



Remember the Human: A Systematic Review of Ethical Considerations in Reddit Research

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Reddit is one of the world's most prominent social media platforms, and also a valuable source of data for internet researchers. However, working with this kind of data also presents novel ethical complications for researchers, including issues around privacy, vulnerable populations, and unintended consequences. This paper describes an analysis of 134 papers that rely on Reddit data while also including some discussion of ethical implications and/or considerations by the researchers. Our analysis of these papers reveals common ethical issues and ethically motivated methodological decisions, as described by the researchers themselves, while also exposing some gaps for further ethical contemplation for researchers relying on Reddit data. Based on these findings, we close with a set of recommendations for ethically-informed methods and reflection for researchers working with social data.

CCS Concepts: • **Human-centered computing** → **Collaborative and social computing**.

Additional Key Words and Phrases: ethics, privacy, public data, Reddit, research ethics, research methods, social computing, systematic literature review

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1 INTRODUCTION

Reddit is one of the web's most prominent social platforms with over 57 million daily active users as of 2022 [2] and over 138,000 active topical “subreddit” communities [73]. Because of its prominence, influence, and history of controversy, Reddit has also become a valuable data source for internet researchers in various fields, including social computing. For example, research using data from Reddit has covered a spectrum of topics—from social support [44, 93] and professional practice [25, 63] to conspiracy theories [103] and content moderation [52, 58]. A comprehensive review of Reddit research between 2010 and 2020 revealed a steady increase in the number of papers published year over year [91].

Part of what has made Reddit such a valuable data source is that it is largely composed of publicly visible content and, until April of 2023, it offered a free and open Application Programming Interface (API) for collecting that content. Additionally, Reddit's topic-specific subreddit structure

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provides a focused means for researchers to locate relevant conversations, discussions, and debates to mine and analyze. In early 2023 when Twitter drastically limited API access, some researchers suggested that Reddit may become a more popular site for data collection to help fill a gap left by Twitter [65]. However, months later, Reddit also announced its own changes to its API, placing restrictions on data that could be accessed for free, and claimed that these changes were made in response to concerns about the way Reddit data was being used, most notably in training large language models.¹ While Reddit has stated a commitment to allowing not-for-profit researcher access, these changes introduced uncertainty around what data can be accessed, how, and under what conditions.

While it remains to be seen how Reddit's API changes will ultimately impact the production of scientific knowledge, the ethical issues scientists encounter as part of the process of gathering, using, or sharing this type of data (on Reddit or elsewhere) remain and, in some ways, have become magnified. While discussions on Reddit are primarily public in that anyone, with or without a Reddit account, can view the content (with the exception of private subreddits), those discussions sometimes also include highly sensitive or individually identifiable information, or come from populations at risk, or from individuals with a false sense of the reach of their content. Though these ethical complications are not entirely specific to Reddit, the growing popularity of the platform as a research site makes it instructive for examining current practices, as well as providing both specific and general recommendations for researchers. Further, with the previously most common ways of accessing Reddit data no longer available, researchers may begin seeking alternative means that could violate users' expectations or even place researchers themselves at risk. As we move further into the "post-API age" [45], it is increasingly important to keep ethics at the forefront of discussions about data access and use [114].

Building upon recent empirical work designed to help inform best practices for research ethics in social computing, including understanding researcher practices [107, 117], limitations and challenges of regulatory ethical review [18, 35, 116], and the perceptions of people being studied [39, 47, 118], as well as work that emphasizes the contextual nature of research ethics [122] and patterns in variation across platforms [46], we conducted a deep dive into current practices for research ethics on Reddit specifically, as they are described in published work. We conducted a qualitative analysis of 134 research publications that used Reddit data and included any mention of ethical concerns or deliberations within the manuscript. Our work here builds upon the systematic review of Reddit research that we conducted in Proferes et al. [91] that provided a quantitative account of whether a paper mentions ethics review, among other descriptive variables. Our qualitative analysis presented in this paper provides greater detail on how researchers are confronting ethics issues associated with Reddit research, allowing us to describe the most common "ethical considerations" across a range of disciplines, including what researchers perceive as potential harms, and in some cases, the steps they took to mitigate those harms. Through our more qualitative lens, we provide a bottom-up account of potential emerging norms or ethical practices for Reddit research.

Our goal with this work is to understand how researchers are confronting ethical issues in research that uses Reddit data and to raise awareness of different approaches to these problems. Ultimately, we suggest researchers follow a cue from Reddit's own values statement and center ethics discussion practices that focus on the impacts on the research subjects, thereby "remember[ing] the human" [1]. We provide a set of recommendations meant to help researchers engage in ethical reflection on their methodological decisions during the research process, and in publications.

¹https://www.reddit.com/r/reddit/comments/145bram/addressing_the_community_about_changes_to_our_api/

2 BACKGROUND AND RELATED WORK

2.1 Research Ethics for Public Data

Broadly, research ethics describes a set of guidelines for the responsible conduct of research, traditionally focusing on research involving human subjects. Globally, various organizations have created ethical guidelines for the protection of human research subjects, such as the Australian Research Council, the Canadian Tri-Council, The Research Council of Norway and its National Committee for Research Ethics in the Social Sciences and Humanities, the United Kingdom's National Research Ethics Service, and the Forum for Ethical Review Committees in Asia and the Western Pacific (FERCAP), and the United States Federal Policy for the Protection of Human Subjects, known as "The Common Rule" (45 CFR § 46).² While specific ethical requirements and procedures vary across these jurisdictions, a basic set of principles exists across most research ethics guidelines, stemming from shared principles of respect, beneficence, and justice. These include minimizing harm, obtaining informed consent, and protecting subject privacy and confidentiality.

Internet research ethics has been a topic of scholarly work for at least two decades, considering issues such as the scope of public versus private [12], how people react to being studied online [55], and how we might protect subjects from re-identification [15]. In their overview of the domain, Buchanan and Zimmer [16] point to a growing number of questions confronting researchers (and ethical review boards) when using data from online sources:

What ethical obligations do researchers have to protect the privacy of subjects engaging in activities in "public" internet spaces? What are such public spaces? Is there any reasonable expectation of privacy in an era of pervasive and ubiquitous surveillance and data tracking? How is confidentiality or anonymity assured online? How is and should informed consent be obtained online? How should research on minors be conducted, and how do you prove a subject is not a minor? Is deception (pretending to be someone you are not, withholding identifiable information, etc.) an acceptable online norm or a harm? How is "harm" possible to someone existing in an online space? How identifiable are individuals in large data sets? Do human subjects protections apply to big data?

A growing number of scholars have started to confront many of these open questions around the use of internet-based data for research (see, for example, [40, 80, 123]), which aligns with greater attention to research ethics generally within the field of human-computer interaction, including case studies of how both ethics review bodies and researchers handle specific projects [5, 83, 109]. Additionally, multiple scholarly associations have worked to provide ethical guidance for internet researchers, including the American Psychological Association's Advisory Group on Conducting Research on the Internet,³ the Association of Internet Researchers (AoIR) Ethics Working Group,⁴ and the SIGCHI Research Ethics Committee.⁵

Though research practices vary from discipline to discipline and regulatory practices vary from country to country, we see similar patterns of concern around research review processes and challenges for researchers from, e.g., Canada, Europe, South America, and the U.S. [5, 14, 18, 35, 83, 117]. In addition to disciplinary responses as noted above, there have also been regulatory responses to these challenges around internet-based research. For example, the U.S.-based Secretary's Advisory Committee on Human Research Protections (SACHRP), which provides expert advice and recommendations on issues pertaining to the protection of human subjects in research to the Department of Health and Human Services, affirmed that the fundamental research ethics principles of respect

²For a broad overview of international research ethics standards, see [86].

³<https://www.apa.org/science/leadership/bsa/internet/internet-report>

⁴<https://aoir.org/ethics/>

⁵<https://sigchi.org/committees/>

for persons (ensuring autonomy), beneficence (minimizing harm and maximizing benefits), and justice (fairness in benefits and burdens) still apply, and that “regardless of how the regulations may be interpreted in individual studies, adherence to these fundamental principles is important to encouraging public trust in the ethical conduct of internet research” [87].

This “public trust in the ethical conduct of internet research” has been strained in recent years, particularly in the wake of high-profile examples of research ethics controversies [50, 81, 121] and as the amount of empirical research has increased, particularly in the social computing and medical research communities. Research studies have shown, for example, a lack of consistency or guidance in ethical review for such research [5, 35, 83, 116], challenges for researchers in making ethical decisions [107, 117], both negative and nuanced reactions to being studied from social media users [9, 32, 39, 47, 118], and potential harms and challenges for protecting privacy [7, 15, 122].

There have been some attempts to map how researchers are confronting these questions in particular domains. For example, for HCI generally, Salehzadeh Niksirat et al. counted instances of research ethics-related disclosures, such as mentions of ethical review board (ERB) approval or consent processes and found that over a five-year period there was an increase in these disclosures in papers published at CHI [101]. With respect to internet research specifically, Stommel and de Rijk [110] examined manuscripts from discourse analysis-oriented journals that relied on publicly accessible online data, finding, “roughly one-third of the articles (85 out of 132) did not discuss ethical issues, mostly claiming the data were publicly available” and “approval from research ethics committees was mostly regarded unnecessary.” Chancellor et al. conducted a systematic review of papers that use social media data for mental health prediction, identifying a number of challenges related to research ethics, including multiple potential risks to communities [19]. In their study of papers using Twitter data, Zimmer and Proferes [124] found less than five percent of papers discussed going through some sort of ethics review. Finally, Taylor and Pagliari [112] examined how research sponsors and researchers themselves were addressing the ethical challenges of mining social media data by analyzing a “corpus of research ethics guidelines and published studies in one interdisciplinary research area” and that less than a third of health-related studies involving social media data, “only 50 of which mentioned ethical concepts, in most cases simply stating that they had obtained ethical approval or that no consent was required” (p. 2). Taylor and Pagliari concluded there was a deficit in ethical guidance for research involving data extracted from social media [112].

This apparent gap in ethical guidance for internet research generally, combined with concerns about ensuring public trust in the ethical conduct of internet research and the likelihood of Reddit or similar sources of data continuing to be a common site for this research, motivates our study on how Reddit researchers address ethical concerns within their publications.

2.2 Reddit and Research

Describing itself as the “front page of the internet,” Reddit is a popular content aggregation site where users share articles, photos, videos, and discussions. Unlike social networking sites such as Twitter that organize content around user profiles and where feeds consist of content shared or liked by people users have chosen to follow, content on Reddit is organized around user-created communities known as “subreddits.” Subreddits are often topic-oriented and cover a wide variety of subjects, themes, and media types. Subreddits are typically public-facing in that anyone can view content, such as posts and comments. However, only registered users can submit content. Registration on Reddit is a straightforward process—all that is required is a unique username and password, but no other verification. While all Reddit users are bound by its Content Policy, subreddits are free to create their own set of rules [38]. These rules are created and enforced by volunteer moderators, who are also users of the site, and who shape the content shared and discussions had on each subreddit [48].

Reddit's unique sociotechnical affordances, such as topic-oriented communities, popularity, and open API resulted in the platform becoming a popular site of study. Articles use a variety of methods, from human subjects research such as interviews or surveys (e.g., [30, 57]) to qualitative analysis of trace data (e.g., [25, 93]) to computational analysis (e.g., [22]). They also address a variety of topics: for example, content moderation, such as supporting healthy communities (e.g., [54]), the role and labor of volunteer moderators (e.g., [60]), and the impact of content removal on Reddit users (e.g., [58]). They also explore how people engage online, such as anonymity preservation tactics [67], voting patterns (e.g., [68]), and how people engage with the information they encounter on Reddit (e.g., [62]). Reddit research has also addressed specific topics discussed on Reddit and what values Reddit users hold. For example, topic areas include academic discussions [105], parenting [4], professional UX practice [63], mental health, [99], and conspiracies [103]. While this work relies on a variety of approaches, including human subjects research, much Reddit research draws from analyses of public data [91]. However, as noted in the introduction, researcher access to Reddit data face restructuring as of summer 2023.

Additionally, the variety of purposes Reddit serves for its users, and therefore researchers, adds a layer of complexity to ethical considerations for Reddit research. Recent work [46] studying users' perceptions across three different social media sites, including Reddit, shows that while users across platforms are generally more comfortable with data use when informed consent is given, there are also differences in attitudes and expectations. For example, while Reddit users tend to be more comfortable and less concerned with research uses of their data, they also reported valuing privacy [46]. These variations highlight the need for exploring platform-specific approaches to research ethics, particularly within complex and multi-purpose platforms like Reddit. With that in mind, one overall goal of this work is to identify best practices for use in future research.

3 METHODS

The corpus of papers that serves as the basis for our analysis comes from our previous data collection in Proferes et al. [91]. In that systematic analysis, we identified published manuscripts that have the term "Reddit" in their title, abstract, or keywords, and were published in a journal, conference proceeding, or as a book chapter, between 2010 and 2020. That data collection resulted in a corpus of 727 manuscripts. However, unlike our previous quantitative approach, or similar work that counts instances of research ethics related disclosures [101], our goal here was to examine qualitatively *how* ethical considerations in the research process are discussed in these papers.

As part of our previous analysis, we had examined this corpus of papers for any mention of research ethics or related issues. Our inclusion criteria included (1) mentions of review by an ERB or other review body (as also noted in [91]), or an explicit statement about not seeking such review (101 papers in total mentioned ERB review, or the choice not to seek it); or (2) any ethical discussion about the research regardless of review status, such as discussions about research subject privacy or ethical/moral justification for the research (we found 83 papers that did this, beyond mentioning review). In sum, we identified 184 (just over 25%) as touching on the *concept* of ethics (even if that included a negative mention, such as "we did not seek ethics review"). We do note that disclosure of ethics review in a publication is also not always standard practice even for human subjects research, nor is explicit discussion on the page of ethically motivated decisions. Thus, we do not assume that manuscripts that did not discuss ethics as part of their publication did not go through ethics review, that those researchers did not consider ethics, or did not make conscious ethical decisions, nor do we make assumptions about how authors confront or think about ethical issues. Rather, this paper focuses on how authors discuss ethical issues in their papers. Therefore, as our analysis is focused directly on how researchers engage in ethics discussions as part of their publication practices, those

lacking any mention within the publication cannot be considered. Following the creation of this new dataset, we conducted a secondary thematic analysis of the 184 papers, as described below.

In conducting a qualitative analysis of the ethics-related content in this collection of papers, we used an approach based on thematic analysis [11]. As a first step, we familiarized ourselves with the data and generated initial codes. All five authors independently conducted open qualitative coding of 10% of the corpus, then discussed and iterated on a collective set of codes to be used as part of the full analysis. Though the initial code generation stage of thematic analysis is typically conducted over the entire corpus, due to the size of the corpus we deviated from this practice in using a subset; however, during the next stages we continuously checked in as themes emerged to ensure that our initial codes were representative of the overall dataset. The initial codes that guided our analysis included:

- Reddit data as "public"
- Anonymization of usernames, such as the inclusion of pseudonyms
- Obfuscation or fabrication of quotes
- Formal review by an ethical review board or similar committee
- Analysis reported in the aggregate as an ethical decision
- Any specific statement about ethics, consent, or ethical review, as appearing to be required by the publication or publishing venue itself
- Ethical decisions based on the sensitive nature of the subreddit or Reddit data
- Content excluded on ethical grounds (for example, a researcher mentioning they explicitly did not collect certain types of content for ethics-based reasons)
- Possible misuse or unanticipated consequences of their research
- Risk versus benefit analysis of research
- Discussion of whether user consent was obtained
- Citations to materials used for any kind of ethics-related discussion (for example, citations to ethical decision-making guides, other work that dealt with similar research ethics issues, etc.)
- Where the ethical discussion occurred in the paper
- The overall depth of the ethical discussion

These facets are not necessarily exhaustive nor mutually exclusive, and they represent various levels of complexity and conceptualization. Our identification and analysis of these is not for purposes of providing an unequivocal quantitative analysis. Rather, they served as a mechanism for flagging manuscripts for comparison and identifying patterns through a qualitative thematic analysis. For this type of qualitative analysis focused on theme generation, the codes served as a process rather than a product, and so the goal was not agreement but to yield themes [78]. During this initial coding process, we also narrowed the dataset to papers that use Reddit data in some way, excluding those that, for example, only recruited Reddit users for interviews or surveys but did not use Reddit data itself. This left us with 134 manuscripts that have some discussion of ethics in the context of research using Reddit data. The bibliographic information for the 134 manuscripts we worked from is available in Appendix A. Please note that the works we directly quote additionally appear in the "Works Cited" section.

Once this process was complete, we then returned to the manuscripts that were tagged for particular properties and produced theme memos, identifying salient features of each topic as expressed by the collection of papers that it appeared in. During this process, we had multiple discussions about emergent themes, in which we further synthesized and defined those themes. The findings represent a synthesis of the major themes that we uncovered in this data, along with illustrative examples. With respect to reporting this analysis, we include quotes from papers along with citations so that these papers can serve as examples, and readers can seek them out for more

detail. However, given the evolving norms in our research community, and that our intention in this work was to highlight examples to help researchers make their own ethical decisions, we used our discretion in not quoting verbatim or citing when we felt the mention might draw unwelcome attention to the researchers or to members of a particular Reddit community.

In any qualitative interpretive research, the researchers serve as a partial lens for these interpretations. Therefore we considered our own positionality when conducting this research. All but one of the co-authors are affiliated with US-based institutions of higher education and our approach to research ethics are informed partially by U.S. federal regulations and the practices of Institutional Review Boards. That said, we share commitments to broader pursuits of ethics, fairness, and justice beyond what might be codified in specific U.S. research ethics guidelines. We span disciplines of computer science, data ethics, human-computer interaction, information studies, and political science, and have been trained in the United States, Canada, and the United Kingdom. We are all Reddit users, two authors are active volunteer moderators, and three authors have previously published research based on Reddit data.

4 FINDINGS

The findings reported below represent a synthesis of the major themes identified through our analysis of the key facets described above. These categories are not put forth as firm metaphysical divisions, but are organized based on our understanding of key research ethics issues related to Reddit-based research and are meant to serve an organizational function to guide our thinking around these complex issues.

4.1 Structural Features of Ethical Discussions

The substance of research ethics discussions varied considerably across our dataset. In some cases, authors provided multi-paragraph discussions detailing their thinking, decision-making, and compliance practices. In other cases, authors provided a single sentence that stated that ethics approval and consent to participate was or was not applicable to their project. The majority of such statements or discussions were within the “methods” portions of these papers, and some included separate sections labeled “ethical considerations” or similar. In a few cases, ethics-related conversations were diffused throughout the paper or were built into the foundational background of the projects as part of the literature reviews.

The depth of the discussions authors engaged in varied even among similar projects or potential ethical issues. For example, one analysis of the subreddit “r/cancer” [33] dedicated multiple paragraphs in the literature review, methods, and discussion to the ethics of studying a vulnerable population, particularly when using their data without a consent process, even though the data is public. In contrast, another paper described a project focused on oncology patients’ experiences in treatment (many drawn from “r/cancer,” but not exclusively), and simply noted in a single sentence that institutional board approval was unnecessary because Reddit is public.

Some of the discussions noted above include citations for ethical or methodological justification. As part of our analysis, we also looked at what authors were citing and found that they drew on a variety of different sources as part of making their arguments. There were three general categories of citation practices that appeared in the corpus. The first category included ethical guidelines, such as the Association of Internet Researchers’ guidelines [72]. Authors frequently used these guidelines to justify particular practices or approaches used in their own papers. The second category of references included papers that were broadly about more generalized ethical concerns, such as ethical issues in qualitative research on internet communities [34] or ethical issues in using social media for health and healthcare research [79]. The final category included situations in which the author drew on a specific example of how another author had approached

a research ethics issue in their study, for example, how one set of researchers approached how to ethically study individuals in a disordered eating community [20].

4.2 Ethical Review

Nearly half of papers in our corpus mentioned that the research methodology was evaluated by an ethical review board (ERB) or a similar review body. In most cases, this took the form of a generic statement that ethics approval was received, without further detail (e.g., “Our Institutional Review Board approved the study.”), or that the review body determined the research was exempt from full review (e.g., “Our study was found to be exempt from Institutional Review Board (IRB) approval”).⁶ When a formal review body was specifically mentioned, U.S.-based IRBs were most commonly referenced, but studies also mention relevant ethical review committees from British, Canadian, Swiss, and Australian universities. Other studies from Sweden and Germany, for example, made reference to adhering to local laws and regulations in the absence of formal ethical review bodies.

Multiple papers provided a simple statement indicating that because the data collected was considered public, formal ethical review was not needed or there was “no reasonable expectation of privacy.” Others made the assertion that human subjects were not involved in research, thus alleviating the need for ERB consideration. In such cases there typically was no mention of consulting with an ERB and it appeared these determinations were made by the researchers themselves (e.g., noting that “IRB approval was not required”).

A few papers noted that while ERB approval was not needed, they nonetheless consulted informally with their ethics review committee outside the formal review process to gain general advice. Others noted how the sensitive nature of their study prompted them to consider the ethical dimensions of their work more deeply, and thus sought a formal review from their ethical review board nonetheless. For example [88]:

Typically, public online content can be analysed without formal ethical approval. However, research involving vulnerable groups like victim-survivors raises ethical concerns. For example, it was important in this research that victim-survivors’ disclosures remained anonymous, despite their posts being publicly visible. Some victim-survivors indicated that their online disclosure was the first and only place they had discussed their experience of sexual violence. Because of these considerations, I sought ethics approval from RMIT University’s Human Ethics Advisory Network to analyse posts.

Other papers also engaged in a deeper discussion of their ethical obligations even if the research did not meet the criteria to require formal ERB review. For example:

All data was publicly available when gathered, and the researchers had no interactions with users—therefore, our research did not qualify for ethics board review at our institutions. However, we are obligated to protect the privacy and anonymity of the users in our dataset because of these risks. [21]

Some papers also cited legal rather than ethical regulations—for example, a decision not to share data due to the EU’s General Data Protection Regulation (GDPR) or a statement that data collection practices abided by Reddit’s Terms of Service. Due to Reddit’s public API, it has been largely unnecessary to violate their rules to collect data, though regardless, there is disagreement in the academic community about whether TOS violations are unethical [37]. However, though they both have an API, unlike Twitter [39], Reddit’s privacy policy does not include any statements about external researchers being potential data users. Still, in part due to issues of readability and

⁶Note that an Institutional Review Board (IRB) is the title for ERBs at universities in the U.S.; in other institutions and locations they might be called, for example, independent ethics committees (IEC) or research ethics boards (REB). In this paper we refer to ethics review bodies in the general as ERBs and in the more specific (e.g., IRB) when appropriate.

vagueness, it is unlikely that even if the content policy did warn users about the potential use of their content for research purposes, that would constitute formal consent [37].

4.3 Consent

Only a small portion of papers made specific mention of the principle of informed consent related to their research methodology, with most noting that consent was not needed given the public nature of the data collected. For example, one paper noted that a public RSS feed meant that a subreddit was “public in practice” and therefore informed consent was both not necessary and also impossible to achieve.

Some papers considered subjects’ likely expectations of privacy in determining the need for consent, for example, one noting that “public subreddits are built around an expectation that user contributions will be popular, be upvoted and increase in public visibility” [13]. Other authors noted the impracticality of obtaining consent from such a large number of generally anonymous users. In one case, the author noted that attempting to obtain informed consent might “disturb or alter behavior” and thus potentially compromise the data sought for the research project [69], a phenomenon known as the Hawthorne effect.

Others similarly acknowledged the difficulty of obtaining consent, but instead discussed other means of addressing subject privacy and research ethics broadly in the absence of consent. For example:

The lack of informed consent given by social media users for data usage leads to ethical questions. In particular, confidentiality with respect to the publication of research results is an issue. [3]

One paper noted that while the publicness of Reddit data obviated the need for gaining consent, the authors recognized that Reddit users might not fully understand how their data might be included in a research study. To partly alleviate such concerns, the authors obtained consent from the subreddit’s moderators [27]. A handful of other papers also noted engaging in discussions with moderators or a “Reddit Community Manager” to obtain their consent prior to data collection. One paper also discussed doing extensive consultation with the community prior to the study:

Informed consent was waived for this study, which involved months of community consultation and approval. I debriefed the community about the study conclusions in a community-wide announcement visible to anyone visiting r/science. [76]

The fact that some subreddits have explicit rules about or against research requests (e.g., r/girlgamers, r/IndianCountry, and r/Drugs) suggests there may be some concern or even fatigue within some subreddits around such requests [31, 53]. Therefore, reaching out to moderators helps familiarize a researcher with a community’s norms [32].

4.4 Publicness of Reddit Data

Throughout these discussions around both ethical review and informed consent, researchers commonly invoked the “public” nature of data collected from Reddit. A large number of papers note that Reddit content is inherently public (some using framing such as “public discourse” or “public domain”) since no login is required to access what is posted and discussed on the site (with the exception of private subreddits not openly accessible). For example:

An important ethical aspect to consider is whether the selected online fora can be considered public or private. We contend that the selected subreddits, which represent thousands of members, can be considered publicly available. Anyone who is interested, and who has online access, may explore posts on the selected subreddits, thus rendering the data public. [96]

As noted in the previous section, this publicness of Reddit data was framed as both a benefit of studying Reddit compared to more closed platforms, and also as reasons for why consent or ethical review is not required due to an assumption of participants' (lack of) expectations of privacy.

However, research has shown that users often have differing understandings of what it means for information to be "public." For example, Proferes [90] found Twitter users had sometimes incorrect understandings of whether or not any web-goer could view tweets or if a Twitter account was required, how long public tweets were accessible for, the fact tweets were accessible by the APIs for bulk-collection, and the kinds of metadata that were associated with tweet content [90]. In another study by Fiesler and Proferes [39], many Twitter users were unaware that researchers can and do collect their data, despite this being explicitly mentioned in Twitter's privacy policy.

Other papers noted that access to data was gained via an RSS feed or, more commonly, through Reddit's API or Pushshift, a popular platform developed to provide researchers easy access to Reddit data. Other tools, such as Elasticsearch and custom Python scripts, were also mentioned to assist with processing large amounts of Reddit data. In at least one case, researchers noted they were able to retrieve data from a subreddit recently banned from the platform due to a lag in removing that data from the API platform.

In some cases, however, researchers acknowledged that while Reddit content is public, ethical considerations drove them to take steps to protect user privacy nonetheless. For example:

Although Reddit data (like Twitter) are public, and research using public social media is typically granted exemption from review by IRBs in the US context, ethical considerations—particularly with respect to privacy—remain. In this paper, in order to protect user anonymity, we did not present user identifiable information (eg, direct quotations, usernames). [89]

Other researchers noted how participants in subreddits discussing sensitive or controversial topics (discussed in more detail below) might not expect their posts to be readily accessible outside of those particular communities. Thus, additional steps were also taken in such cases to protect subjects' privacy. For example, researchers studying a subreddit community of victim-survivors of sexual violence noted:

Typically, public online content can be analysed without formal ethical approval. However, research involving vulnerable groups like victim-survivors raises ethical concerns. For example, it was important in this research that victim-survivors' disclosures remained anonymous, despite their posts being publicly visible. [88]

Other papers indicated the use of pseudonyms instead of actual Reddit usernames to help ensure quotes could not be easily traced back to individuals. We consider these cases in more detail next.

4.5 Privacy Preservation Strategies

In considering efforts to anonymize or de-identify Reddit data, we analyzed specific instances where authors explicitly stated a decision on whether or how to include usernames in their studies, such as creating another level of pseudonyms to obscure actual usernames or removing them altogether. Several papers mentioned usernames as already being inherently "anonymous" or "pseudonymous," arguing that including them was unlikely to lead to the real-world identification of users.

The majority of articles, however, mentioned potential privacy harms as a reason for not providing usernames—even if pseudonymous—especially because of the particular topic or subreddit community being studied. For example, a paper discussing a subreddit on psychostimulant use noted:

Anyone who is interested, and who has online access, may explore posts on the selected subreddits, thus rendering the data public. However, we also consider that

certain members would prefer not to be identified. Reddit fosters the anonymity of its members through the use of pseudonyms, posing a challenge to the identification of users. Still, we must also be mindful of the stigma that may be associated with psycho-stimulant use, potentially placing members at risk if the posts were to circulate to a larger audience. [96]

The above quote also reflects a decision we saw a number of times to obfuscate/obscure and/or fabricate details in Reddit content to further protect user identity and reduce the potential for harm to individuals and subreddit communities. Some authors explicitly grounded this practice in the concept of "ethical fabrication" [71, 95] through obfuscation or composite accounts. The most common tactic was paraphrasing quotes, which included rewording direct quotes and/or substituting details such as pronouns, times, or places. Some also noted the use of descriptions of quotes instead of using direct quotes. There was a general awareness of fabrication as a means against de-identification through search engines, like Google search. For example:

I've paraphrased or shortened comments within this article to preserve the commenter's anonymity, because even if I don't include the username of the person posting, directly quoting from Reddit can mean the image titles or comments can be entered into a search engine and traced back to the poster. [115]

And other papers noted that despite the common practice among Reddit users to use anonymous or pseudonymous usernames, as noted above, concerns over possible re-identification persisted. Thus, some took additional steps to create another layer of pseudonymity when directly quoting from comment threads. For example:

Reddit uses persistent pseudonyms which are rarely linked to a "real name." However, because most of the Fapping posters still maintain Reddit accounts, usernames and all potentially identifying information have been removed for the sake of privacy. In certain cases, we have assigned pseudonyms to users to excerpt particular conversations. [74]

Finally, aggregation was also commonly listed as a privacy preservation tactic, noting that no information would be presented in the article that could be traced back to an individual user. For example,

Note that no identifiable data are included in the results, as the findings are aggregated and presented at the subreddit level rather than the commenter, which further protects individual privacy. [97]

Though not in every case, frequently these privacy preservation strategies were mentioned explicitly in the context of sensitive content or potentially vulnerable communities.

4.6 Sensitive Content and Communities

Given the extent to which Reddit itself hosts subreddits which may involve sensitive content and communities, it is unsurprising that one of the explicit themes throughout the ethical considerations contained in the dataset comes from research involving sensitive topics or vulnerable populations. Topics and communities that prompted these conversations included ones with discussion of death, drug use, health, LGBTQ+ related issues, mental health, racism and hate speech, experiences of racism and hate speech, sexual assault, and suicide.

Most commonly, these papers cited privacy considerations. For example, in a study of a subreddit for sexual assault survivors, the authors noted that though "public online content can be analysed without formal ethical approval... research involving vulnerable groups like victim-survivors raises ethical concerns" [88] and opted to have the project reviewed by a university ethics advisory

network and to take steps to protect anonymity, i.e. removing usernames and employing ethical fabrication. Another paper emphasized that “online health intervention design needs to consider ways in which the identities of these vulnerable communities may be protected against revelation to unintended audiences” [8] and another that “any intervention built out of automated algorithms like the one we proposed here, needs to honor the privacy of the individuals and those who volunteer to provide help and support” [64].

Some papers also noted the risks of not only de-identifying individuals in the data but also drawing broader attention to a community, e.g.:

Another element worth considering in the research process was how to publicly write about a sexual practice, and a specific subreddit, that may have otherwise remained relatively unknown. [115]

Several papers that examined subreddits related to drug use mentioned both stigma and legal concerns. One noted measures taken to protect anonymity (e.g., ethical fabrication) due to “potentially placing members at risk if the posts were to circulate to a larger audience” [96] and another also “obtained a certificate of confidentiality issued by the National Institutes of Health to prevent [the] data and analysis from forced disclosure, including by government authorities” [21].

Some papers also explicitly mentioned vulnerable or potentially stigmatized populations in terms of researcher positionality and the importance of appropriately representing their experiences:

It is also important we disclose that the first author is a member of the vulnerable population included in this research. Particular to research, “membership” here is defined as interest in studying a population to which the researcher already belongs, and to which the researcher may have greater or more opportune access than a non-member (e.g., as a diagnosed cancer patient and participant in online cancer support forums) [33]

Multiple coauthors on the papers hold different LGBTQ+ identities, which has enabled us to incorporate sensitivity in the framing of the work and contextualize our findings in the light of our own lived experiences. [100]

[W]e engaged in a detailed and iterative process to make sense of commenters’ complex experiences as accurately as possible. However, when we analyze social media data from a vulnerable population or one to which the researchers do not explicitly belong, there may be misrepresentations or limitations. As researchers, we tried to be cognizant and reflective of our own identities as well as our lack of knowledge about the experiences of people whose data we analyzed. [6]

In addition to the vulnerability of certain populations of Reddit users and communities, a small number of papers also noted the likely sensitivity of types of content—for example, posts deleted by their users or posts by throwaway accounts.

[W]e did not use posts deleted by their authors in this work, as those felt qualitatively different to everyone with whom we discussed this work. [22]

Due to the sensitive nature of throwaway comments and their responses, we describe the contents of comments without direct quotations from the dataset. [4]

A small number of papers also noted potential harms to researchers, annotators, or readers due to the upsetting nature of content.

Researchers must be aware of the impact that conducting research in sensitive settings may have on themselves... the relevant stakeholders should develop guidelines that consider researcher wellbeing as well as the participants’ wellbeing, and that building support networks among researchers is important. [6]

In terms of exposing people to sensitive content, Mechanical Turk workers were shown sample sets of the Reddit posts and replies in order to provide labels on the post text. These workers were made aware of the content topic area [racism] in the task title and instructions, were free to skip any item, and could stop labeling at any time. [119]

Some of these quotes contain language that may be perceived to be emotionally triggering. [106]

It is also worth noting that researchers may have different standards for what constitutes sensitive content. For example, some researchers may conceptualize users' discussion of sexual habits as sensitive content, where others may not. Even among the papers in our dataset that included explicit ethical statements (e.g., about a decision to only analyze "public" data), a number studied data from these same types of sensitive populations (e.g., subreddits about drug use or mental health) but did not include any mention of the sensitivity of the content as a factor in ethical decision making.

4.7 Weighing Risks

Some papers in our dataset discussed explicit risks of the research, including possible misuse or unintended consequences. Overall, specific risks alluded to included: (1) the use of classification systems to discriminate or stigmatize; (2) privacy violations, particularly by identifying members of support communities on stigmatized or sensitive topics; (3) chilling effects on community participation; and/or (4) misrepresenting the experiences of a group. Nearly all of the papers discussing unintended consequences involved machine learning and classification or intervention.

Most commonly, these discussions noted ethical tensions and challenges that point to how more guidance would be helpful since solutions may not be obvious:

[I]t is conceivable that big-data research can begin to provide a blueprint that could be misused. It could be possible, in the future, to build a system to screen potential employees for their sexuality or politics based on their statements on social media. [113]

[T]here are ethical complexities associated with employing automated classification-based monitoring of minority stressors on an online platform... employing algorithmic methods may silence the speech of those stigmatized individuals who adopt these online platforms as safe spaces for LGBTQ+ conversations, but resist their data being computationally analyzed. [100]

Sometimes they also explicitly pointed to the need for further thought or work on how to resolve these ethical tensions:

[C]ollaborations between computing researchers, mental health experts, moderators, and ethicists can help develop protocols and guidelines that facilitate the use of our work in practical contexts in the future. [28]

Nevertheless, future research in online health intervention design needs to consider ways in which the identities of these vulnerable communities may be protected against revelation to unintended audiences. [8]

[W]hen we analyze social media data from a vulnerable population or one to which the researchers do not explicitly belong, there may be misrepresentations or limitations... We hope to engage study populations in a more collaborative approach in the future. One idea is sharing a short readable blog post about this work on r/science and the subreddits whose data we analyzed on in this article. [6]

Some papers also included discussions about risk/benefit analysis and/or explicit decisions made to mitigate risks. For example, one paper that made use of deleted Reddit content to understand community governance mentioned the authors discussing the potential risks with colleagues and their ERB and determining that as long as they took measures to mitigate risks the benefits outweighed them:

We actively worked to minimize potential risks by not linking moderated comments back to their authors (who may not want to be immortalized in a research paper next to their norm violation). Moreover, we did not use posts deleted by their authors in this work, as those felt qualitatively different to everyone with whom we discussed this work. [22]

Another paper about classification of content about opioid addiction noted that “[o]nce identified as an opioid addict, individuals could suffer harm to reputation, employment, as well as criminal investigation” [21] and noted the steps made to protect people from those risks, including working with an addiction expert, obtaining a certificate of confidentiality to ensure that the data could not be forcibly disclosed by the government, data security measures, and employing ethical fabrication for quotes.

Similarly, another paper that included classification of mental state noted that “it is impracticable to gain informed consent from thousands of people,” and therefore anonymized usernames “to protect the identity and safeguard detecting the mental well-being state of user” [99].

Finally, in explicitly considering possible misuses of research or data, some authors gave explicit instructions for how their work should or should not be used:

[W]e do not advocate letting the model automatically decide on banning or removal of messages (perhaps apart from situations where false positives play only a smaller role). Rather, hate detection models can be used to flag comments for human moderation. [102]

Our work is not intended to be used to intentionally or inadvertently marginalize or influence prejudice against those groups who are already marginalized (by gender, race, religion, sexual orientation etc.), or vulnerable, and are often the targets of hateful speech on campuses. [99]

One paper also noted ethical vetting for use of the dataset:

The dataset will only be made available to researchers who agree to follow ethical guidelines, which include requirements not to contact or attempt to deanonymize any of the users. [120]

These discussions of risks, even when they are not explicitly paired with solutions or decisions, represent a high level of ethical consideration. Throughout the papers we analyzed, these stated considerations point to overall themes of ethical anxieties, but also showcase how researchers can learn from each other.

5 DISCUSSION

The original dataset of Reddit research papers from which we drew our collection included over 700 publications. It is therefore important to note that even among the 134 papers we ultimately analyzed that had very little by way of ethical discussion—such as a minimal statement that the data was public, or that ethical review was unwarranted—still represent more ethical consideration on the page than the majority of published papers that use Reddit data. Arguably, many of the same types of ethical concerns are present in the hundreds of papers that did not include any ethical discussion. We of course cannot know what types of ethical considerations might have been

present in these studies but not disclosed in the papers, but regardless hope that our explication of examples will be helpful for researchers with respect to both ethical decision-making and what might be appropriate to explain on the page.

Even among these 134 relevant papers, we found considerable variance in how ethics was discussed. Some papers included a single line noting there was a determination made by an ERB (or that such a formal review was not sought). Others included paragraphs of reflection by the authors as to the ethics of the research and the justifications for their methodological choices. Even among those papers in our dataset with rich ethical discussions, many brought up risks or raised potential ethical concerns without necessarily offering solutions or describing related methodological decisions. Though even considering and stating potential issues goes beyond the majority of papers published based on Reddit data, our analysis also suggests that work is needed to help researchers know what to do.

One step towards this is open conversation and, importantly, writing about methodological decisions related to ethics in papers so that others can learn from them. Some research communities that are also struggling with ethical norms for emerging practices (e.g., NeurIPS within AI) are beginning to require more discussion in papers about ethical implications and broader impacts [84]. There is a lot of value to be taken from those who are deeply engaging with these issues in their work. Learning from Reddit researchers who have engaged with ethical questions was our goal in this paper. While some of our recommendations could carry forward to research in other platforms, prior work [46] recommends taking platform-specific approaches to ethics. Further, despite being a public forum, Reddit's complex constellation of communities with varied norms, practices and expectations means that navigating ethics is complicated even when taking a platform-specific approach. With that in mind, we offer some concrete recommendations drawn from prior approaches by researchers from across disciplines.

5.1 Remember the Human: Recommendations for Researchers

Rule number one of "Reddiquette," the expression of Reddit's community values, is "remember the human." Reddit elaborates "When you communicate online, all you see is a computer screen. When talking to someone you might want to ask yourself 'Would I say it to the person's face?' or 'Would I get jumped if I said this to a buddy?'" [1]. Though this rule is intended to mediate Reddit users' interactions with each other, this reminder that the person behind a computer is an actual human is an important one for researchers as well.

One of the recognized ethical challenges of big data research is when publicly available data is just treated as data without consideration for the humans that created it [17, 80]. However, research has shown that social media users have opinions and even perceive harms for how their data is used in research [39]. Consideration for the humans present in a dataset from Reddit does not have to mean that strict review by ERBs is required. **Rather, we suggest attentiveness by researchers using Reddit data to SACHRP's recommendations that the fundamental research ethics principles of respect for persons, beneficence, and justice must be considered, and that "adherence to these fundamental principles is important to encouraging public trust in the ethical conduct of internet research" [87].** A number of themes that emerged from our data also track to suggestions made by others, particularly attention to context [83, 122], as well as some of the "provocations for ethical HCI research" offered by Brown et al. [14]. With this in mind, and drawing from the patterns of ethical considerations described above, we provide the following recommendations researchers should keep in mind when using data from Reddit.

5.1.1 Ethics review is more than a check box. A number of high-profile academic ethics controversies have involved research where ethics review bodies were aware of the research and found it to be

exempt from review either before or after it was conducted—for example, the Facebook emotional contagion study [50] or the experiment that intentionally introduced security vulnerabilities into Linux [24]. Subsequent concerns about the ethics of those research projects does not necessarily mean that these ethics board reviewers made a faulty determination—ethical review in the U.S. is about legal compliance to federal regulations and the scope is limited to those specific rules, not necessarily to the broader ethics of a particular research project. *However, encouraging public trust in the ethical conduct of internet research means considering ethics beyond legal compliance.* Many of the papers in our dataset noted that their ethical review board found the project to be “exempt” or that the research does not meet a regulatory definition of “human subjects research.” Such a determination from an ERB (or from an individual researcher, even if a correct analysis) does not necessarily provide information about whether a project is ultimately ethical. Moreover, ERBs self-report that they often lack the domain expertise to fully understand the nature of harms in big data research beyond the scope of their training in regulatory compliance [116]; for example, guidance for IRBs in the U.S. states that they “should not consider possible long-range effects of applying knowledge gained in the research,” therefore excluding possible unintended consequences or broader impacts of research from the purview of that formal review process.

ERBs tend to be most helpful for ensuring regulatory compliance for traditional issues in human subjects research, but research that falls outside of their purview or expertise might still raise significant ethical concerns. In the case of the U.S., research that involves data from platforms like Reddit frequently falls outside strict definitions of “human subjects research,” defined by U.S. Code 45 CFR §46.102 as work that involves either direct interaction with humans or the collection of data that is both personally identifiable and private. Many IRBs consider the collection of public data to fall outside of this definition and thus their authority [116]. Based on the number of papers in our dataset that rely on a statement that data is “public” regarding ethical concerns, we suspect that researchers themselves are relying on this definition of human subjects research.

Some papers in our dataset engaged in their own ethical analysis of the implications of their research and methodological choices beyond the “it’s public” argument; noting, for example, that their research included vulnerable subjects and therefore required an added layer of care [88]. Though the idea that researchers should engage in ethical consideration beyond the ERB is not a new point, **we remind Reddit researchers that a true ethical review is about more than just “checking the box” that the research protocol was screened by their ERB, and to document their ethical decisions in their publication.** Just as “does my work violate Terms of Service?” is not a substitute for “is this research ethical?” [37], neither is “does this research fall under the jurisdiction of an ERB?” or even “was this research approved by an ERB?” Similar to how Munteanu et al. called for a more “situational” ethics approach that is more sensitive to the challenges of research that falls outside the “ethical template” of formal review [83], we posit that meaningful ethical deliberation for Reddit research must move beyond what local rules and regulations require, and embrace a broader set of ethical principles, such as those set forth in the Belmont Report of respect for persons, beneficence, and justice [43, 117]. Moreover, researchers should be writing about these decisions and the principles that they choose to apply, regardless of whether or not they obtain ERB approval.

5.1.2 “Publicness” is not the only context that matters. Numerous researchers in our corpus noted that the “publicness” of Reddit data simplified their (or their ERB’s) ethical analysis and was a key factor in justifying the use and publication of this data without obtaining specific consent. While we agree that Reddit data is generally publicly viewable online and understand how ERBs rely on this in their deliberations, the rhetoric of “but the data is already public” can too easily be invoked to gloss over complex ethical concerns, such as privacy, consent, and harm [121].

We found examples of researchers discussing beyond a simple “publicness” calculus and engaging in deeper reflection on the ethical implications of collecting, analyzing, and publishing Reddit data, and we encourage more researchers to take such a reflective stance and document it in their publications. This includes recognizing that users might not fully understand the true publicness of their data and the tools available to researchers to extract such data from a platform [39], understanding that anonymization is rarely a perfect tool for protecting research subjects’ identities [70, 104], and that the appropriateness of taking data out of its original context requires weighing more than just its “publicness.”

Nissenbaum’s [85] concept of contextual integrity has emerged as a helpful heuristic to guide researchers grappling with how to ethically engage in research with public data. Rejecting the traditional dichotomy of public versus private information, contextual integrity ties adequate privacy protection to the preservation of informational norms within in specific contexts, providing a framework for evaluating the flow of personal information between agents to help identify and explain why certain patterns of information flow are acceptable in one context, but viewed as problematic in another. Zimmer [122] has shown how applying contextual integrity’s decision heuristic can provide a much more nuanced—and contextually sensitive—approach to considering the ethics of particular methodological choices within big data research. **Reddit researchers will benefit from taking a similar contextual approach to consider the ethics of their research design beyond solely considering the publicness of the data. We recommend researchers learn the norms of a community, which can help researchers understand community contextual expectations for information flow [32].** In our dataset, we saw applications of contextual integrity most prominently among researchers who study sensitive content and communities, for example, by ensuring that people aren’t revealed to audiences they hadn’t intended [8]. These applications highlight that in the case of Reddit, important contexts for researchers to consider include the norms and expectations of communities included in the research as well as the perceived sensitivity of conversations included in the data.

5.1.3 Consider risks and benefits. In explaining the concept of “beneficence” with respect to research ethics, the Belmont Report (the document that guides IRBs in the U.S.) states that “persons are treated in an ethical manner not only by respecting their decisions and protecting them from harm, but also by making efforts to secure their well-being,” and goes on to summarize that the “general rules” of both “do no harm” and minimizing harm while maximizing benefits [43]. “Do no harm” is part of ethical guidelines in other countries and for many disciplines, and though sometimes considered to be insufficient [56], weighing risks to human subjects versus benefits of the research is a common heuristic for ethical decision-making.

One challenge of weighing risks is that they are often not readily apparent, particularly when it comes to what might happen because of the research rather than in the course of it; consideration for unintended or unanticipated consequences therefore requires some speculation about possible harms, including those that might be the result of bad actors [36]. Though as noted above some research ethics review bodies do not consider downstream consequences and broader impacts of research as part of their determinations, within research communities these issues are increasingly important topics of conversation. These conversations have largely focused on the review process, including calls for changes within ACM [51], and recently the NeurIPS conference instituted a requirement that all papers include a statement of the “potential broader impact of their work, including its ethical aspects and future societal consequences” [42].

Many of the strategies discussed in the papers we analyzed, such as ethical fabrication or reporting data in the aggregate, are described as ways to minimize potential harms. There were a small number of papers that included explicit instructions for how the research should not be

used by others. While ethical fabrication is a privacy preservation tactic that can be applied across contexts in internet research, it is particularly well aligned with Reddit research because users tend to privacy value more than users of other platforms and [46, 71]. However, because Reddit content is indexed by Google and other data archives, researchers should take care to ensure their efforts are successful [94] **We encourage authors to consider not just what potential risks and consequences are (including thinking beyond intended outcomes), but also what steps might be taken to mitigate negative outcomes.**

Moreover, though benefits are often an implicit part of a research paper, these are often framed only in terms of scientific contribution. In addition to minimizing harm to the subjects of research, researchers might also consider how to maximize benefits. Some of the papers in our dataset included strong implications for future work that would be beneficial—for example, building systems that could support people struggling with health issues or reduce negative content online. Maximizing the benefits of the current work might include consideration for how those benefits might actually come to pass, what researchers might do beyond publishing a paper to help ensure that they do, and considering the feasibility when weighing risks versus benefits. In the case of Reddit, benefits should also be considered not just with respect to society as a whole, but also the specific community that is being studied—who in the case of research involving public data often have no idea that they were ever part of research at all [39].

5.1.4 Remember the community. In their analysis of Reddit research generally, Proferes et al. found that though more papers were shared on Reddit by others (for example, on r/science), only about 1% of papers appeared to have been shared by the researchers themselves back to the subreddit that they studied. **Though this too is a decision that should be made carefully (considering for example if some research findings might be harmful or put the researcher at risk, see [111] and [75]), we put forth that it is a decision that should be actively considered, rather than defaulting to not sharing findings.** While many researchers professed hesitancy about sharing research outputs with research subjects in a study by Proferes and Walker [92], prior work has found that both Reddit and Twitter users find sharing research with the public to be more appropriate when their data is used [39, 46].

Additionally, Reddit researchers should holistically consider harms and benefits as they manifest to a community, and not just individuals. For example, a research paper might draw unwanted attention to a small community—and even positive attention to a subreddit can cause challenges for that community, e.g., if there is an influx of new users [61]. That unwanted attention may be in the form of additional news stories about a particular research study, or an influx of additional researchers using a community as a data source. Conversely, particularly because some people fundamentally object to being studied without their consent [50], knowledge that an online community is a research site might drive participants away from it, even if that community is an important support resource. This is particularly a concern for situations where a community is designed as a support space for individuals who are part of vulnerable populations.

In sum, it is important that researchers do everything they can to understand a community and therefore any potential risks that they might not be aware of. Some examples in the papers we analyzed included: (1) speaking with the subreddit's moderators, and even getting their permission to engage in the research; (2) spending time participating in the community before conducting research, in order to better understand norms and practices; (3) pairing analysis of public data with human subjects data (e.g., interviews) so that researchers are also speaking directly with the community; and (4) having someone on the research team who identifies as part of that community.

5.1.5 Consider your positionality and power as a researcher. Prior work on design justice [10, 26, 29], disability activism [23], and decolonization [108] highlights the need for researchers to consider

their position of power in relation to the people they are studying. Our results show that researcher power may manifest in a number of different ways in the context of Reddit research. For example, a Reddit researcher may hold certain kinds of social power in relationship to the community they are studying, particularly if it is a vulnerable community. Researchers may hold asymmetrical power even if the community itself isn't vulnerable, but the topic of conversation is. And finally, researchers have asymmetrical power when they collect data that could be sensitive or identifying, such as photographs containing users' bodies or faces. Researchers should take steps to mitigate these imbalances where possible, such as by obtaining certificates of confidentiality [21].

We argue that researchers need to be attuned to these imbalances, and further, that participant-centered methodological approaches can help mitigate some of these issues. While they are not appropriate for every research situation, conducting research *with* research subjects can help let the studied actively shape the research and how they are represented in it [41, 66]. Similar approaches are used in methodologies such as participatory design [82] and action research [59]. In our analysis, we saw examples of researchers engaging in collaborative research approaches on Reddit in different forms, such as researchers working with community moderators, and, notably, researchers engaging in community-led experimentation [77]. These approaches can help avoid so-called "parachute research." Simultaneously, researchers need to be aware of prior work highlighting the emotional labour of involved in research [31, 53]. Particularly as some Reddit communities come "under the microscope" more than others, it is important for researchers to think through the burdens associated with this [91].

Additionally, Reddit is a complex sociotechnical space. Reddit, at points, has hosted communities that promote harassment and propagate discrimination [22]. There are additional ethical complexities when considering the relationship between researchers and potentially hostile communities. As Rüdiger and Dayter [98] argue, "conducting research in a hostile community may influence traditional methodological decisions." While researchers typically hold positions of power relative to the researched (and indeed, this is often the case on Reddit), there can be tensions where those being studied may hold or exercise power over those doing the studying. Massanari [75] describes this phenomena as an "alt-right" gaze in which these groups use research visibility to surveil and silence researchers, particularly those who are visible minorities [49]. Indeed, while researchers have ethical obligations to their research subjects, those must also be balanced with the ethical obligations researchers have to research team members, student workers, and themselves [111].

In sum, **we encourage researchers to consider including community members in their work, such as through methods like participatory/action research and collaborative ethnography, reaching out to moderators about data collection where appropriate, and reflecting on their own positionality relative to the population, even when conducting quantitative research.**

6 CONCLUSION

Our goal with this analysis was to understand how researchers describe ethical issues in research that uses public data from platforms like Reddit, and to raise awareness of different approaches by providing examples and ideas that researchers might draw from in making methodological decisions and in describing ethical considerations in their own papers. Our recommendations provide researchers a helpful set of guideposts to foster ethical reflection on their methodological decisions, and we encourage a more purposeful engagement with ethics when designing and publishing research using Reddit data.

The variety of researcher engagement with ethics within our analysis of 134 papers is matched only by the variety of research design and methodologies across the entire corpus of over 700 Reddit papers [91]. Similar to the interdisciplinary team of scholars who published "ten simple

rules” for addressing the complex ethical issues in big data research [125], we recognize that our recommendations might not work for all forms of Reddit research. But, like Zook and his colleagues, we “exhort researchers to recognize the human participants and complex systems contained within their data and make grappling with ethical questions part of their standard workflow” [125]. In short, we hope more researchers engage in ethical contemplation, document their thinking, and discuss with both their research subjects and fellow researchers to drive a broader trend toward the ethical use of public data.

Though a number of the suggestions we make align to ethical discussions already taking place in the growing literature around research ethics for public data, we emphasize that we have derived them bottom-up from existing practices. We therefore focused our efforts on understanding how authors are talking about their research ethics practices on the printed page, but we also recognize that there may be much more nuanced and careful consideration going on behind the scenes. Future work in this area should additionally focus on interviewing Reddit researchers about their ethics-based practices in order to develop a more robust account of emerging local norms.

Internet researchers have made many positive steps to ensure attention to research ethics becomes more prominent in our practices and publications, and we offer these recommendations as a continuation of those efforts. We believe that by “remembering the human” Reddit researchers can continue to engage in innovative research within this unique platform in an ethical manner.

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A APPENDIX: ARTICLES ANALYZED

The list below includes articles analyzed as part of this systematic review. Articles cited in the text are also included in the reference section above.

- Abavi, R., Branston, A., Mason, R., & Du Mont, J. (2020). An Exploration of Sexual Assault Survivors' Discourse Online on Help-Seeking. *Violence and Victims*, 35(1), 126–140.
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