared in all of the 22 subreddits studied in previous

work [20,50] to identify those dedicated to discourse and support around sexual abuse. Additionally, we used reddit's native search functionality to search for subreddits relating to the keyword "sexual abuse." Using these methods, we identified three subreddits that were exclusively focused on sexual abuse: r/traumatoolbox, r/rapecounseling, and r/survivorsofabuse. At the time of writing this paper, these subreddits each had 600-4,000 subscribers. Note that redditors can post on a subreddit without also subscribing to it. All of these subreddits host public content. For each of these subreddits, we obtained daily crawls of posts in the *New* category, to collect posts shared in the three subreddits between February and November 2014.

Identifying Throwaways. Now we discuss our method of identifying throwaway user accounts in our data. We used a two-step approach based on prior work [29,42,50]. The first step (programmatically) examined the naming conventions used in the user ids, and whether they include mentioning the word "throwaway" or a lexical variation of the word (e.g., *thrw*, *throwaway*, *throw*, *thrw*, *thraway*) [29]. In the second step, we (programmatically) looked for mentions of the word "throwaway" in either post titles or post text. One author followed up with manual inspection of a random sample of these posts to verify that the word "throwaway" was used to mean an anonymous disclosure. The manual second step is motivated by prior work done on reddit "throwaway" accounts [42]. While it is possible that this technique yielded some false negatives, it ensures that our dataset represents throwaway accounts accurately.

Our complete dataset included a total of 234 posts from throwaway accounts and 2,139 posts from identified accounts. Because we wanted to compare content across throwaway and non-throwaway accounts, we randomly selected 100 posts from throwaway accounts and the same number from identified accounts: thus a combined sample of 200 posts. During data coding, we removed posts that included only an external link without explanation, spam, and posts that were not possible to put into context and understand. The final analyzed dataset consisted of 189 posts: 96 from throwaway and 93 from identified accounts.

Methods and Analysis
To develop a codebook for the posts, we followed an iterative semi-open coding procedure. In doing so, we looked for some concepts from the literature and prior work. For example, different forms of seeking support (i.e., direct versus indirect, and informational, emotional, etc.). We also employed open coding, remaining sensitive to other topics that might emerge. Two of the authors independently coded a test sample of 20 randomly selected posts drawn from the larger dataset, then discussed each post together with assigned codes to establish a shared vocabulary. Next, they coded another 20 randomly selected test posts and similarly discussed them one by one in detail. Applying the resulting codebook, they coded a final set of randomly selected 20 posts to establish inter-rater

reliability, which yielded an overall Cohen's Kappa coefficient of 0.86. Next, the two coders independently coded portions of the 189 posts. We assigned multiple codes to each post, and our unit of analysis was posts.

We coded for disclosure content based on the DPM model [12] discussed above. Duration did not apply to our data, but we coded for the other three dimensions (depth, breadth, and emotional content). Our story-telling theme, as we will describe in findings, is a proxy for a disclosure's breadth and depth. To capture emotional content, we open-coded emotional expressions in the data, then one author categorized the emotions into standard emotional categories based on Shaver et al.'s emotion categorization [60].

We coded for support seeking at two levels. First, we coded for direct versus indirect support seeking. Second, when support was sought directly, we coded for specific types of support seeking as categorized in the Social Support Behavioral Code [16] described above.

Limitations
We analyzed posts on three subreddits (r/traumatoolbox, r/rapecounseling, and r/survivorsofabuse) to characterize self-disclosures about abuse, with a focus on sexual abuse and rape experiences. While we recognize that our data might not be representative of the wide population who experience abuse and rape (e.g., not everyone has access to the Internet, or uses reddit) or even the narrower population who post on these subreddits, we believe our approach is sufficiently robust to provide a foundation for understanding abuse-related self-disclosures and support seeking and the role of anonymity in these behaviors. We believe that we could also gain important insights by talking to redditors who post on these subreddits and the moderators and volunteers who provide support - an important direction for future research.

FINDINGS
In this section, we first share a summary of our findings from phase I and phase II respectively. We then report them in more detail. Our qualitative analysis contributes a characterization of abuse-related posts in online forums through a self-disclosure lens. Our quantitative analysis suggests that there are significant differences between posts from throwaway accounts and identified accounts in the context of disclosures relating to sexual abuse. Posts including indirect and direct support seeking, references to attitudes toward disclosure, and posts by men were more likely to be posted using throwaway accounts. Throwaway posts were also significantly linguistically different than identified posts. We also found that while emotional disclosure (i.e., feelings of neglect such as loneliness) is significantly positively related to indirectly seeking support, first-time disclosures and explicit questions are predictors of directly seeking support. Finally, seeking direct instrumental support and expressions of attitudes towards disclosure are significantly linked to first-time disclosures.

Phase I. Characterizing Abuse-related Disclosures

RQ1. What do people disclose in abuse-related subreddits?
Table 1 details the themes that emerged in the data and each theme's percentage of occurrences in posts.

Disclosure dimensions
While most of the disclosures described a poster's personal experience with abuse, sometimes others' experiences with abuse were discussed, and sometimes posts were mixed. Most abuse disclosures referred to rape and sexual assault, appearing in a total of 66.1% of posts. Other types of abuse were also disclosed, with a combined total of 77.8% posts including some form of disclosure about abuse.

Emotional disclosure was also common in our data. We observed five emotion categories: Sadness (e.g., depressed, despair, broken, hopeless, sad, suicidal, confused, lost, traumatized, empty), fear (e.g., nervousness, anxiety, social anxiety, scared), anger (e.g., angry, disgusted, disturbed, frustrated, dirty, self-hatred), shame (e.g., guilty, ashamed, regretful, self-blame), and neglect (e.g., embarrassed, lonely, worthless). Although negative emotions are generally difficult to express, some, such as shame, are still harder [56], as reflected by the 27% prevalence in Table 1.

We also observed considerable breadth and depth of disclosure through storytelling. Writing down problems in online support groups might enable more distance from others, reflection, and less concern about immediate responses [72]. It can also create distance between people and their dilemmas, help externalize these problems, take them out of isolation, and connect them to the larger culture [21]. Due to space limitations and to satisfy ethical standards for reporting sensitive disclosures, we generally include partial reworded sentences in posts that exemplify the themes we discuss. However, because it is difficult to convey the storytelling theme without providing a complete example, we include this paraphrased post as an instance of detailed disclosure about an abuse event through storytelling coupled with feelings of fear and sadness:

I hope that it gets easier to deal with through telling my story. I also hope that this helps other guys out there not feel lonely. My electricity was cut off in mid January, so I was couch surfing. I was crashing at a friend's place, I smoke weed and got higher than I've ever been. When I was laid out on my friend's bathroom floor, he told me that if I could make it to the bed, he would make sure I would be okay through the night. I clarified that I didn't want to do any sexual stuff as I had promised to my partner. He said that was fine. I got into the bed and fell asleep high, and I woke up to my situation. I keep telling myself that I'm okay and that it was nothing, but that's just a lie and I know it. This has put a ton of stress on my relationship with my partner, my grades have dropped badly, and my sex drive is gone. I feel like I'm so distant from reality. I had and have self-esteem issues so one thing is just complicating the

Theme	Categories
Disclosure dimensions	- Disclosure of the abuse (77.8%): rape, 39.2%; sexual, 32.8%; physical, 13.2%; emotional, 11.6%; drug, 7.4%; verbal, 5.3% - Disclosure of other people's abuse (14.5%) - Storytelling (depth and breadth of disclosure) (64.0%) - Emotions (84.7%): sadness, 55.6%; fear, 34.4%; anger, 30.7%; shame, 27%; neglect, 22.2%
Attitudes toward disclosure	- Non-disclosure reasons (20.6%) - Fear of disclosure (9.0%) - Disclosure reasons (32.3%) - Desire to disclose (27%)
Past disclosure outcomes	- Supportive responses (11.1%) - Unsupportive responses (26.5%)
Seeking support	- Direct (68.3%): informational, 60.8%; network, 12.2%; esteem, 9.0%; emotional, 3.7%; instrumental, 3.2% - Indirect (22.8%)
Providing support	- Providing some kind of support (9.0%): Informational, 5.3%; network, 4.2%; emotional, 2.6%
Attitudes towards abuse	- Minimization of abuse by self (7.4%) - Self-validation (10.6%) - Perceived impact of abuse (58.2%): on self, 50.8%; romantic/sexual relationships, 23.3%; sexuality, 13.8%; family, 9.0%; school, 7.4%; work, 4.8% - Uncertainty about sexual assault – naming the experience (15.3%)
Disclosure framing	- Sense-making (39.7%) - Explicit questions (51.3%)
Platform-specific	- First time disclosure (9.5%) - Audience awareness (45.5%)
Gender	- Female (41.0%) - Male (16.5%)

Table 1. Prevalence of themes and categories in the data.

other. I know I should speak with a therapist, but I can't afford it now, and those at school are all booked. I haven't told the police or my parents. My family isn't okay with me being gay, so I'm not sure how they'd respond. I'd do anything to feel semi-normal again.

In this storytelling example, the poster refers to his attitudes towards disclosure (hoping it helps others) while also seeking indirect support and providing network support.

Attitudes toward disclosure

Attitudes toward disclosure was a prevalent theme in our analysis. Posts often included reasons for disclosure or non-disclosure, fears regarding disclosure, and desire to engage in self-disclosure. Out of the 27% of posts that included references to desire to disclose, 20% referred to the reasons for disclosing on reddit:

I was in my bed thinking that I have never talked to anyone with a similar experience, and thought I might find comfort in that, or maybe some people I can relate to about this.

Past disclosure outcomes

26.5% of posts mentioned that they had disclosed the abuse at some point before posting on reddit. Confidants included families, friends, significant others, therapists, and authorities. Redditors who had disclosed before posting often described confidants' reactions and most of these posts described unsupportive responses:

I am not sure how to write this out. I never open up about this. When I try to tell them about it, no one gets what it's like... the few friends I've told sympathize, but they act like they are walking on eggshells around me afterwards until we forget about the conversation.

In this example, disclosure led to temporarily diminished intimacy between the poster and the confidant. Negative responses to disclosures in offline contexts may precipitate support seeking in online forums like reddit.

Seeking support

Seeking support was a major theme, with direct support seeking three times more prevalent than indirect support seeking. Informational (i.e., seeking advice, opinions, and information) was the most prevalent type of direct support seeking, followed by network, esteem, emotional, and instrumental. We give examples below:

Seeking direct informational support involves asking for others' input: *"Any advice would be appreciated."*

Seeking indirect support involves describing a lack of resources or knowledge: *"Everyday I can hear her in my head telling me it doesn't mean anything. She stole my life away. I don't know how to take it back. It's hard to live with this. Everyday I struggle to make it through. I don't know how to feel safe or live anymore."*

Providing support

Some posts (9.0%) attempted to provide informational, network, or emotional support to the other redditors, for example by ensuring others that, *"We all have weak moments and I am so grateful for this subreddit."*

Attitudes towards abuse

This theme includes posts in which posters discussed the perceived impacts of the abuse on various aspects of their lives, minimization or validation of the abuse by the poster, and trying to name the event, at times by expressing uncertainty about it. Some examples:

Uncertainty about sexual assault (naming): *"This is the first time I've ever posted to this site. I've been lurking for a year but never felt like my story is 'bad' enough to be shared here. But it keeps eating at me. I don't feel like I deserve to name it sexual assault because of how I behaved after."*

Impacts of assault: *"I have problems being intimate with my partner because I have flashbacks to that night."*

Disclosure framing

We also coded for how posts were framed. Some posts included explicit questions, while others were framed to make sense of the abuse, emotions, and thoughts. For example, a poster might share a story and then say: *"I want to make sense of this,"* while others ask direct questions such as *"how do I get back to being functional?"*

Platform-specific themes

We also observed two platform-specific themes in our analysis. The first refers to first-time-ever disclosures that happened on reddit and the second refers to considerable references to a specific or more general imagined audience.

First-time disclosure: *"Hi. Throwaway because I haven't mentioned this to anyone, and I find it hard to talk about."*

Audience awareness: *"I've posted here before with this throwaway and you were all so kind. I'm having a new problem, so I thought to come back here."*

Gender

Finally, in 57.5% of posts we identified the poster's gender based on explicit identification or reference. Among those whose gender could be identified, there were 2.5 times more women than men. This finding pertains to posts in which posters explicitly identified with a gender.

In summary, we found considerable support seeking and detailed, emotional disclosures. We observed awareness of audience and references to attitudes towards disclosure and abuse. Importantly, we observed first-time disclosures and references to responses received to previous disclosures. We identified 4 posts by abusers, yielding no themes.

Phase II. Statistical Analyses

In this section, we use statistical analysis to address research questions 2-4.

RQ2. What factors are significantly associated with a post being from a throwaway rather than an identified account?

To answer this question we: 1) used qualitative findings from Phase I to investigate what post features were more likely to appear from throwaway accounts, and 2)

| Variable | Throwaway account | |
| | (Model 1) | (Model 2) |
	Coefficient (Standard error)	
Seeking support indirectly	1.28* (0.52)	1.43* (0.57)
Seeking support directly (overall measure)	-	1.21* (0.52)
Seeking informational support directly	1.00* (0.45)	-
Seeking esteem support directly	1.27* (0.62)	-
Attitudes toward disclosure	0.64* (0.31)	0.65* (0.31)
Male	1.18** (0.46)	1.08* (0.46)
Intercept	-1.48*** (0.45)	-1.62** (0.52)
Nagelkerke R^2	0.16	0.13

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 2. Logistic regression model examining factors associated with throwaway accounts.

quantitatively analyzed posts' text to identify differences between throwaway and identified accounts.

1) Differences in post types between throwaway and identified posts

We developed logistic regression models using backwards variable selection (an appropriate method when not beginning with an *a priori* set of variables) to identify the optimal models explaining our data, which we report in Table 2. We report two models with a binary indicator of an account being a throwaway as the dependent variable in each (see Table 2). The difference between Model 1 and 2 is that in the first, we included the five different types of direct support seeking whereas in the second, we entered direct support seeking as a general category (i.e., the presence of any type of direct support seeking). We did this to delve deeper into the relationship between support seeking behavior and anonymity. We found no multicollinearity effects.

We found that posts including indirect as well as direct (specifically informational and esteem support) support seeking, references to attitudes toward disclosure, and posts by men were more likely to be from throwaway accounts. Methods such as interviews could illuminate posters' motivations for using throwaway accounts to indirectly seek support; however, one explanation for the observed relationship between indirectly seeking support and using a throwaway account could be that these posters sense that a more direct disclosure would lead to negative reactions (as is found in the literature [41]), and so are hesitant to engage in direct support seeking. Another possible explanation is that sometimes people may not know what it is that they need, or may just want to vent. In these cases, they would not directly ask for help.

Additionally, we found that certain forms of directly seeking support – specifically informational and esteem – are also associated with using a throwaway account. It may be that stressful events that threaten people's self-concept, such as sexual abuse and rape, would best benefit from esteem support [15,36]. Feelings of uncertainty about the experience and not knowing what to do is common for people who have experienced abuse or rape [47]. These both may lead to a poster admitting she does not know something and is confused, and that she needs validation; all of which threaten self-image. Therefore, these posters may choose to directly seek support anonymously to reduce risks of losing face. Another explanation is that in the context of sexual abuse and rape, direct offline disclosures receive more negative responses [41]. To save face in the event that they receive unsupportive responses, posters might make direct bids for support anonymously.

Posts that described a desire and need to engage in self-disclosure about abuse, as well as those that included reasons for engaging or not engaging in self-disclosure were more likely to be from throwaway accounts. In 9.0% of posts, the poster specifically mentioned that they desired to disclose on reddit while 14.5% mentioned that they need a "safe" disclosure space. Some people using throwaway accounts pointed to reasons for doing so. For example, one poster said, *"and for the throwaway, i don't want to get into trouble,"* while another stated, *"i made a throwaway as i think some family members know about my main account and none of them know about my story."*

Posters may use such explanations or references to disclosure attitudes because they want their audience to know that they have a reason for choosing to be more anonymous. This may make them seem more credible and trustworthy as a member, despite their anonymity. Another explanation could be that those who use throwaway accounts are in dire need of disclosure, and explicitly referring to this need as additional context to their posts may increase the likelihood of receiving a desired response.

In our data, men were significantly more likely to use throwaway accounts although prior research [42] suggests that women are more likely to use throwaway accounts on reddit overall. Our results highlight the importance of the context in which we talk about the use of temporary socio-technical identities. It is likely that because disclosing abuse is more stigmatized for men than women, men seek anonymity by using throwaway accounts when disclosing.

2) Quantitative text mining to identify content in throwaway posts

As part of our characterization of anonymity in sexual abuse subreddits, we quantitatively analyzed posts' text to identify differences between throwaway and identified accounts. Using the full dataset of 2,373 posts (9.9% from throwaway accounts), we built two logistic regression classification models, both with a binary indicator of a throwaway account as the dependent variable (see Table 3).

The first model used unigrams and bi-grams in posts' text as independent variables, calculating their frequency by count. The second model also used unigrams and bi-grams in posts' text as independent variables, but instead calculated the frequency of each using term frequency-inverse document frequency (tf-idf) [43]. For each, we applied 10 fold cross-validation to prevent overfitting, and we report the results from the most accurate model. The models performed well: on average over the 10 folds, the model using counts had accuracy 0.91 and AUC (area under the curve) 0.63, and the model using tf-idf had accuracy 0.91 and AUC 0.63. The numbers in Table 3 are coefficients for the logistic regression classification model; as the prevalence of terms increase by one unit, the log odds ratio that the account is a throwaway increases by the amount of that coefficient.

We present the results of this classification model to highlight two important findings: (1) sexual abuse related posts made using throwaway accounts and identified accounts are linguistically different enough that we can quantitatively distinguish between the two types, and (2) the words and sets of words here contribute to the characterization of anonymity in sexual abuse forums. We hesitate to speculate regarding the nature and meaning of the unigrams and bi-grams that are significantly different between throwaways and identified accounts. However, we note several terms more common in throwaways that may connote childhood sexual abuse (e.g., "child," "mom even," "her younger"), potentially signaling adulthood disclosure of abuse from one's childhood. We also identify several temporally related terms (e.g., "than month," "for years"), as well as terms that may be related to alcohol consumption (e.g., "so drunk," "and drank," "messed up"). We cannot base empirical conclusions on the presence and frequencies of these words, but they help us to characterize the distinct features of purely anonymous vs. less anonymous sexual abuse posts on reddit. This analysis complements our qualitative analysis in which we uncovered meaning by understanding words and phrases in context.

RQ3. What factors are significantly associated with support seeking? How do these factors differ between direct and indirect support seeking?

To answer the first part of this question, we developed a logistic regression model using backwards variable selection to identify the optimal model (see Table 4, model 1). This model suggests that emotional disclosure, specifically feelings of neglect (e.g., worthless, embarrassed, stupid, lonely), is significantly positively related to indirectly seeking support.

It has been suggested that the more lonely people feel on social media, the less they will engage in directed communication [9]. It is also possible that if a person feels worthless and embarrassed, she does not feel like she deserves other's time and support, and as such does not ask for help directly. She may potentially feel even more neglect if she does ask for help directly and does not

	By count	By tf-idf	Unigrams occurring with similar frequency in throwaway and identified accounts
Unigram or Bi-gram	Coefficient		
More likely to occur in throwaway accounts			
dating she	0.61***	0.33**	
down crying	0.52***	0.26**	about
she has	1.09***	0.41†	just
uncomfortable and	0.42***	0.33***	all
frank	0.43***	0.37***	because
hand was	0.38***	0.27*	time
know	0.91***	0.85**	feel
bit and	0.44**	0.04	really
toilet	0.55**	-	want
like because	0.33**	0.08	told
stuff with	0.45**	0.24†	one
child	0.44**	0.25	now
sleepy	0.37**	0.39**	even
it up	0.32*	0.13	after
than month	0.49*	0.28**	never
to talk	0.41*	0.30†	years
because was	0.45*	0.33†	happened
so drunk	0.30*	0.21	think
messed up	0.31*	0.11	over
it was	0.74*	0.73*	being
costume	0.37*	0.24**	back
her younger	0.31*	-	myself
nothing too	0.34*	0.27**	some
her virginity	0.45*	0.25†	said
sex	0.45*	0.34†	more
of stress	0.29*	0.12†	things
like	0.52*	0.19	go
to do	0.45*	0.09	still
etc but	0.25*	0.21*	people
and drank	0.04	0.42***	going
for years	0.23	0.35*	much
mom even	-	0.26*	life
very	0.36	0.47*	started
ass	0.31†	0.36*	
More likely to occur in identified accounts			
weird	-0.68*	-0.20	any
me	-1.21*	-0.85†	friends
or	-0.67*	-	other
in	-0.93*	-0.69	went
to	-1.45*	-1.00	tell
and	-0.59	-1.86**	only
model deviance	524.3	557.71	remember
†p<0.10; * p < .05; ** p < .01; *** p < .001			help

Table 3. Unigrams and bi-grams that occur with significantly different frequencies in throwaway vs. identified accounts, and unigrams that occur with similar frequencies in each.

receive it. A person in this situation may not directly seek support, to preemptively defend against potential neglect.

To answer the second part of this question, a second logistic regression model (see Table 4, model 2), again developed using backwards variable selection, suggests that first-time disclosures and explicit questions are predictors of directly seeking support. The fact that explicit questions are associated with direct support seeking suggests that most of the time when people asked for direct help, they framed it in form of a question, which is not surprising. However, the more significant finding here is that reddit is used as a platform for first-time disclosures of sexual assault and rape, and that these first time disclosures are significantly linked to support seeking. This is important because of the highly stigmatized context of sexual abuse and rape. Many abuse and rape events remain unreported to authorities or undisclosed to friends, family, and mental health professionals. These online forums have created alternative spaces where disclosures that might have otherwise remained silent have a voice, and people can seek support.

Variable	Seeking support indirectly (Model 1)	Seeking support directly (Model 2)	First time disclosure (Model 3)
	Coefficient (Standard error)		
Seeking instrumental support directly	-	-	2.45** (0.92)
First time disclosure	-	1.96* (0.83)	-
Explicit questions	-	4.04*** (0.63)	-
Attitudes toward	-	-	1.60* (0.68)
Shame	-	-	0.94† (0.54)
Neglect	1.15** (0.38)	-	-
Intercept	-1.54*** (0.22)	-0.677** (0.23)	-3.85*** (0.66)
Nagelkerke R^2	0.07	0.55	0.20

†p<0.10; * p < .05; ** p < .01; *** p < .001

Table 4. Logistic regression model examining factors associated with support seeking and first time disclosures.

Whether these online disclosures lead to significant support and improved psychological outcomes is an important topic for further study.

RQ4. What post-related factors are significantly associated with first-time disclosures (i.e., disclosures happening for the very first time offline and online)?

Because first-time disclosures are significantly related to direct support seeking, we investigated what factors are significant predictors of first-time disclosures. Results of a final logistic regression model (see Table 4, model 3) suggest that seeking direct instrumental support and expressions of attitudes towards disclosure are significantly linked to first-time disclosures. This suggests that first-time disclosers are likely to seek very tangible and explicit support, and similar to the first model (Table 2, model 1), they might feel that they need to provide context as to why they are disclosing, or why they have not done so before.

DISCUSSION

When choosing between anonymity and identifiability, people face trade-offs [39]. For example, when anonymous, one can avoid embarrassment or criticisms that might, in Goffman's terms, threaten self-image ("face") [31]. In the context of sexual abuse, potential retaliation is another reason why people might seek anonymity. Anonymity can make people feel less inhibited, but being identified might help them be perceived as more credible and trustworthy by others, which may influence their decision to provide support. Thus, disclosure of high-stress events leads to a dilemma: "how to disclose enough of one's misery to gain the benefits such revelations can provide, without disclosing in such a way or to such an extent that it will drive others away" [15:230]. Our analysis suggests that when people seek support in stigmatized traumatic contexts such as sexual abuse, they face a trade-off between choosing anonymity (e.g., by using a throwaway account) and being potentially identified. While people would feel more disinhibited if anonymous, they might choose to be identified to higher the chances of receiving the desired response and support or to establish credibility, membership, and trustworthiness.

In the specific context of reddit, both throwaway and identified accounts are anonymous to some extent, allowing for more disclosure depth and breadth than fully identifiable interactions, but there are important nuances between the two levels of anonymity. Our analysis of the differences between sexual abuse disclosures in these two levels of anonymity highlights that throwaway accounts elicit more direct and indirect support seeking, posts from men, and expressions of disclosure attitudes.

We find that throwaway accounts enable significantly more support seeking than identified accounts. We have discussed the possibility that when asking for help, a person may look weak or less competent and does not wish to give off that impression [31], and therefore chooses the more anonymous option. Although we have discussed some possible explanations based both on our data and on literature about self disclosure and sexual abuse, we do not know why these redditors chose to use throwaways to seek support, why they chose reddit to make these disclosures, or if they also used other online support forums. Understanding the lived experience of sexual abuse disclosure online and concomitant support seeking is an important area for future research.

We also find that throwaway accounts are used significantly more often by a population who finds disclosure more difficult in the context of sexual abuse: men. A variety of masculinity ideologies, norms, and gender roles play a part in discouraging men's help-seeking behavior [1]. Even though prior work suggests that more women use throwaway accounts [42], this was not the case in our analysis, pointing to the importance of a context-specific approach to anonymity research. This finding also highlights the importance of anonymous platforms and identity segmentation tools [24] such as throwaway accounts on reddit to encourage support seeking in populations that otherwise find it hard to self-disclose and ask for help.

Sexual abuse and its aftermath can entwine online and offline social experiences. The sexual assaults described in our data took place offline, while the disclosures we analyzed took place online. Sometimes, these disclosures were reported to take place for the first time online, while other times these disclosures occurred after a previous offline disclosure. Talking about one's experiences, feelings, and thoughts, and asking for support, are

fundamental needs that often remain unmet for abuse survivors. In our analysis we found that people expressed a desire to disclose, and referred to their unmet disclosure-related needs (e.g., social support). Prior work has suggested that online support groups could help meet needs unmet in non-mediated relationships [23]. Unmet needs might be due to one's lack of access to a critical mass of similar others, or because one's offline ties may be unsupportive when a sensitive issue is disclosed and support is desired, or because one needs a break from the double-edged sword of obligation and dependency that often comes with support seeking in offline close relationships. Other work suggests that online spaces are not particularly convenient places for instrumental support [67], where people will need to actually do something "tangible" to help out. However, the fact that instrumental support seeking and expressing attitudes towards disclosure (e.g., need to disclose), are significantly related to first-time disclosures, suggests that many people whose needs have been unmet in other social contexts seek tangible support as they disclose abuse-related stories on reddit for the very first time. Uncovering reasons *why* one would disclose on reddit or other online platforms for the first time ever is an area for future research. Although people can use the very different affordances for communication that online and offline spaces provide to their advantage, the long-term effects of support that is sought and provided in these different contexts is unknown and the ways that online support seeking - as we observed in our data - can lead to longer term support is an area for further investigation.

We observed significantly distinct content in throwaway posts based on our mixed methods as well as text mining approaches. We suggest that subreddit moderators could be given access to interface features that highlight potential support seeking and sensitive disclosures in throwaway accounts so that they could suggest additional support, as our analysis indicates may be necessary. This could help redditors identify offline options for support with the goal of improving well-being of abuse survivors. In future work, we plan to study responses that abuse-related posts attract. This will allow us to delve into the types of disclosures that elicit more or less supportive responses, and the role of anonymity proxied through throwaway accounts.

Ethical Considerations
Although we attempted to capture aspects of posters' nuanced and complex experiences through our coding and analysis, we acknowledge the limitations and potential misrepresentations that can occur when researchers analyze social media data, particularly data from a vulnerable population or group to which the researchers do not explicitly belong. Similar to Pater et al.'s approach in their research involving publicly-available social media data from people with eating-disorders, we "as researchers have attempted to keep in mind our own group memberships, identities, and potential lack of knowledge about that group's experiences, challenges, and values" [49]. The data

used for our study was publicly available, and though it is common practice in social computing research to analyze such data without the posters' consent or knowledge, we are cognizant of the ethical limitations that occur in the absence of consent and feedback from the study population. For example, if our analysis misrepresents sexual abuse survivors' experiences, our methods do not allow for illumination from posters. In future research, we hope to engage study populations in a more collaborative approach.

To reduce risk of participants' data being resurfaced (e.g., through Google searches of quotes), we changed quotes slightly and used paraphrasing to obfuscate posters' data, a common method in ethical social computing work.

The two researchers who coded this data frequently talked to each other about the impact that immersing themselves in stories of sexual abuse had on them. Reflexivity is a part of many human-centered research traditions, but it is not common in HCI to discuss how research impacts researchers [46]. Building support networks among researchers is critical, and HCI culture seems well-suited to sharing narratives and developing awareness about researchers' occupational vulnerabilities [3].

CONCLUSION
In spite of the importance of self-disclosure and support seeking for survivors of sexual abuse, little HCI research has focused on understanding the experiences of survivors who seek help online, or the characteristics and affordances of online spaces (e.g., anonymity) that encourage or discourage these disclosures. In this study, employing both qualitative and quantitative methods, we address this gap by investigating self-disclosures by sexual abuse survivors and exploring the relationships between anonymity, disclosure, and support seeking by analyzing posts from both throwaway (providing more anonymity) and identified accounts on abuse-related subreddits. Our qualitative analysis contributes a characterization of abuse-related posts in online spaces through a self-disclosure perspective and suggests that there is considerable deep and detailed storytelling, emotional disclosure, and direct as well as indirect support seeking. Our quantitative analysis indicates significant differences exist between posts from identified accounts and throwaway accounts. Posts from throwaway accounts are significantly linguistically different than posts from identified accounts. Additionally, posts including support seeking, references to attitudes toward disclosure, and posts by men are more likely to be posted using throwaway accounts. Analysis of first-time disclosures suggests that survivors whose needs have not been met in other social online or offline contexts seek tangible pragmatic support as they disclose abuse-related stories on reddit for the very first time. Our work reveals the potential of designing new kinds of provisions that subreddit moderators could use to identify potential support seeking and sensitive disclosures by throwaway accounts, so that they can direct timely help and support.

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