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MAPPING THE SOCIAL IMPLICATIONS OF PLATFORM ALGORITHMS FOR LGBTQ+ COMMUNITIES

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ABSTRACT

LGBTQ+ communities were among the first to appropriate the Internet to experiment with their identities and socialize outside of mainstream society. Recently, those platforms have implemented algorithmic systems that curate, exploit, and predict user practices and identities. Yet, the social implications that platform algorithms raise for LGBTQ+ communities remain largely unexplored. At the intersection of media and communication studies, science and technology studies, as well as gender and sexuality studies, this paper maps the main issues that platform algorithms raise for LGBTQ+ users and analyzes their implications for social justice and equity. To do so, it identifies and discusses public controversies through a review and analysis of journalistic articles. Our analysis points to five important algorithmic issues that affect the lives of LGBTQ+ users in ways that require additional scrutiny from researchers, policymakers, and tech developers alike: the ability for sorting algorithms to identify, categorize, and predict the sexual orientation and/or gender identity of users; the role that recommendation algorithms play in mediating LGBTQ+ identities, kinship, and cultures; the development of automated anti-LGBTQ+ speech detection/filtering software and the collateral harm caused to LGBTQ+ users; the power struggles over the nature and effects of visibility afforded to LGBTQ+ issues/people online; and the overall enactment of cisheteronormative biases through platform affordances.

Keywords: algorithms; digital platforms; LGBTQ+ communities.

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1 INTRODUCTION

Lesbian, gay, bisexual, trans, and queer (LGBTQ+) communities were among the first to appropriate the Internet in the late 1990s to experiment with their identities and socialize outside of mainstream society (Campbell, 2005; Gray, 2009). Today, digital platforms are integrated in nearly all components of LGBTQ+ cultures and lives. Social media platforms are used by LGBTQ+ people to socialize (Duguay, 2019), especially among younger publics (Robards et al., 2018). Dating sites and apps, like Grindr and Her, are used to foster intimate and sexual relationships (Ferris & Duguay, 2020; Myles, 2020), whereas platforms like Facebook and Instagram play an integral part in LGBTQ+ activism and political organizing (Ayoub & Brzezińska, 2015; Myles & Lewis, 2019). The Internet has represented somewhat of a safe harbour for LGBTQ+ communities (Lucero, 2017), especially since many physical spaces for queer socializing, like bars and clubs, have closed (Renninger, 2018), been violently attacked (Ramirez et al., 2018), or gentrified to attract mainstream clienteles (Nash, 2013).

However, the claim that digital platforms directly empower LGBTQ+ citizens should not be made uncritically, as platforms can also play an important part in their oppression. Researchers are increasingly examining how digital platforms are implicated in forms of gender and sexual discrimination (Hanckel et al., 2019; Mainardi & Pavan, 2020). Studies examining the potential risks posed by digital platforms for LGBTQ+ communities have highlighted the propensity for their members to become the targets of online hate speech (Lingiardi et al., 2019), cyberbullying (Elipe et al., 2018), and harassment (Marciano & Antebi-Gruszka, 2020). These studies have concluded that LGBTQ+ individuals, like people of color (Daniels, 2013) and women (Mendes et al., 2018), are more likely to experience violence online than their cisheterosexual, white, and male counterparts (Abreu & Kenny, 2018).

Though undoubtedly valuable, these studies tend to focus on individual user practices and underplay how platform affordances and operating models may themselves reproduce social inequalities (Gillespie, 2010; Hoffmann, 2019). Beyond individual user practices, researchers must also consider how digital platforms increasingly rely on sophisticated algorithms that can affect the lives of LGBTQ+ users, namely, by automating sexual- and gender-based biases (Massanari, 2017). Indeed, digital platforms have recently implemented algorithmic systems that curate, exploit, and predict user practices and identities (Bucher, 2018). So far, researchers have criticized platform algorithms for introducing biases in automated decision-making that disproportionally affect women and people of color (Benjamin, 2019; Noble, 2018). This paper extends these critical reflections by exploring how platform algorithms can specifically

affect the lives of LGBTQ+ users. Through a review and analysis of journalistic articles (Chartier, 2003), it aims to identify significant issues that platform algorithms raise for LGBTQ+ communities and reflect on their implications, especially in terms of social justice and equity.

2 LITERATURE REVIEW

If the Internet was initially composed of countless independent sites, today, most users interact on a handful of privately owned platforms, what is sometimes referred to as the platformization of the Web (Helmond, 2015). Platform studies invite researchers to examine how digital platforms, like Facebook and Twitter, partly configure user activities by enacting a series of affordances, that is, the sociotechnical possibilities provided to, and the constraints imposed on, users (Bucher & Helmond, 2018). These affordances typically serve platforms' common imperatives of fostering user engagement online, breaking down user activities into data points, and curating them into large datasets to build predictive models and attract potential third-party companies (van Dijck, 2014). The datafication of user activities relies on sophisticated algorithmic systems that manage, organize, and exploit increasingly complex data infrastructures (Musiani, 2013). Algorithms now oversee nearly all activities that take place on digital platforms: they select and order the results of searches, they filter, recommend, or censor certain contents, they monitor user activities to predict their preferences, and they score, evaluate, and moderate user content or even users themselves, among other tasks (Latzer et al., 2016).

Social researchers are increasingly interested in algorithms for their propensity to reshape our private lives (De Filippi, 2016) and our possibilities for collective action (Milan, 2015), as well as in their capacity to exert power (Beer, 2009; Bucher, 2018). Studying algorithms amounts, then, to assessing how they are shaped by human meaning as well as how they shape human meaning in return (Seaver, 2017). For example, digital platforms can reproduce patterns of exclusion by imposing users with preconfigured sociotechnical categories (e.g., gender, racial, and sexual identities) that help these platforms produce data that is easier for algorithms to recognize and exploit (Gillespie, 2017). Platforms also rely on algorithms to automatically determine who or what is deemed important, legitimate, valuable, or socially acceptable online (Crawford & Gillespie, 2016). Inquiries into the political nature of algorithms have largely sought to challenge their presumed neutrality (Cardon, 2015; Crawford, 2016a). Their objective is not to assess whether algorithms can be wrong in a technical sense as much as it is to understand how they can do wrong in an ethical or political sense (Gillespie, 2012; Tufekci, 2015). Indeed, algorithmic systems can produce harm or injustices by automating pre-existing biases

shared by the people who develop, implement, or use them (Garcia, 2016), especially as there are still no clear guidelines overseeing algorithmic innovation or governance (Ananny, 2016; Introna, 2016).

A scholarship on the implications that platform algorithms – and platform affordances more generally – raise for LGBTQ+ users has emerged over the past few years. For example, researchers have suggested that the predictive nature of platform algorithms can result in outing LGBTQ+ people online by promoting default settings like publicness and visibility (Cho, 2018; Werbin et al., 2017). Some scholars have illustrated how digital platforms, guided by industry imperatives, rely on binary classification systems that reproduce cisheteronormative assumptions about gender and sexual orientation (Bivens & Haimson, 2016; Lingel & Golub, 2015) that can further lead to online harassment against LGBTQ+ users (Albury et al., 2020; Blackwell et al., 2017). Other researchers have focused on the cisheteronormative biases reproduced by automated content moderation strategies used by digital platforms, documenting how they label LGBTQ+ content or users as being "questionable" or "offensive" (Anderson & Roth, 2020). For example, platforms like YouTube appear to be more likely to flag LGBTQ+ channels as 'inappropriate' and demonetize them by employing recommendation algorithms positively biased toward "family-friendly" content (Fredenburg, 2020; Southerton et al., 2020; Wilkinson & Berry, 2020). In this context, cisheteronormative biases refer to sets of beliefs and attitudes that normalize heterosexuality and cisgender identity (i.e., gender identity matching sex assigned at birth), while also making non-heterosexual and transgender/non-binary individuals abnormal in ways that legitimize deliberate or inadvertent discrimination against them (Adam, 2015).

Other researchers have examined how changes in content moderation policies, especially those targeting "explicit" or "inappropriate" content, negatively impact LGBTQ+ online communities developed to experiment and socialize outside of cisheteronormative environments (Byron, 2019; Pilipets & Paasonen, 2020). Furthermore, these platforms' terms of service often fail to ensure the safety of their LGBTQ+ users and can participate in further censoring the content they produce online (Duguay et al., 2020; Oliva et al., 2020). This emerging scholarship raises important issues in matters of algorithmic governance, as LGBTQ+ communities exert little control over the Internet regulations that oversee their online activities (DeNardis & Hackl, 2016). As such, these issues are indicative of broader trends in the automation of dataveillance by digital platforms that raise important issues in terms of social equity and self-determination (Wood & Monahan, 2019), especially for LGBTQ+ communities (Kafer & Grinberg, 2019).

3 CONDUCTING AN STS-INFORMED PRESS REVIEW AND ANALYSIS

This paper is primarily grounded in media and communication studies and mobilizes key insights from the fields of science and technology studies (STS) as well as gender and sexuality studies. First, STS examine technologies as socially and historically situated artefacts (Sismondo, 2010), with a particular interest in the human values that are embedded in technological design (Friedman & Kahn, 2003; Nissenbaum, 2005). Communication scholars often mobilize STS scholarship to understand how communication technologies are shaped by humans and how they shape humans in return (MacKenzie & Wajcman, 1985). Feminist STS critique is particularly relevant for this study, as it examines the interplay between the social and material processes that participate in constructing technologies (Wajcman, 2010). Since the 1990s, this scholarship has unpacked the gender and sexual norms that are embedded in digital technologies and their tendency to exacerbate social inequalities (Suchman, 2008). This study also mobilizes key theoretical and methodological insights from controversy mapping and analysis (Marres, 2015). It investigates how different stakeholders make sense of Internet regulatory issues by shaping them as public controversies, namely, to strategically highlight (or underplay) some of their sociocultural or political implications (Musiani, 2018). Controversies have long been used in STS to examine the ruptures in seemingly seamless technologies, that is, to reveal the values embedded in them by paying attention to moments of failure (Star, 1999). In this paper, algorithmic controversies were identified through the press review and analysis detailed below.

Second, this study is informed by gender and sexuality studies that deconstruct and examine the performative nature of gender and sexual identities (Butler, 1990; Giffney & O'Rourke, 2016). This scholarship is grounded in the pivotal work of Foucault (1978) and his successors who revealed the institutional processes through which certain gender and sexual identities have become historically stigmatized and how LGBTQ+ individuals were prevented from fully exercising their civic privileges (Evans, 2007; Richardson, 2017). Furthermore, Foucault's (1975) investigation into the institutional mechanisms of control and discipline has largely contributed to the field of surveillance studies (Lyon, 2002), whose queer-informed subfield (Kafer & Grinberg, 2019; Phillips & Cunningham, 2007) also guides this study. Today, digital platforms and the algorithms they operate have become new sociotechnical institutions (Napoli, 2013). These emerging regulatory bodies are actively enacting sexual and gender categories whose performative power raises issues for LGBTQ+ communities in terms of social exclusion and discrimination (Southerton et

al., 2020). In turn, critical inquiries into the performative nature of gender and sexual categories bridge canonical work in STS on the role of technological categories in sorting and classifying ideas, things, and people (Bowker & Star, 2000).

In light of our STS-informed theoretical framework, we adapted the press review and analysis method (Chartier, 2003), which consisted of a detailed search in newspapers and online magazines through the use of keyword lists. We narrowed our review via three inclusion criteria and their related keywords: a) 54 keywords pertaining to digital platforms (Search field A, located anywhere in the text: e.g., 'digital media', 'dating app', 'Google'); b) 7 keywords pertaining to algorithms and datafication (Search field B, located anywhere in the text: e.g., 'algorithmic', 'artificial intelligence', 'big data'); and c) 39 keywords pertaining to sexual and gender diversity (Search field C, located anywhere excluding the body of the text: e.g., 'lesbian', 'queer', 'transgender'). Those keywords were used in ProQuest Global Newsstream, a database that counts over 2,800 news sources around the world. Our search was limited to full-text articles written in English published between January 2010 and February 2022 (articles published before this period were mostly found to be false positives). Dissertations, scholarly articles, and conference papers were excluded from this study, as our team was conducting a concomitant review of the scientific literature at the time.

This process yielded 1,243 articles from newspapers, magazines, news blogs, and other news media sources, to which our team members applied the established inclusion criteria through the collaborative reference management software Zotero. To be considered, articles needed to explicitly address digital platforms, algorithmic and/or datafication processes, as well as LGBTQ+ users. Our team also removed duplicates and false positives during that step. For example, numerous articles about Alan Turing were removed, as well as news wires summarizing the last 24-hour news cycle. Through that process, 276 articles were identified through ProQuest. A second step of our review consisted of a search through the Google and Google News search engines with a reduced version of our keyword list to comply with the platform's limitations. After eliminating duplicates, 67 articles were added to our corpus, for a total of 343 articles. By using algorithmic functions as a guiding concept (adapted from Latzer et al., 2016), we classified our corpus into five categories: sorting (n=106), recommending (n=81), filtering (n=112), and searching (n=35), as well as a fifth meta-category examining issues related to cisheteronormativity in the tech industry more generally (n=24), with certain articles recurring in more than one category.

This review process was not without challenges and limitations. The selection of our guiding concept to categorize our corpus was the subject of ongoing debate within our team. Various concepts could have been used to perform this classification with varying results. For example, we could have sorted articles by platform types, by social activities, by user populations, or by social justice issues. Ultimately, we decided to use algorithmic functions as our main guiding concept because it best served the objective of this paper, which is to highlight the implications that platform algorithms raise for LGBTQ+ users. Furthermore, using algorithmic functions allowed us to identify transversal algorithmic issues across platforms and user populations, an output that our team found particularly valuable given the variety of people and sites covered in the corpus.

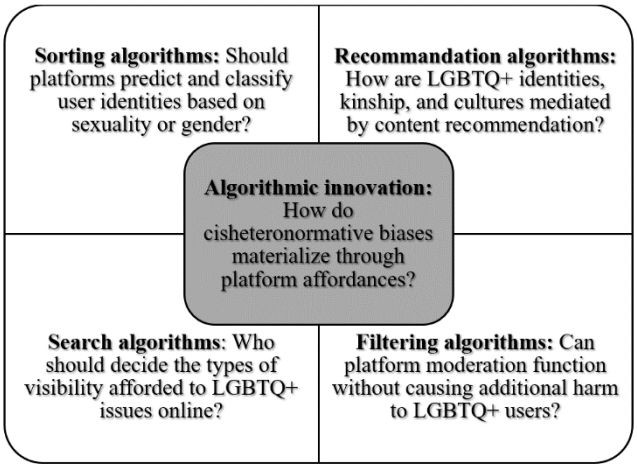

Figure 1 Platform algorithms and their social implications for LGBTQ+ users.

Moreover, the use of algorithmic functions as a guiding concept raised a significant ontological issue, namely, because those functions are not clear-cut but often interrelated and distributed. For example, it can be difficult to distinguish between recommendation and filtering algorithms, especially when recommendation algorithms are used as a filtering mechanism (Gillespie, 2018). Like all algorithmic decision-making, sorting remains a highly arbitrary task (Bowker & Star, 2000). Through our process, our goal was to identify the algorithmic function that was at the heart of the controversy or case study exposed in each article. When an article addressed multiple algorithmic functions in significant ways, it was classified accordingly. Effectively, our sorting system aimed at distributing our corpus coherently between conceptual categories in a way that would yield important questions and support meaningful discussions. These questions have been summarized in Figure 1 (see above). Most importantly, our team members sought consistency in their decision-making, and

ensured that the reasoning behind our decisions was stated clearly and transparently in each of the sections that follow[1].

3.1 Sorting algorithms and the prediction of LGBTQ+ identities

Sorting algorithms monitor and quantify platform users' activities to predict or infer individual qualities associated with them that can later be commodified. As such, they directly relate to platform dataveillance (Van Dijck, 2014), which has become the topic of increased public interest following the Snowden revelations and the Cambridge Analytica scandal. Algorithmic sorting relates to foundational considerations in platform and surveillance studies over the role of technology in the labelling and classification of social identities and relations (Lyon, 2005). Sorting is often accomplished through the use of predetermined sociotechnical categories that may reproduce binary conceptions of sexuality and gender (Bivens, 2017). Overall, the articles in this first category fall into two subsets: those that address the safety and privacy implications raised by sorting algorithms in a more general fashion; and those that specifically highlight the increasing capacity for digital platforms to classify or predict the gender and/or sexual identity of their users (as well as for external actors to train their algorithms by exploiting accessible social media data).

A first subset of articles offers critical reflections on the general implications that digital platforms raise for LGBTQ+ communities in terms of safety and privacy. Platforms were especially criticized for their propensity to provide hostile governments or organizations with the means to identify, track, and oppress LGBTQ+ users[2]. Those articles highlighted an important paradox: on the one hand, digital platforms play an emancipatory role, as they allow LGBTQ+ users to shape their own communities online; on the other, sorting algorithms and the surveillance imperatives they serve increase the vulnerability of LGBTQ+ citizens by potentially exposing them to state-sponsored or corporate mistreatment. Those concerns were particularly expressed toward dating and hookup apps that cater to LGBTQ+ users, likely because of the sensitive nature of the data they produce or manage (e.g., intimate pictures, sexual preferences, health-related information)[3]. Unsurprisingly, the hookup app Grindr was most commonly cited in this subset of articles, as the app was at the center

[1] Our list of journalistic references, which we have ordered alphabetically according to each analytical section of this article, can be accessed here: https://borealisdata.ca/dataset.xhtml?persistentId=doi:10.5683/SP3/QOFTIC

[2] Hackl (2014); Harford (2019); Hassett (2014); Mohd Yatid (2018); Nangia (2020); Shezaf & Jacobson (2018); Wareham (2021a; 2021b).

[3] Anonymous (2020a); Harari (2019); Ramos (2016); Rudder (2014); Wood (2014); Wood (2018).

of various controversies over the past decade. Its acquisition by the Chinese corporation Kunlun Tech between 2016 and 2018 garnered fears over the misuse of sensitive user data by China[4], as previously discussed in the scientific literature (Kokas, 2022; Myles, 2022). The app was also criticized for its role in the public outing of athletes and religious figures, as well as for sharing HIV-related data to third-party companies[5].

A second issue on dating apps arose around the introduction of new gender categories that cater to trans and gender nonconforming users, especially on Tinder[6]. Those debates relate to broader considerations surrounding gender inclusivity on digital platforms. An important tension has emerged between the need for platforms to proliferate gender categories to ensure user inclusivity and the belief that such categories should be deleted altogether in favor of gender neutrality or fluidity. This tension was also discussed in relation to linguistic-based platform services[7]. Overall, those articles point to an ongoing debate around social sorting and queerness (Schram, 2019). Namely, does the introduction of new gender and sexual categories by digital platforms truly aim for a better representation and inclusion of LGBTQ+ users or do these initiatives conceal corporate schemes seeking to better predict and commodify sexual- and gender-diverse users through the training of high-performing sorting algorithms?

A second subset of articles in this category addresses controversies in which digital platforms operate sorting algorithms to predict the sexual and/or gender identity of their users, either through the use of behavioral data or facial recognition software. First, several articles addressed how Facebook can predict the sexual orientation of their users with 'just a few likes' or by analyzing user friends lists[8]. Published in the wake of the 2013 Cambridge Analytica controversy, the case of sexual prediction by Facebook was mainly characterized as a privacy rights issue. It was sometimes referred to as a sort of algorithmic 'gaydar', a reflection that was also extended to other platforms[9]. A second corpus of articles addressed the 2017 Kosinski experiment, in which a Stanford researcher collected tens of

[4] AFP (2019); Anonymous (2020a); Stone Fish (2019).

[5] Boorstein et al. (2021); Jefferson (2020).

[6] Burke (2016); Mallenbaum (2016); Newmark (2015); O'Brien (2017); OkCupid (2018); Stack (2016a; 2016b); Tanna (2021).

[7] Fingas (2018); Reuters (2018).

[8] AFP (2013); Anonymous (2014); Anonymous (2018a); Alloway (2015); Anderson (2013); Ball (2013); Cadwalladr & Graham-Harrison (2018); Daily Telegraph (2017); Franklin (2013); Goldbeck (2015); Kendall (2013); Jayson (2013); McCarthy & Cookson (2013); Naughton (2017); Preston (2014); Rainey (2015); Taylor (2013); The Telegraph (2013); Tinker (2018); The Herald (2013); Tufekci & King (2014); Tyree (2017).

[9] Anonymous (2020b); Khalaf (2018).

thousands of pictures from a popular dating site and supposedly trained a facial recognition software to predict sexual orientation based on key facial features[10]. This researcher claimed that his software could predict the sexual orientation of users with a high level of certainty. If some articles have painted Kosinski as a sort of whistleblower against LGBTQ+ platform surveillance, his research was heavily criticized both for its conceptual limitations (e.g., for its propensity to reproduce binary conceptions of sexual orientation) and for its implications in terms of user safety and privacy, especially if such software were to fall into the wrong hands.

In 2019, a related controversy arose around the propensity for facial recognition software operated by digital platforms to misgender trans and non-binary users[11]. This controversy echoes a paradox in public discourse between the need for facial recognition software to acknowledge trans and gender nonconforming users to ensure their full inclusion in a digital society versus the inherent privacy and safety issues that such surveillance apparatus raises[12] (Lingel, 2020). This paradox is best illustrated by the Facebook 10-year challenge, which was seen as a way for trans users to visually narrate their own transitioning story online or, alternately, as a ploy to help digital platforms train their facial recognition software to better predict the effects of gender-affirming surgeries or therapies.

As illustrated by the controversies above, the majority of articles in this section characterize social sorting algorithms as being predominantly oppressive toward LGBTQ+ communities. However, a subset highlighted the potential of platform dataveillance for LGBTQ+ health and safety. For example, the Trevor Project developed an AI-based surveillance system to identify youth at risk of suicide in collaboration with Google[13], researchers used big datasets to support the health of trans users via Twitter[14], while other researchers talked about the dataveillance potential of the dating app Blued to develop sexual health initiatives[15]. Similarly, one article evoked the potential of platform dataveillance to identify LGBTQ-phobic personnel in the US Army in collaboration with the Rand corporation[16]. Other articles

[10] Ahmed (2017); Anonymous (2017); Baska (2017); Coldewey (2017; 2021); Daily Telegraph (2017); Dialani (2021); Fernandez (2017); Harari (2019); Hawkins (2017); Hindustan Times (2017); Holden (2018); Kalaichandran (2017); Kayvon (2017); Kuang (2017); Levin (2017); Lewis (2018); Morgan (2018); Murphy (2017); Rose (2017); Segal (2021a; 2021b); ; Sulleyman (2017); Sweeney (2019); Volokh (2017).

[11] Burt (2020); Crockford (2019); Fried (2019); Haggard (2019); Khalid (2019); Metz (2019); Rose (2019); Swerling (2019); Thalheim (2019); Trout (2017).

[12] Watling (2021).

[13] Jones et al. (2020); Srikanth (2021); The Trevor Project (2021a; 2021b).

[14] Rivero (2015); Sharma (2015).

[15] Blued (2019).

[16] Wentling (2021).

explored the use of dataveillance schemes to support the safety of increasingly mobile LGBTQ+ consumers, especially in the field of tourism[17]. For example, the app GeoSure was developed to help LGBTQ+ people identify the safest neighborhoods when travelling[18].

Overall, the articles cited in this section illustrate ongoing debates in the literature at the intersection of dataveillance and queerness (Schram, 2019). The sorting of sexual and gender identities by platform algorithms can be perceived as a powerful tool to afford visibility to LGBTQ+ users and provide them with legitimacy by shaping them as a recognizable social group. Yet, algorithmic sorting and its path to commodification can also be seen as irreconcilable with queer political agendas that seek to challenge the use of gender and sexual categories by public and corporate actors altogether. A final subset of articles reversed this logic by underscoring how anti-LGBTQ+ attitudes could be used by sorting algorithms to predict conservative affiliations among platform users[19], either in the context of romantic matchmaking or to identify potential voters during electoral campaigns. As such, the instrumentalization of LGBTQ+ issues by digital platforms to predict the personal values of cisheterosexual users deserves more scrutiny, as it uniquely exploits queerness as a metric and not as a predictive output.

3.2 Recommendation algorithms and the remediation of LGBTQ+ cultures

Recommendation algorithms are built to provide platform users with personalized content or ads based on their past preferences or identity markers to maintain a high level of engagement and, by extension, to help platforms generate a profit. As such, they constitute key mechanisms in a system of surveillance capitalism (Zuboff, 2019) and have transformed how LGBTQ+ publics are constituted and reached by advertisers, businesses, and non-profit organizations alike (Sender, 2018). Recommendation algorithms are predictive systems that directly relate to culture and identity, in the sense that what users consume and whom they interact with online co-construct their own social identity (Cheney-Lippold, 2017). The articles that were included in this category address issues that fall in one of these three subsets: the increasing role that recommendation algorithms play in reshaping LGBTQ+ cultures, the algorithmic promotion or radicalization of anti-LGBTQ+ stances, and the consumerist imperatives under which algorithmic ad promotion operates.

[17] Phataranawik (2019).

[18] GeoSure (2018a; 2018b).

[19] Cookson & McCarthy (2013); Goldbeck (2015); Lord & Potter (2015); Pothier (2015).

A first subset of articles examines how algorithmic recommendation systems have become new curators of LGBTQ+ cultures, tastes, and aesthetics. In recent years, TikTok's recommendation algorithms have been particularly discussed for their propensity to help LGBTQ+ users find their communities of peers online, as well as to support the remixing of LGBTQ+ cultural codes[20], as also discussed in the scientific literature (Simpson & Semaan, 2021). In particular, the app's For You page, which offers users a personalized list of trending videos that are tweaked based on their preferences, has received a lot of media attention for its eerie ability to predict users' interests. Instagram's recommendation algorithms have also been identified as key mediators of gay visual cultures and beauty standards, resulting in a new category of "Instagays" that intersects with influencer culture[21]. Other articles have identified how apps are transforming dating and hookup cultures within LGBTQ+ communities[22]. Indeed, the task of romantic or sexual coupling has been increasingly undertaken by matchmaking algorithms that combine recommendation and user rating systems (Myles, 2020).

Recommendation algorithms were also discussed in their propensity to reshape processes of production and circulation within cultural and media industries. For example, some articles underlined how emerging LGBTQ+ musical artists, like Lil Nas X, ElyOtto, and Saucy Santana, have trended by harnessing the power of recommendation algorithms[23]. Some articles addressed how LGBTQ+ journals and magazines have changed in recent years to follow trend hypes imposed by recommendation algorithms to ensure commercial success[24]. Some have highlighted how Netflix's recommendation algorithms can recreate "an experience akin to having a queer owned video store"[25], while others have warned that their predictive power could also unintentionally out users to family members by revealing their viewing habits[26]. Related articles argued that recommendation algorithms play an increasing role in mediating user identities, namely, because of their predictive capability. To that effect, TikTok's recommendation algorithms were particularly identified as being able to predict the sexual and/or gender identity of users before users themselves, with some users realizing or coming to terms with their own queerness

[20] Jeffers (2021); George (2022); Hess (2021); Ohlheiser (2020); Noyce (2022); Savage (2020); Scriver (2021); Wilson (2020).
[21] Davis (2022).
[22] Anonymous (2020b; 2020c; 2020d; 2020e); Hanau (2017); Headero (2021); Heffernan (2021); Light (2010); O'Brien (2016); Wells (2015).
[23] Hardy (2022); Hughes (2021); Hitt (2019); Volmers (2021a; 2021b).
[24] Anonymous (2018b); Czyzselska (2018).
[25] Chilton (2019).
[26] Ellis (2019).

through their interactions with the app's recommended content[27]. Similarly, an article evoked an older controversy where the digital video recorder TiVo would "think" certain users were gay based on their media preferences[28], which echoes studies that have underlined how digital platforms increasingly intersect recommendation algorithms, identity, and queerness (Cohn, 2016).

A second subset of our corpus highlights how recommendation algorithms may participate in radicalizing anti- or pro-LGBTQ+ stances. This relates to the extensive scholarship that has examined (or challenged) the claim that digital platforms can act as echo chambers or filter bubbles (Bruns, 2019). Articles in this subset criticized digital platforms and their quest for virality that allegedly exacerbate forms of LGBTQ-phobias[29]. Platforms like Facebook and YouTube were particularly criticized for operating recommendation systems geared at promoting the most controversial – and often hateful – videos to other users, while failing to consider the implications that those videos may raise in terms of LGBTQ+ safety and discrimination[30]. Similarly, TikTok was criticized for promoting anti-LGBTQ+ videos during the US month of Pride[31]. Articles also underlined how music streaming platforms, like Spotify, Apple, and Deezer, were being investigated after it was disclosed that they were recommending homophobic and racist music to their users[32]. The role of recommendation algorithms in radicalizing political stances was also a key issue. Some articles discussed how recommendation algorithms could exacerbate hate speech against LGBTQ+ politicians, like US Democrat Pete Buttigieg[33], while others posited that recommendation systems played a significant role in sustaining both hate speech campaigns against LGBTQ+ folks and, inversely, "cancel campaigns" against individuals who disagree with LGBTQ+ rights campaigns[34].

A third subset of articles specifically examines the implications that targeted ads raise for LGBTQ+ communities. Articles included in this subset offered critical reflections on the dataveillance and consumerist imperatives to which targeted ads respond and the implications they generate in terms of consumer rights[35]. Those articles often underlined how targeted ads

[27] Bokody (2021); Joho (2022); Kammerer (2021); MacGowan (2020); Oliver (2021); Simpson (2020); Singal (2018).
[28] Kikidis (2019).
[29] Beaty (2019); Godwin (2017).
[30] Balkissoon (2019); Crerar (2021); January (2020).
[31] Colombo (2021); Little (2021); Zakrzewski (2021); Zitser (2021).
[32] Fingas (2020).
[33] Hicklin (2020).
[34] Aberle (2018); Cook (2019); Maddox (2021); Metz (2021); Susarla (2020).
[35] Brown (2016); Murgia (2019); Wood (2018a; 2018b).

could lead to further discrimination against LGBTQ+ communities. For example, some addressed how targeted ad services could be used by conservative religious groups to reach young LGBTQ+ users and promote conversion therapies, as well as the difficulty for digital platforms to implement policies differentiating anti-LGBTQ hate speech from legitimate freedom of religious speech [36]. Other articles have identified how recommendation algorithms could lead to the promotion of targeted anti-LGBTQ+ ads and disinformation during political campaigns[37], as well as highlighted how targeted ads, coupled with automated gender recognition software, could further lead to the misgendering of trans and non-binary users[38].

Facebook's failings in the implementation of clear and safe policies regarding their targeted ads service was the topic of several analyses. On the one hand, because of the sexual and gender datafication schemes they operate, targeted ads raise significant privacy risks for LGBTQ+ users who might not want to have their personal information disclosed to third-party companies; on the other hand, LGBTQ+ users may also be unfairly excluded from these ad services by companies that do not wish to include LGBTQ+ folks in their consumer base, thus further leading to their social discrimination[39]. LGBTQ-themed ads on Facebook were also more prone to be the targets of hateful comments[40]. Additionally, Facebook was criticized by advertisers for allegedly blocking gay-themed ads that were erroneously labelled as sexually explicit, as well as by unhappy businesses whose ads were recommended under LGBTQ-phobic videos[41]. Those controversies came in the wake of various policy and bill propositions seeking to prevent or better oversee the use of sexual orientation and/or gender identity to target platform users (among other protected identity categories), like in the US and in Europe [42]. In response to these controversies, Facebook announced in 2021 that it would likely remove sensitive ad-targeting categories from its service[43].

Overall, our review indicates that LGBTQ+ ad targeting is emerging as a lucrative market, with companies like Gay Ad Network specifically catering to the needs of digital advertisers seeking to reach those publics[44].

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[36] Asher-Schapiro & Gebeily (2021); Cuthbertson (2018); Horton & Cook (2018); Lidman (2019); Pandey (2018); Rosa (2018); Toce (2018); Whyte (2018).
[37] Buonaiuto (2018); Legon (2021).
[38] Sadagopan (2019).
[39] McIntyre (2019).
[40] Piper (2013).
[41] Dwoskin & Timberg (2017); Rosenberg (2018).
[42] Consumer Watchdog (2020); Dag (2022); Nuttall (2019).
[43] Isaac & Hsu (2021).
[44] Gay Ad Network (2012); Nocera (2014); Qvist (2016).

Other articles identified how new platforms are launched to provide marketers with safe ways to reach LGBTQ+ publics [45] or promoted opportunities for marketers to help them improve their skills to reach niche publics through targeted ads training[46]. Our analysis underlines how the topic of targeted ads is a particularly complex issue. The use of targeted ads by corporations to reach LGBTQ+ publics based on their personal data is especially criticized for its implications in matters of consumer rights and user privacy. That said, these services can also be used by LGBTQ+ non-profit organizations and cultural industries to reach the same publics. Mainstream platforms' decision to remove LGBTQ+ targeted ads could significantly hinder their operations, especially those of smaller organizations or businesses that may not have the resources to build their own LGBTQ+ publics, an issue that deserves additional scrutiny.

3.3 Filtering algorithms and the politics of LGBTQ+ acceptability

Filtering algorithms are typically geared at identifying undesirable content on digital platforms and preventing users from accessing it, either by removing that content or by making it more difficult to find. As such, filtering algorithms are inherently related to platform content moderation strategies (Gerrard & Thornham, 2020; Gillespie, 2018). In our review, articles that addressed the topic of algorithmic filtering in relation to LGBTQ+ issues were generally interested in how digital platforms are becoming new moral authorities that redefine the boundaries of social acceptability. The articles that were included in this category are divided into two interrelated subsets: those addressing the need for platforms to better support the algorithmic detection and removal of anti-LGBTQ+ hate speech and those highlighting, somewhat paradoxically, how those content moderation mechanisms often censor or harm the LGBTQ+ users they are supposed to protect (Cobbe, 2020).

A first subset of articles addresses the contentious topic of anti-LGBTQ+ hate speech on digital platforms. Several articles shared the reports and studies prepared by human rights agencies and organizations that highlight the need for digital platforms, like Facebook and Twitter in particular, to develop better filtering algorithms in the hope of mitigating LGBTQ+ harassment online. Those organizations include GLAAD, the anti-defamation league, Media Matters for America, the United Nations, and the California Attorney General[47]. Their reports identify LGBTQ+ users, among

[45] Grier (2020).

[46] Mckelvey (2015).

[47] Collins (2021); Fried (2021); Guynn (2019); Monifa (2021); TNS (2019); TNS (2020a); Zitser (2021).

other vulnerable populations, as being disproportionally targeted by hate speech and argue that those users deserve safe spaces to interact online. Articles were particularly critical of Facebook's alleged laxity in the matter of LGBTQ+ hate speech detection[48], with certain celebrities, like singer Elton John, inviting users to boycott the platform in 2018[49]. Facebook was also criticized for introducing its "real name" policy in 2014, which negatively impacted LGBTQ+ communities, and drag artists in particular, who often employ online alter egos[50]. Furthermore, the platform was criticized for its alleged unwillingness to follow local laws and its inability to protect LGBTQ+ users outside of Western countries but was also celebrated for its ban on targeted conversion therapy ads[51].

Elsewhere, the video-sharing platform YouTube came under heavy criticism when it decided to reinstate the channel of a homophobic creator in 2019, opting to demonetize his channel rather than banning it altogether[52]. Similarly, Twitter was identified as a hotbed of anti-LGBTQ+ discourse[53], whereas Google's and TikTok's[54] efforts to combat hate speech online received more positive responses[55]. The failures of various types of platforms in protecting their LGBTQ+ users from hate speech were also raised through cases relating to the blackmail of North African queer dating app users, the increase of LGBTQ-phobic trolls on Instagram and Facebook, and the presence of homophobic bullying on gaming and sports platforms[56]. Overall, these articles highlight the prevalence of anti-LGBTQ+ hate speech online and the limitations of content moderation policies – and their related filtering algorithms – in removing discriminatory or threatening content, as well as call for more effective automated hate speech removal systems.

A second subset of articles examines the limitations and dangers associated with the implementation of content moderation policies per se. Notably, this second subset documents the flaws of AI-based detection systems that have had the tendency to censor LGBTQ+ content in favor of more 'family-friendly' content[57]. Several articles addressed how sex and

[48] Dwoskin et al. (2021); Foufas (2014); Hindman et al. (2022); Kuchler (2018); Scott (2021); Seetharaman et al. (2021); The Washington Post (2021); TNS (2020b).
[49] Naffi & Davidson (2018).
[50] Allen (2015); Foufas (2014); Michaelson (2014a; 2014b); Rushton (2014a).
[51] Al-Khal (2020); Asher-Shchapiro & Gebeily (2021); Fae (2017); Roeder (2020); Rosa (2018); Whyte (2018).
[52] Farrell (2019); Fitzgerald Rodriguez (2019); Gilbert (2019); Kinney (2019); McCarthy (2019); Sharman (2019); Weill (2019a); Yurieff (2019).
[53] Desmarais (2019).
[54] Prang (2022).
[55] Besen (2019); LaMagna (2018); Smith (2017).
[56] Al-Khal (2020); Chang (2021); Farrell (2021); Hardy (2022); Jammot (2021); Levesque (2020); O'Leary (2012); Porter (2021); Ryall (2021).
[57] Snow (2022); York (2021).

nudity bans on digital platforms, as well as age verification policies have become very contentious issues[58]. This is best illustrated by the so-called Tumblr and OnlyFans purges, during which both platforms announced they would ban adult content in an effort to guarantee the safety of younger users, but with the collateral consequence of banning the profiles of thousands of LGBTQ+ creators who contributed to the early popularity of those platforms (OnlyFans later rescinded this decision)[59]. The most prevalent cases of LGBTQ+ censorship by content moderation policies, however, related to the restricted mode implemented by YouTube in 2017, which seemingly affected the ability for LGBTQ+ users to monetize their videos[60]. Similarly, a second controversy arose in 2019 when a group of LGBTQ+ YouTubers sued the platform, alleging that its algorithms were disproportionally demonetizing videos pertaining to LGBTQ+ subjects or keywords[61], as those videos would stop being suggested by the platform. While this controversy technically relates to recommendation algorithms, it was included in this section because those algorithms incidentally function as a content moderation mechanism (Gillespie, 2018).

Other controversies surrounding the issue of content moderation and censorship included Facebook preventing lesbian users to employ the word 'dyke', TikTok censoring the use of certain LGBTQ+ keywords in its Disney filter, as well as Twitter's propensity to disproportionally flag the profiles of drag artists[62]. Furthermore, Twitter and Instagram were criticized for enacting content moderation policies that disproportionally censor and penalize trans and non-binary users[63], whereas review platforms, like Yelp and Zomato, were criticized for providing transphobic labels or censoring reviews retelling homophobic experiences[64]. Finally, the use of deepfake technology to protect the identities of LGBTQ+ participants in a documentary on Chechnya also garnered reflections on the inability of digital platforms to moderate this emerging technology[65].

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[58] Anonymous (2019); Belton (2021); Blue (2019); Drake (2018); He (2019); Robertson (2021); Turban (2018).

[59] Beachum (2021); Heater (2018); Mitchell & Akhtar (2021); Perez (2017); Powell (2018); Robertson (2022).

[60] Allen (2017a); Cooper (2017); Lewis (2017); Ogles (2017); Ryan (2017); Shu (2017); Whilem (2017).

[61] Banerjee (2019); Bensinger & Albergotti (2019); Dodgson (2019); Ellis (2019); Farokhmanesh (2018); Fisher (2019); Forrester (2020); Guilfoil (2019); Hutton (2019); Kleeman (2019); Lothian-McLean (2019); Murdock (2019); Oremus (2019); Romano (2019); Steiner (2019); Stokel-Walker (2018), TNS (2020c).

[62] Sharpe (2017); Smith (2021); Trigger (2017).

[63] Savage (2021); Smith (2018); Walker (2019); Weill (2019b).

[64] Allen (2018a); Ramnani (2017).

[65] Coyle (2020); Needham (2020); Rothkopf (2020).

Overall, this section highlights how changes in content moderation policies, especially those targeting 'inappropriate' content, negatively impact the online spaces built for LGBTQ+ socializing, as previously discussed in the scientific literature (Byron, 2019; Pilipets & Paasonen, 2020; Southerton et al., 2020). Indeed, platform policies often fail to protect their LGBTQ+ users and can even participate in censoring the content these users produce (Duguay et al., 2020; Oliva et al., 2020). This paradox was the topic of several articles included in this section[66]. In response, start-up companies are marketing new social media platforms around this paradox, arguing that their services are expressly developed to provide LGBTQ+ users with safe spaces while also preventing the censorship of their content[67]. Thus, the failure of mainstream platforms in safely catering to their LGBTQ+ users appears to have become somewhat of a marketing opportunity for LGBTQ+ tech entrepreneurs.

3.4 Search algorithms and the struggle over LGBTQ+ visibility online

Search algorithms are typically built to help users navigate the Internet by offering a ranked or ordered lists of results in response to their specific queries. To that effect, search engines have become a central topic of interest in the scientific literature on algorithmic oppression, especially as they can reproduce supremacist and cisheteronormative conceptions about sexuality, gender, and race (Noble, 2018). The articles in this fourth category generally discuss case studies and controversies showcasing how the Internet has become the site of significant struggles over LGBTQ+ self-expression and mediated visibility.

Unsurprisingly, Google emerged as the main topic of discussion in this category, with a specific interest in the racial, sexual, and gender biases that can be reproduced by the company's proprietary search engines[68]. Google was particularly criticized for its tendency to sexualize and fetishize search results on lesbians and for catering to the interests and taste of white, heterosexual men, while preventing LGBTQ+ users – and queer women in particular – from obtaining search results that meet their individual or collective needs (Google tweaked its search algorithms to that effect in 2019)[69]. Google also came under heavy criticism in 2017 when it was disclosed that an AI bot it developed, which relied on sentiment analysis,

[66] Allen (2018b); Christy, (2018); Garland (2019); Lidman (2019); O'Neill (2019); Vecchietti (2020).

[67] ETX Studio (2022); Grier (2020); Rushton (2014a; 2014b).

[68] Davis (2014).

[69] Bondioli (2019); Burkholder (2019); Ehrenkranz (2019); Marr (2019); Parkinson (2019); Ritschel (2019); Simister (2019).

had learned to automatically label LGBTQ+ keywords as negative[70]. Other articles discussed how Google's autocomplete function, which offers users suggestions to complete their queries based on the most popular searches, reproduced discriminatory assumptions about LGBTQ+ people[71]. Similarly, other controversies emerged after learning that the natural language processing models upon which several of Google's online tools operate often filter out or minoritize gender and sexual diverse voices[72].

Other articles addressed Google's search algorithms at the intersection of politics and policy. In 2011, several articles reported how Rick Santorum, an ultra-conservative US politician, demanded that Google remove undesirable search results associated with his name[73]. This news story relates to a 2003 controversy when the Republican party member compared homosexuality to incest and bestiality. In response, the American journalist Dan Savage organized an online campaign with LGBTQ+ rights supporters to manipulate Google's search results so that queries related to the politician's name resulted in an explicit sexual term, a political tactic now known as Google bombing (Gillespie, 2017). Other articles addressed the ethical intricacies for Google to comply or not with anti-LGBTQ+ policies in countries like Russia, Turkey and Thailand, as well as the implications of the corporation's decisions in matters of free speech[74]. Another controversy came in the wake of the 2017 Australian Marriage Law Postal Survey, when Google was accused of censoring anti-marriage equality results in its search engine and, thus, of being biased in favor of marriage equality[75], an accusation that was also made against Facebook[76].

To conclude, algorithmic searchability also directly relates to the labels and hashtags that facilitate and accelerate the provision of meaningful search results through the use of predetermined sociotechnical categories. For example, the introduction of new LGBTQ+ labels on the gaming platform Steam in 2019 was seen as a useful addition for users in search of more diverse games[77], whereas Twitter's perplexing decision to prevent the search of certain keywords associated with bisexuality was condemned[78]. Interestingly, other articles used LGBTQ+ search results on adult streaming platforms, like Pornhub, to demonstrate how sexual and gender diverse

[70] Jackman (2017); Lumb (2017); Morse (2017); Thompson (2017); Wood (2018).
[71] Cain Miller (2015); Quinn (2016); Morozov (2012); Nicas (2017).
[72] Anderson (2021); Winchel (2018).
[73] Cohen (2012); Goodman (2012); Krieg (2016); Rozsa (2011).
[74] Gordon Crovitz (2015).
[75] Davidson (2017); Fox Koob (2017); Tomlinson (2018).
[76] Mitchell (2016).
[77] Grayson (2019).
[78] Allen (2017b).

citizens exist globally, thus refuting the conservative claim that LGBTQ+ people are the exclusive products of Western societies[79].

Together, the articles included in this section raise important questions as to who possesses the legitimacy to shape and control LGBTQ+ representations online amid new algorithmic regimes of visibility (Bucher, 2018). Articles highlighting sexualized, stereotypical, and negatively biased search results also reflect queer scholars' assertion that visibility can be a double-edged sword for LGBTQ+ people (Barnhurst, 2007). In the past decade, algorithmic searchability has emerged as a key concept, particularly in the hashtag activism scholarship (Khoja-Moolji, 2015; Yang, 2016). This is also true for LGBTQ+ communities, for which the hashtag feature has supported the rapid constitution of highly visible and searchable LGBTQ+ publics that are leveraged to formulate sets of cultural (Navar-Gill & Stanfill, 2018) and/or political demands (Duguay, 2016; Myles & Lewis, 2019; Woods & McVey, 2016). That said, articles pertaining to LGBTQ+ hashtags have not emerged as a significant subset in our review. This points to some of the methodological limitations of our review that are discussed in this papers' conclusion.

3.5 Algorithmic innovation and the reproduction of cisheteronormative biases

The last subset of our corpus deals with the overarching issue of representation in the tech industry and its role in reproducing gender and sexual biases through the digital platforms that stem from it. The articles included in this category offer meta-commentaries to understand the origins of algorithmic oppression and its implications for LGBTQ+ users. In line with the scholarship on algorithmic justice (Noble, 2018), some articles identified Silicon Valley's toxic technoculture (Massanari, 2017) as a main source of cisheteronormative biases[80], which ultimately materialize into platform affordances and result in LGBTQ+ discrimination[81].

Two related controversies arose in this subset: the resignation of Mozilla's ex-CEO over homophobic remarks in 2014[82], as well as the nomination of a seemingly transphobic individual to sit on Google's newly formed AI Council in 2019[83]. To that end, Google was particularly criticized for the alleged mistreatment of its LGBTQ+ employees[84]. Despite the

[79] Doig (2014); Foxton (2014); Gupta (2017).
[80] Metz (2021); Norton (2021); Segal (2021); TNS (2021); Watling (2021); Webb (2017).
[81] Allen (2018); Bahl (2022).
[82] Tan (2014).
[83] AFP (2019); Chapman (2019); Harris (2019); Hatmaker (2019); Metz (2019); Risi (2019); Sumagaysay (2019).
[84] Daily Telegraph (2019); Grind & MacMillan (2018).

adoption of equity, diversity and inclusion policies, the under-representation of LGBTQ+ workers in STEM research and the tech industry was identified as a key obstacle to reach algorithmic justice[85]. Hence, some articles discussed the necessity to increase LGBTQ+ hires in the tech industry[86] or stressed the importance for LGBTQ+ professionals to build their own AI-related skills[87]. This relates to recurrent calls to diversify the tech industry, as similarly argued by Crawford (2016b): "artificial intelligence [reflects] the values of its creators. So, inclusivity matters — from who designs it to who sits on the company boards and which ethical perspectives are included. Otherwise, we risk constructing machine intelligence that mirrors a narrow and privileged vision of society, with its old, familiar biases and stereotypes".

As such, this last subset – the smallest of our corpus – highlights how most of the newspaper articles included in our review tend to focus on downstream considerations, as they generally contend with the effects that platform algorithms have on the lives of LGBTQ+ users after their implementation. This points to the importance for researchers, activists, and journalists alike to also engage with more upstream concerns when dealing with LGBTQ+ algorithmic justice, namely, by considering digital platforms as culturally situated artefacts that reflect and exacerbate the power imbalances of the industrial sector from which they spawn.

4 CONCLUSION

In this paper, we conducted a review and analysis of journalistic articles to identify significant issues that platform algorithms raise for LGBTQ+ users and analyze their implications, especially in terms of social justice and equity. The results of our review were divided into four algorithmic functions (i.e., sorting, recommending, filtering, and searching), as well as a fifth meta-category relating to cisheteronormativity in the tech industry more broadly. In light of our analysis, our paper points to five important issues that platform algorithms raise for LGBTQ+ communities that merit additional scrutiny: the ability for sorting algorithms to identify, categorize, and predict the sexual orientation and/or gender identity of users; the role that recommendation algorithms play in mediating LGBTQ+ identities, kinship, and cultures; the development of automated anti-LGBTQ+ speech detection/filtering software and the collateral harm caused to LGBTQ+ users; the power struggles over the nature and effects of visibility afforded

[85] Flickinger (2018); Sahoo (2021); Telford (2020).
[86] Collins (2021).
[87] Croxon (2019).

to LGBTQ+ issues/people online; and the overall enactment of cisheteronormative biases through platform affordances.

Our press review presented some methodological limitations mainly associated with the use of keyword searches to identify relevant controversies. First, our review is limited to articles containing specific LGBTQ+ keywords. Evidently, AI-related issues that can be applied to the general population also apply to LGBTQ+ communities but may not have been identified by our review process. Second, the use of predetermined keywords represented a challenge to encapsulate dynamic or contested concepts (e.g., 'algorithms', 'digital platforms', 'LGBTQ+ communities'). Third, our review process did not allow us to fully engage in an intersectional analysis of the literature, that is, to examine sexual and gender identity at the intersection of other equally important social identity markers such as race, disability, and/or social class. Fourth, our review was limited to newspaper articles published in English, a methodological decision that diminishes the scope of our results. While our analysis included articles from English-language newspapers from the Americas, the Middle East, Europe, Africa, Asia, and Oceania, its results and their implications should in no way be understood as universal, given this linguistic limitation.

Still, our review points to key avenues for future research. Researchers must develop innovative empirical studies to account for the various forms of algorithmic oppression LGBTQ+ users experience on and by digital platforms. Importantly, future studies should examine how platform algorithms affect and oppress LGBTQ+ users in differentiated ways, depending on a variety of intersecting and complex factors (e.g., race, disability, social class, religion, age, local cultures, indigeneity, geopolitical contexts, legal jurisdictions), in line with studies that apply intersectional theories to digital research objects (Geerts & Rahbari, 2022). Furthermore, our review shows how platform algorithms have so far been apprehended as being predominantly oppressive in nature toward LGBTQ+ users. Beyond algorithmic oppression or harm (Tufekci, 2015), future research should consider how platform algorithms are not solely oppressive but also productive in nature (Bucher, 2018). Indeed, algorithmic surveillance does not solely repress LGBTQ+ identities, kinship, and cultures or prevent them from emerging in the first place; rather, it shifts and reshapes them in differentiated and complex ways.

To that end, more research is needed to examine platform algorithms beyond their constraining properties to understand how they are actively reshaping the lives and practices of LGBTQ+ users, while simultaneously unpacking the capitalistic and surveillance imperatives to which these algorithms respond. Importantly, future research should account for the agency LGBTQ+ users exert vis-à-vis platform algorithms. For example, in

what creative ways do LGBTQ+ users resist, counter, or hijack platform algorithms (Grison & Julliard, 2021)? Finally, our review stresses the need for more industry-related investigations into the underrepresentation of LGBTQ+ professionals in positions of power within the tech industry, and how this may contribute to the development of cisheteronormative algorithmic systems. Together, these recommendations lay the foundation of a research agenda on algorithmic justice that can steer future technological innovation and policy, as well as guide research on LGBTQ+ communities and other marginalized communities facing similar challenges online.

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COVID-19 VACCINE HESITANCY: A MIXED METHODS INVESTIGATION OF MATTERS OF LIFE AND DEATH

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ABSTRACT

In this article, hesitancy towards COVID-19 vaccinations is investigated as a phenomenon touching upon existential questions. We argue that it encompasses ideas of illness and health, and also of dying and fear of suffering. Building on a specific strand within anti-vaccination studies, we conjecture that vaccine hesitancy is, to some extent, reasonable, and that this scepticism should be studied with compassion. Through a mixed methods approach, vaccine hesitancy, as it is being expressed in a Swedish digital open forum, is investigated and understood as, on the one hand, a perceived need of protecting one's body from techno-scientific experiments, and thus the risk of becoming a victim of medicine itself. On the other hand, the community members express what we call a tacit belief in modern medicine by demonstrating their own "expert" pandemic knowledge. The analysis also shows how the COVID-19 pandemic triggers memories of another pandemic, namely the swine flu in 2009–2010, and what we term a medical crisis that occurred then, due to a vaccine that caused a rare but severe side effect in Sweden and elsewhere.

Keywords: COVID-19; pandemic; vaccine hesitancy; mixed methods; topic modelling; illness narrative; social media, Flashback Forum

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1 INTRODUCTION

During the COVID-19 pandemic we witnessed heated, polarised debates over vaccination in society. In many countries, the majority, who were vaccinated, [1] have had difficulty understanding their fellow citizens' reluctance to take this evidently effective measure (Watson et al. 2022), accusing "them" of lacking feelings of solidarity towards others in need of disease protection. In this article, we will investigate and clarify this dissensus based on a study of digital conversations dedicated to COVID-19 vaccines in a Swedish context, with a special interest in vaccine hesitancy.[2] In March 2023, more than 670 million people in the world have been infected with the corona virus SARS-CoV-2, and close to 7 million have died.[3] Billions went into lockdowns during 2020 and 2021. Some countries, such as Sweden, remained open. Nevertheless, people by and large conformed to official social-distancing recommendations. These were a governmental safety measure intended to stop the spread of the virus, which, likely, led to citizens increasingly using the internet to communicate their beliefs, feelings, opinions and information about the pandemic restrictions and measures.[4]

A growing body of research concerning the influence of social media on COVID-19 vaccine information spreading is currently emerging. In a cross-sectional systematic review by Cascini et al. (2022), 156 international articles are identified which reported outcomes related to COVID-19 vaccine attitudes and social media use. Among these, studies that performed thematic analyses of extracted social media data related to vaccine opinions "demonstrated the potential for polarized views to be amplified using social media [implying that] [u]nderstanding this notion has profound benefits for targeting misinformation and combating false-news preaching 'bubbles'" (Cascini et al. 2022: 35). Similar to the study by

[1] Globally, 13 billion doses of COVID-19 vaccines have been administered according to Johns Hopkins University's Corona Virus Resource Center, https://coronavirus.jhu.edu/map.html (accessed on 2023-03-14).

[2] The research presented in this article was conducted within the framework of the 4-year project *Rumour Mining* (Riksbankens Jubileumsfond grant # MXM19-1161:1), with the goal to study vaccine hesitancy and vaccine rumours in Swedish social environments.

[3] Johns Hopkins University's Corona Virus Resource Center, https://coronavirus.jhu.edu/map.html (accessed on 2023-03-14).

[4] See Internetstiftelsen's [The Internet Foundation] survey from 2020, showing an increase of social media use in Sweden during 2020, https://svenskarnaochinternet.se/rapporter/svenskarna-och-internet-2020/sociala-medier/fler-anvander-sociala-medier-under-pandemin/#2020-7.1 (accessed on 2023-03-14). For an overview of the social media use increase in other parts of the world during phases of the COVID-19 pandemic, see Rosen et al. (2022).

Cascini et al. (2022), much of the literature about COVID-19 vaccine hesitancy more generally is concerned, implicitly or explicitly, with the task of coming to grips with the problem; that is, it has a normative point of departure. It seeks to understand vaccine-hesitant individuals' unsettling perceptions with the purpose of offering them solutions and, by extension, increasing COVID-19 vaccine uptake. Survey investigations draw conclusions regarding the importance of, e.g., traditional pro-vaccination campaigns (Schmidtke et al. 2022), multimedia vaccine promotions (Frankenthal et al. 2022), improved education for health professionals (de St Maurice et al. 2022), and governmental strategies to convince citizens to take the shot (Lindvall and Rönnerstrand 2022).

We do not question the importance of this research but will aspire to move beyond it by building on a strand within vaccine hesitancy research more broadly which we term *compassionate anti-vaccination studies*. In doing so, we strive to contribute to a nuanced understanding of this phenomenon by assuming that people on opposite sides of the vaccine debate share some fundamental traits. For example, all human beings have bodies that can be both strong and vulnerable, and all human beings get sick and die at some point – circumstances that we may fear but still have to live with. And as vaccines protect us from illness, and eventually also from dying, it is a phenomenon encompassing existential dimensions, we argue, that is, matters of life and death and what it means to be living. This applies as much to people who talk about COVID-19 vaccinations in positive terms as to people who discuss them critically. Like all research, our study is ultimately driven by curiosity, but also by a desire to increase our understanding of the world, on the premise that greater understanding also generally leads to better coping.

Two interrelated intellectual starting points inform our study. First, we claim that vaccine hesitancy is, to some extent, reasonable. Second, we assert that vaccine scepticism should be studied with compassion. Thus, through this non-dismissive approach we aim to understand how COVID-19 vaccine hesitancy is expressed on Sweden's largest open forum on the internet, Flashback Forum, using a research methodology mixing (quantitative) topic modelling with (qualitative) narrative analysis. With close to 1.5 million registered users and 80 million published posts, it is even one of the largest open web forums in the world according to some researchers (Wahlström and Törnberg 2021: 771).[5] Our article addresses the following research questions: What is being said about COVID-19 vaccinations on the forum? And in relation to this, what kind of illness stories are being told through hesitancy towards COVID-19 vaccines? How

[5] Figures from March 2023, https://www.flashback.org/ (accessed on 2023-03-14).

is the fear of the side effects of vaccination[6] described and, ultimately, what can we learn about the community members' belief and disbelief in modern medicine by studying these conversations?

The outline of our investigation is as follows: firstly, we introduce the reader to the Swedish pandemic context and the background literature which we have consulted. Secondly, we present our material and methods. After this, the analysis is developed, starting with the topic modelling analysis, which leads the way to an exploration of the illness narrative. We round up the article with our conclusions and suggestions for further research.

2 COMPASSIONATE ANTI-VACCINATION STUDIES

Sweden managed the intense phases of the COVID-19 pandemic with high vaccination rates[7] but also a declining satisfaction among the population with the government's pandemic response (Andersson 2021), which differed markedly from that of other countries in Europe. While the neighbouring Nordic countries were closing down Sweden remained relatively open, which gave rise to harsh criticism from pandemic experts and politicians in Norway, Denmark and other parts of the world. Heated media debates about "Sweden's gamble" ensued, engaging both members of the public and medical experts (Vogel 2020; Claeson and Hanson 2021a, 2021b).

According to a national survey from 2021, a minority (4%) of the Swedes stated that they would most likely not take the COVID-19 vaccination, or refuse it altogether, expressing a distrust in the vaccines which seemed to correlate with a lack of trust in the authorities (Rönnerstrand 2021). The same study also shows that as much as one fifth of the Swedish citizens were of the opinion that there is a risk of severe side effects caused by the vaccines. This indicates that the fear of adverse vaccine effects is something that also people willing to take the shot seem to grapple with. One should also note that the COVID-19 pandemic did not occur in a cultural vacuum. In 2019 WHO identified vaccine hesitancy – "the reluctance or refusal to vaccinate despite the availability of vaccines" – as

[6] It is well-known that the fear of side effects affects people's willingness to vaccinate (Björkman and Sanner 2013).

[7] 86.3% of the Swedish population had taken two doses of vaccination against COVID-19 in February 2023, https://www.folkhalsomyndigheten.se/folkhalsorapportering-statistik/statistikdatabaser-och-visualisering/vaccinationsstatistik/statistik-for-vaccination-mot-covid-19/ (accessed on 2023-04-04).

one of ten urgent threats against public health.[8] The reason for this was that measles had seen a 30% increase in cases globally. Not all of these cases were due to vaccine reluctance but it is a fact that some countries that were close to eliminating the disease now have to deal with a resurgence.

What we will show through our analysis is that memories from the (A)H1N1 swine flu pandemic come into the picture when Flashback members discuss COVID-19 vaccines. For this reason, we will give a brief overview of the events that occurred at that time. In 2009–2010, the swine flu vaccine Pandemrix (marketed by GlaxoSmithKline), resulted in a serious but rare side effect. Out of 1.5 million Swedish children who were vaccinated, approximately 500 developed narcolepsy, a severe, chronic neurological disease (Nihlén Fahlquist 2018; Lundgren 2015b, 2017).[9] The cases of narcolepsy caused by Pandemrix demonstrate how adverse vaccine effects could still occur despite Sweden's highly efficient pandemic preparedness, and even though more than a decade has passed the story has not come to an end. In February 2023, 479 people filed a collective claim with the Chancellor of Justice directed towards the Swedish state for compensation of 32 million euros.[10] However, lessons have been learnt. As

[8] https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019 (accessed on 2023-03-14).

[9] Figures from an e-mail-conversation (2022-04-07) with Anders Hultman, Deputy CEO at Svenska Läkemedelsförsäkringen AB, a national company that handles all pharmaceutical injuries in Sweden, show that 740 reports of narcolepsy have been made, and for about 440 of them the state has assessed that the disease was caused by the Pandemrix vaccine. It is now Kammarkollegiet (Legal, Financial and Administrative Services Agency) that handles incoming injury claims: https://www.kammarkollegiet.se/vara-tjanster/ersattning-och-inkomstgaranti/ansok-om-statlig-ersattning-for-narkolepsi (accessed on 2023-03-14). The first to report about this adverse effect was the Finnish physician Markku Partinen (Partinen et al. 2012; Sarkanen et al. 2017). Subsequently, the increase of narcolepsy cases caused by the Pandemrix vaccine has been confirmed by other studies, https://www.sciencedirect.com/topics/neuroscience/pandemrix (accessed on 2023-03-14). More about the Pandemrix consequences in Norway can be found here: https://sciencenorway.no/childrens-health-diseases-sleep/children-who-got-narcolepsy-after-the-swine-flu- vaccine-struggle-with-obesity-and-depression/1784818 (accessed on 2023-03-14). In 2011, The European Medicines Agency (EMA) recommended restricting use of Pandemrix, https://www.ema.europa.eu/en/news/european-medicines-agency-recommends-restricting-use-pandemrix (accessed on 2023-03-14). An estimation from 2015 is that 1,300 people in Europe developed Pandemrix caused narcolepsy, https://www.science.org/content/article/why-pandemic-flu-shot-caused-narcolepsy (accessed on 2023-03-14). To put this figure into perspective, the vaccine was given to more than 30 million Europeans.

[10] A debate article about the complaints was published in Dagens Nyheter, one of Sweden's largest dailies https://www.dn.se/debatt/narkolepsidrabbade-kraver-staten-pa-363-miljoner-kronor/ (accessed on 2023-03-14). The claim for damages is based on the

a direct consequence of the swine flu experiences a national vaccination register was established, regulated by law, in order to, among other things, facilitate side effect surveillance.[11] In reference to the Pandemrix induced cases of narcolepsy, the biomedical ethicist Jessica Nihlén Fahlquist writes that the "concerns of lay people should not be seen as signs of ignorance, but as a starting-point for a responsible and respectful discussion" (Nihlén Fahlquist 2018: 187).

It is against this background that we venture to claim that vaccine hesitancy is, at least to some extent, reasonable, which leads to the idea of the importance of a compassionate stance towards people who express anti-vaccination opinions and sentiments. The term was introduced by the anthropologist Elżbieta Drążkiewicz, though it was presented slightly differently in a piece published in *Nature*'s World View section entitled "Study conspiracy theories with compassion". She writes as follows:

> Motivated to end the pandemic, and to encourage vaccination and other health-promoting behaviours, many researchers new to the subject are asking how best to 'confront' or 'fight' conspiracy theories, and how to characterize people wary of medical technologies. But my field has worked for decades to push back on this tendency to pathologize and 'other'. Whether researchers are trying to understand beliefs around vaccination or theories surrounding NATO, Russia and bioweapons labs, such framing limits what can be learnt. Conspiracy theories are more about values than about information. Debunking statements might occasionally be effective, but does little to tackle their root cause. (Drążkiewicz 2022: 765)

Drążkiewicz underscores the risks of the "us versus them" framing of the vaccination issue, leading to descriptions of fellow humans as *those people*, "obsessing over characteristics that make them distinct – especially from the researcher" (Drążkiewicz 2022: 765). The reaction can be quite

argument that the Swedish state violated Article 8 of the European Convention, which says that states must actively provide people with the necessary information so that they can assess risks to life and health, and that they only implement pressure for vaccination if there is a strong social need. A decision in favour of the families would, they claim, finally confirm the state's responsibility for the vaccination injuries. The legal case of the patient 'John' filing charges and winning against the UK government is one of the most well-known https://www.theguardian.com/science/2017/feb/09/ministers-lose-fight-to-stop-payouts-in-swine-flu-jab-narcolepsy-cases (accessed on 2023-03-14). Several legal cases have also taken place in Ireland, in favour of the plaintiffs https://www.irishtimes.com/news/crime-and-law/courts/high-court/girl-who-claims-to-have-sleep-disorder-after-swine-flu-jab-gets-1-325m-1.4737586 (accessed on 2023-03-14).

[11] https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-2012453-om-register-over-nationella_sfs-2012-453 (accessed on 2023-03-14).

understandable. Researchers, in general, wish to defend democratic values and scientific knowledge, but this risks interfering with social science researchers' aim to conduct open-minded investigations of individuals and their beliefs. It may prevent them from recording the root causes of citizens' reluctance to receive COVID-19 vaccinations. The goal of our curiosity driven approach is to find out more about the world and to understand it better, and with Drążkiewicz, we are convinced that a compassionate approach in the long run will lead to better understanding of anti-vaccine attitudes and their probable causes among individuals and groups. If the results of this research lead to increased vaccination uptake in the future, this is of course very positive, but this is emphatically not an aim of the research.[12]

Furthermore, we identify Bernice Hausman's research as contributing to similar lines of inquiry, especially in her book *Anti/Vax*: *Reframing the Vaccination Controversy* (2019, thus published before the pandemic). Concerning the recurring claims, in both academic literature and the public debate on anti-vaccination sentiments, that the so-called anti-vaxxers are, in fact, denialists who suffer from some kind of cognitive delusion,[13] Hausman asks the question, "What if people's beliefs are simply, and basically, different?" (Hausman 2019: 107). Belief in scientific evidence is not a given, she writes. Belief is a contextually bound cognitive state, which means that culture provides us with a more fruitful theoretical framing for health beliefs than psychology "because attention to culture forces us to identify the specific concerns that people have and understand how those concerns are related to lived experiences" (Hausman 2019: 108). The work of Andrea Kitta (2012), Stuart Blume (2017), Maurizia Mezza (Mezza and Blume 2021), Heidi Larson (2020), Maya Goldenberg (2021), Kaisu Koski (Koski and Holst 2017), and Mia-Marie Hammarlin (2022) are also worth mentioning in this regard. Drawing on a variety of empirical sources and theories, they refrain from describing citizens who are sceptical of vaccines as a strange group of people who are not capable of interpreting facts correctly. Instead, they highlight the challenges that immunisation business, technologies and politics will have to contend with now and in the future, such as a growing disbelief in modern medicine among certain groups (Koski and Holst 2017), a lack of transparency regarding reported adverse effects on the part of vaccines (Mezza and Blume 2021), the interconnection between distrust in

[12] To problematise the idea of compassionate anti-vaccination studies, and starting with ourselves, we would like to stress that we strive to be compassionate toward all interlocutors that we encounter in our academic endeavours. See Harambam (2020: 227–239) for an interesting discussion on these questions.

[13] E.g., the MD Saiful Islam and colleagues suggest what they call "cognitive inoculation" against misinformation to improve vaccine adherence (Islam et al. 2021).

vaccines and distrust of the governments that promote them (Larson 2020; Hammarlin 2022), the relationship between distrust in vaccines and distrust of the billion-dollar pharmaceutical industry (Blume 2017: 117–124; see also Harambam 2020), and how the idea that so-called public ignorance of science prevents citizens from making rational and mature decisions was established to begin with (Goldenberg 2021: 21–40; Blume 2006; Vanderslott et al. 2022).

2.1 Illness narrative typology

To better understand what the Flashback members talk about when they critically discuss COVID-19 vaccines, we dovetail this compassionate approach, outlined above, with the sociologist Arthur Frank's illness narrative typology. In line with Hausman (2019) and Koski and Holst (2017), we argue that illness stories are told between the lines in vaccine-hesitancy stories and that they are worth listening to. Illness stories are told not just about the body but also through the body, a body that is certainly not mute but, rather, speaks about experiences and memories of pain, loss, sorrow and fear.

While Frank pays attention to people's personal stories of physical and psychological experiences of illness, we will mainly analyse the Flashback commentators' *ideas* of illness, that is, their conceptions and presumptions surrounding disease and health that are being explicitly or implicitly expressed in the COVID-19 vaccine-critical comments. The Flashback texts are short, generally 5–20 lines, but after putting them together, they form somewhat coherent narratives. In such cases, Frank's typology helps us to explore "the naming story" (Frank 2013: 75), a story that occurs in many individual narratives, which reverberates in society and culture at a certain time and place.

To briefly summarise, Frank explores illness narratives through three main intermingled types: *the restitution narrative*, *the quest narrative* and *the chaos narrative*. The restitution narrative centres, to a higher degree, on health rather than illness, as captured by the following basic storyline: "Yesterday, I was healthy; today, I'm sick, but tomorrow, I'll be healthy again" (Frank 2013: 77). The quest narrative meets suffering head on. In it, illness is seen as a fundamental experience in life. A belief that something can be gained from the illness experience is entertained, in which suffering can be seen as a journey that becomes a quest, leading to personal development (Frank 2013: 115). A sense of purpose, meaning and control comes to the fore in stories of this kind, capturing the ill person as a subject who experiences, feels and acts upon the illness. As we see it, these two narratives – restitution and quest – function as vulnerability management tools; they promote a belief in the body's self-healing capacity and a sense

of control, hope and meaning in relation to illness, which is, in fact, inherently and indisputably characterised by uncertainty.

In comparison, the chaos narrative is a non-story in today's Western medical technocratic culture in the sense that it is rarely being told publicly, as it reveals modern medicine's limitations and life's inherent vulnerability and unpredictability (Frank 2013: 97). It opposes the restitution and quest narratives by replacing hope and meaning with futility and passiveness. Here, the body is subject to incurable illness and eventually dies. Illness and disease are the ultimate embodiment of the contingency of our existence, effectively contradicting the modern idea of the possibility of rationally controlling and predicting every aspect of our being (Frank 2013: 30f).[14] Moreover, all stories have an inherent social aspect. They are told to someone, whether that someone is immediately present or not (Frank 2013: 3). They also encompass cultural aspects; illness stories that are incapsulated in vaccine hesitancy narratives may teach us something about both the present time and past events and traumas. The *body-self* is a concept that we use, suggesting a rejection of the historical dualism between mind and body, as well as between culture and the individual body (Frank 2013: 41).

So, to sum up, while the main focus in this article is on vaccine hesitancy, we use illness narrative theory to provide us with analytical tools which help us capturing the meaning with what is being said about COVID-19 vaccines in the Flashback discussion threads.

3 FLASHBACK FORUM

With its roots in a punk fanzine from the 1980s, Flashback began its path in 2000 (Hannerz, Burcar Alm and Wästerfors 2022). It still carries characteristics of being edgy by providing a space for unfiltered discussions. Flashback is open in many respects, first of all, anything can be discussed (crime, politics, cooking, gaming, parenting et cetera), second, the forum's main principle is freedom of speech and a lack of censorship (Uhnoo and Ekbrand 2017: 126–151), third, registration is free and, as long as one claims to be over 18, anyone with a computer can read and participate in the discussions (Hannerz, Burcar Alm and Wästerfors 2022). Compared to, e.g., Reddit, one can note that Flashback is not owned by a global media company.

The rather frequent use of racist and misogynist language is a characteristic feature, as a consequence of which Flashback has a disputed

[14] However, there is a growing body of research that investigates severe illness and death experiences that are being shared through social media. See, e.g., Amanda Lagerkvist's (2022) contribution within this area.

status in Sweden, but it has also become a well-known and, to some extent, influential platform, thus, attracting extreme discourse while, at the same time, being open to the mainstream (Ulver and Laurell 2020: 482). However, only a small proportion of users visit the forum on a daily basis.[15] Flashback's popularity, availability, and its fusion of mainstream and extreme political discourse are the main reasons we chose to study vaccine discussions here; we had good hopes of finding vaccine hesitancy expressions at this commonly argumentative platform.[16]

When it comes to the style of writing we may add that there is no app for mobile phones, and emoticons are not very common in the discussion threads. The most frequent way of responding to one another is to use the quote function; copying a piece of text from another member marked in a darker nuance of grey and writing a comment or a question underneath it so that everyone can see who is in conversation with whom, consequently promoting dialogue. Upon entering the webpage, commercial banners blink, and mostly satirical avatars are displayed to the left in the discussion threads. We refer to the communication on Flashback as conversation or talk (rather than text), which are the words the members themselves use.

We decided to investigate the three most popular Flashback discussion threads about COVID-19 vaccinations that we could find at the time of the data collection. The biggest of them has an explicit vaccine critical title while the other two have more neutral titles. In total, we study close to 11,000 unique posts. The time period for the entire dataset was from 2020-09-09, when one of the threads started,[17] until 2021-05-14, when activity began to slow down. Thus, the period includes the rollout of COVID-19 vaccines in Sweden and elsewhere.[18] Informed consent in this

[15] Every third Swedish citizen uses Flashback, but only one percent of these use the platform on a daily basis according to the report Svenskarna och internet [The Swedes and the internet], by Internetstiftelsen (2018). In comparison, Instagram, Snapchat and Facebook are, to a high degree, used on an everyday basis. https://internetstiftelsen.se/docs/Svenskarna_och_internet_2018.pdf (accessed on 2023-03-14).

[16] In addition, studies confirm that anti-vaccination views are widely and internationally shared on the internet (Johnson et al. 2020)

[17] The other two began in November and December 2020.

[18] In January 2021, the vaccine from AstraZeneca (later named Vaxzevria) was given to healthcare providers. In February of the same year, it was distributed to elderly citizens in nursing homes. In March 2021, the Public Health Agency of Sweden decided to stop using this vaccine, due to an investigation by the European Medicines Agency concerning blood clots with low blood platelets as a severe but rare potential side effect, which was later confirmed, leading to new recommendations for citizens under 65 years of age. In parallel, so-called mRNA-vaccines from Pfizer-BioNTech and Moderna were

case has not been possible given that the threads involve hundreds of users moving in and out of the discussions (Sveningsson Elm 2009). We have handled this through the following measures: we provide neither the full titles of the threads nor the aliases used by the posters, following Fiesler and Proferes' (2018: 10) suggestion that "publication of user identity should only occur when the benefits of doing so clearly outweigh the potential harms, or with user permission". All quotes are provided as translations from the original Swedish into English. In order to further preserve the members' anonymity, without interfering with the meaning of the discussions, we made some very small changes to the translations so that they cannot be easily translated back into Swedish again. Furthermore, the members' identities are successfully protected by the forum itself.

4 MIXED METHODS APPROACH

To enable the analysis of close to 11,000 posts, we chose to follow an explanatory, sequential mixed methods design composed of two consecutive phases (Ivankova, Creswell and Stick 2006; Harrison, Reilly and Creswell 2020; Chang et al. 2021). This type of design incorporates the quantitative and qualitative findings in order to create more robust results and provide greater depth than either singular analysis would (Fetters et al. 2013). Initially, we quantitatively analysed the data using natural language processing techniques, viz. sentiment analysis and topic modelling. Second, we built on those findings in a qualitative follow-up study of the most voluminous thread – some 4,500 comments – that had a more explicit vaccine-critical title as compared to the others. We performed this study manually using a qualitative data analysis program. Using this tool, we created so-called nodes to obtain an overview of what was meaningfully being discussed in this particular thread. The nodes were developed into a profound narrative analysis, as described in detail below.

Sentiment analysis (Pang and Lee 2008) is the process of extracting and analysing subjective judgments and opinions expressed in a text to determine the author's attitude towards a particular topic – it could be a product, an event, or health interventions (On et al. 2019; Fetters and Molina-Azorin 2021) – i.e., if it is positive, negative, or neutral. We relied upon a lexicon-based approach to identify the sentiments using an in-house Swedish translation of the VADER sentiment analysis tool (Hutto and Gilbert 2014). We performed the analysis on each post to identify the positive, negative, or neutral sentiments, and revealed that out of all posts, more than half had negative sentiments (from 61.4% to 54.2%), with lower

added to the programme in 2021, https://www.folkhalsomyndigheten.se/ (accessed on 2023-03-14)

numbers for neutral sentiments (from 23.7% to 21.3%) and positive sentiments (from 17.3% to 22.1%). On this basis, we deem it probable that most commentators participate in the discussion threads with the purpose to criticize the COVID-19 vaccines, potentially belonging to the small minority in Sweden who hesitate to take, or refrain from taking the vaccinations.

After this, we used topic modelling (TM), a machine learning technique that automatically identifies so-called topics in a given data collection. Topic modelling offers an alternative to qualitative coding for textual analysis of large text collections. According to Chen et al. (2023), topic modelling can be applied to (i) gain a quick overview of the major contents from large unstructured, text collections by transforming a large sample of text into a much smaller set of topics; (ii) provide a new lens for scholars to identify patterns that would otherwise be undetectable with manual coding alone from a massive number of texts; and (iii) extract certain meanings from the text data. Moreover, the generated topics lack context, therefore the qualitative analysis provides the means to manual screening, interpretation and labelling each topic by inspecting the words and the documents they are contained in.

The particular variety of TM used for our study is based on an algorithm called *latent Dirichlet allocation* (LDA), which is widely used for TM and the statistical analysis of textual data (Blei, Ng and Jordan 2003). In this approach, each text – a post in the forum – is treated as a mixture of topics, and each topic as a mixture of words, which also allows posts to be topically overlapping. The input for a TM algorithm is typically a collection of text documents, the number of topics that the algorithm is expected to identify in the collection and a number of parameters used to fine-tune the topic grouping. Conceptually, TM assumes that a topic consists of a set of words, while a document consists of a mixture of topics, and the same word can appear in multiple topics with different probabilities (Reisenbichler and Reutterer 2019).

Before applying the TM algorithm, a number of pre-processing steps are typically applied to the text collection. In our case, meta-information, such as HTML tags, was removed, as were stop words;[19] all words were converted to lower case, and a number of collocations and phrasal verbs with specific meanings were concatenated into a single word in order to improve the results. Examples of the latter are the multiword expressions[20] *great reset*, *astra zeneca*, *big pharma* and *spruta in* 'to inject'. Finally, the text

[19] Stop words are common (function) words, such as *the*, *of*, *and*, *that* and *is* (in English), which do not contribute to text content. In our TM study, the stop words are in Swedish, of course.

[20] Note that Swedish social-media language contains a large number of English expressions.

words were also lemmatised, i.e., the inflected forms of a word were reduced to its lemma, or dictionary form. This step also included the normalisation of spelling variants, such as *antivaxxer*, *anti-vaxxer*, *anti-vaxxare* and *antivaxer* to *anti-vaxxer*.

We begin with a presentation of the results of the TM analysis.

5 TOPIC MODELLING ANALYSIS (ZOOMING OUT)

As earlier mentioned, TM has no means of providing the meaning of topics, therefore we define the topic labels by determining their sense manually, that is, via an inspection of the topic word sets. Moreover, there is no "ground truth" with which to compare topic modelling results, and as such, a topic cannot exist without human interpretation. In the mixed research group – consisting of language technologists and experts in qualitative methods – we discussed the potential topics at length, building on our theoretical knowledge, leading up to five indicative topics with manually determined labels and words with high probabilities of belonging to the topic (Table 1).

Table 1. An overview of the TM results (presentation format: English gloss [Swedish word]). The figures after each topic indicate the probability of the topic within the entire dataset.

Topic Modelling	
Manual labels	**Top-10 words with highest probability in the topic**
Tone/sentiment	scared [rädd], shit/crap [skit], pandemic [pandemi], fucking [jävla], dangerous [farlig], idiot [idiot], understand [förstå], fuck [fan], chance [chans], propaganda [propaganda]; 0.10925152
Freedom issues	force (verb) [tvinga], travel [resa], refuse [vägra], Swedish [svensk], require [kräva], money [pengar], voluntary [frivillig], state [stat], coercion [tvång], vaccine pass [vaccinpass]; 0.10775140
Truth seeking	write [skriva], source [källa], science [vetenskap], anti-vaxxer [anti-vaxxer], argument [argument], post (noun) [inlägg], facts [fakta], information [information], conspiracy theory [konspirationsteori], scientific [vetenskaplig]; 0.10280961

Power issues	world [värld], state [stat], tin foil hat [foliehatt], population [befolkning], media [media], government [regering], to trust [lita], money [pengar], authority [myndighet], responsibility [ansvar]; 0.09912641
Body issues/side effects	problem [problem], vaccination [vaccinering], be affected [drabba], to test [testa], narcolepsy [narkolepsi], swine flu [svininfluensa], injury [skada], medicine [läkemedel], serious side effect [allvarlig_biverkning], side effect [bieffekt]; 0.09572965

Even if presented as five separate topics, they are obviously interconnected. For example, bodily autonomy seems to be an important theme across a large part of the dataset. The topics suggest different threats to bodily safety and freedom, such as travel restrictions, laws, governmental force and adverse vaccine effects. We also note that it is acceptable to swear, perhaps even expected, which puts the results from the sentiment analysis in a more meaningful light, but it is also common to laugh out loud, it seems. This laughter is, considering the subject that is being discussed, likely ironic, which, again, says something important about the sentiment analysis; a positive attitude can be expressed ironically. As other Flashback analyses have shown, the posters' criticism is directed upward, towards the elite: the state, the government and the established media (Ulver and Laurell 2020: 485–487). Additionally, the posters seem to actively refer to sources and facts to promote their ideas.

We interpret the overall meaning of the five topics listed above as follows: the people engaged in these COVID-19 vaccine critical conversations stand together against the elite, who want to restrict "our" freedom and force "us" to take a potential poison, which will be injected into "our" healthy bodies, and we may become incurably sick due to the vaccine, exhibiting what Ulver and Laurell (2020: 486) label "self-positioning as the marginalized Other [which] continuously takes on bitter expressions on the forum". Not surprisingly, the mass vaccination is dealt with as both a political problem (force/coercion/elite/state) and a medical issue (narcolepsy/healthy/immune system). We also observe that the commentators do not seek harmony or acceptance, and they, seemingly, do not advocate trust between citizens and authorities. Instead, they exhort others to think for themselves. In line with Ulver and Laurell, we argue that this particular platform, at least in threads devoted to political debate, amounts to a milieu that fosters feelings of animosity, "giving credence to the interpretation of [vaccine] refusal as an act of political defiance" (Wollebæk et al. 2022: 18). The TM overview also reveals feelings of

vulnerability, we argue. The posters underscore the need to protect oneself and fight back. It may be argued that they express a fear of being subjected to medical experiments, in which memories from the swine flu pandemic seem to play a certain role, as we will delve more deeply into in the next section.

6 ILLNESS NARRATIVE ANALYSIS (ZOOMING IN)

As explained above, vaccine criticism usually includes complex ideas of illness and health (Koski and Holst 2017; Hausman 2019), therefore, we will draw upon Frank's illness narrative typology (Frank 2005, 2013) to better understand the Flashback posts. In this section, we study the biggest of the three threads. Building on the TM analysis and Frank's typology and with the help of a qualitative data analysis program, three interrelated nodes, divided into four to five subcategories, were found (Table 2), which we will investigate closely. The first one, "authority criticism", both reflects and develops the topics "freedom issues" and "power issues". The two other nodes, "vaccines as unnecessary" and "unsafety of the vaccines", deepen the understanding of the topics "body issues" and "side effects". The remaining two topics, "truth-seeking" and "tone/sentiment" seem to have a more all-embracing function: the first by encompassing the posters' fact-searching activities, and the second by capturing their style of talking to one another, thus, they are presented as topics in their own right but are also integrated in all topics and all nodes.

Table 2. An overview of the qualitative analysis.

Nodes	
Authority criticism	big pharma; government criticism; mass media criticism; criticism against medical institutions; conspiracy theories
Vaccines as unnecessary	the pandemic is magnified; not all have to take the shots; relying on natural immunity; the vaccines are ineffective
Unsafety of the vaccines	not tested enough; swine flu; narcolepsy; other side effects and injuries; mRNA technology; gene therapy; vaccine as poison

We will begin with the first node, authority criticism, which contains critique of the pharmaceutical industry, sometimes referred to as *Big*

Pharma, perceived as ruthlessly profit driven. It encompasses globally established, neoliberal-critical ideas among vaccine reluctant individuals and groups (Harambam 2020: 72–76). Furthermore, widespread criticism directed towards the Swedish authorities and experts, such as the state, the Public Health Agency, civil servants and top politicians, is included here. This leads us, step by step, further into the other nodes, but to be able to capture the meaning with the discussions we need a bit more freedom, we believe, and will therefore organise the narrative analysis through more open and explorative subtitles.

6.1 "It's my body!"

Even though vaccines of all kinds are voluntary in Sweden, notions of the need for defiance against the government and the authorities' recommendations are frequent in the thread, reflecting a suspicion that they want to, or will in the end, force all people to take vaccinations against COVID-19. 'The state' (*staten*) is used in order to pinpoint this fighting-back discourse, underscoring the ruthless power it has over peoples' lives, according to the Flashback members. Together with other expressions, such as *Tegnell* – during the pandemic the chief epidemiologist of the Public Health Agency of Sweden Anders Tegnell became the most well-known civil servant and physician in Sweden – 'authority' (*myndighet*) and 'the government' (*regeringen*), 'the state' points toward the conviction that individuals lack control of their own lives. Some typical examples are as follows.

> Generally, I am sceptical towards everything that the state says that we 'have to' do. When they put such an effort into convincing us that it is 'for our own good', then there is a hidden agenda behind it. Thanks, but no thanks.

> I'm just amazed that somebody so blindly can trust the daddy state and its propaganda. But I guess that voluntary guinea pigs will always be available.

> You idiots that don't understand that a profit-driven society never will focus on what is best for you – you need to learn basic logic. It's possible to silence the minority as long as the majority is pleased. Enjoy your vaccines! PS. Don't forget your 300 booster doses!

Conceivably, what is nurtured here is *motivated reasoning* characterised by the central goal of maintaining a valued identity, specifically membership in social and cultural groups (Goldenberg 2021: 45–49). In this sense, however loosely composed, the individuals expressing criticism of COVID-19 vaccines in this particular thread *do* identify with one another, i.e., as

critical Flashback members, impugning the COVID-19 narrative imposed from above. Vaccine hesitancy "is about much more than disliking vaccines; it signifies a constellation of attitudes and behaviours comprising a social identity" (Goldenberg 2021: 46; see also Klintman 2019). Our TM analysis is good at showing how this social identity is being formed through, among other things, a coarse and ironic tone of voice, which we regard as a competence needed to become a part of the Flashback community, at least in discussion threads of this kind.

An urgent need for resistance is expressed, which can be interpreted both as restitution and quest illness narratives. In order to stay unvaccinated and, thus, healthy, the members resist what they identify as propaganda and persuasion attempts, nurturing well-spread ideas among vaccine critical individuals of natural healing without medical interventions (Koski and Holst 2017). The quest narrative materialises itself as a sort of crusade against the powerful elite.

What resistance in relation to illness points to is suffering; the two go hand in hand, Frank claims, and "the body's suffering during illness creates a need for stories" (Frank 2013: 169). So, if resistance and suffering should be regarded as an inseparable couple, in what way do the Flashback resistant driven members suffer, and from what do they suffer? Arguably, they experience feelings of powerlessness, of not being able to control one's own body. "It's my body!" is a common remark, an expression of "embodied paranoia" (Frank 2013: 172), that is, the fear of becoming a victim of not only natural threats, such as natural disasters and diseases, but of medicine itself when bureaucratic experts and physicians, such as Anders Tegnell, have the power to turn bodies into cases, potentially causing suffering. When people feel that decisions about them are made by strangers, they may feel victimised (Frank 2013: 172).

The Flashback members, we argue, negotiate feelings of disempowerment by drawing a line between "my body" and "the state", and by seeking support among likeminded citizens. Together, the members feel less vulnerable. And they seem to see themselves as part of a grander and more challenging project. The dispute was perhaps never only about the vaccines or the science and the companies that produce them, but about complicated societal matters encompassing concerns about how medical technology and technology in general shape our lives, increased privatization of essential health services, growing income gaps and public health injustices (Goldenberg 2021: 106; Hausman 2019).

It may also be "scientised politics" that the posters attack; "the evidence-based everything" movement that swiftly transformed social science research on health and health care from the early 1990's and onwards (Goldenberg 2021: 94). But "[t]he evidence-based promise of moving decision-making past partisanship and personal preference,

though undoubtedly appealing, is not fully realized by silencing value disputes", Maya Goldenberg writes (2021: 96). Seen as a value dispute it could be argued that vaccine hesitancy is good at exposing the limits of the value-free ideal of science and scientised politics, and new medical technology in particular seems to become a projection surface for the debate. A dichotomy takes shape, where romantic ideas of natural immunisation, and a positive view upon nature in general, are contrasted against modern, liberal values encompassing ideas that technoscience and a free market will make the future brighter.

6.2 Fearing mRNA-vaccines

Even if the Flashback members fear vaccines in general, they are most hesitant regarding so-called new vaccination technologies, referred to as poisonous. We will attempt to put this into perspective through a fun and thought-provoking quote by an elderly woman from North Africa, which is found in Pierre Bourdieu's *Outline of a Theory of Practice*. The woman says, "In the old days, folk didn't know what illness was. They went to bed and they died. It's only nowadays that we've learned words like liver, lung, stomach, and I don't know what!" (Bourdieu 1977: 166).[21] The premodern society was characterised by harsh, sudden and surprising illness and death. A seasonal flu or cold – due to poverty, hygiene deficits, cramped housing accommodation and a lack of medical knowledge – could develop into a bacterial, dangerous and sometimes deadly pneumonia or other severe disease. What the quoted statement by Bourdieu's interviewee captures is the shift from premodern to modern notions of illness, which she finds ambiguous, puzzling and maybe even repugnant.

In comparison, when some of the Flashback members, living in the 21st century, seek to understand a new viral pandemic, they talk about it using pseudo-professional terms, adopting a language that seems to be familiar to most members. No one openly protests in the thread when members use technical abbreviations such as mRNA, DNA and SARS or medical terms such as 'autoimmunity' (*autoimmunitet*), 'nanotechnology' (*nanoteknologi*) and 'adjuvants' (*adjuvanter*).[22] Some of these medically and technically oriented comments rely on serious sources but, in the end, tilt toward conspiracy-theory thinking. Three typical examples:

> mRNA has never been used on humans before and acts like an 'operating system' in the form of nanoparticles, in other words chips. It is designed so that it can plug and play interchangeably with different programs. In

21 We owe this quote to Frank (2013: 5).

22 An adjuvant is a substance that is used to increase the efficiency of certain vaccines.

> our case, the 'program' or 'app' is the mRNA drug. The vaccine is emergency use authorised by WHO and FDA.
>
> The crap Pfizer is pushing is freaking gene therapy that messes with your cells in a way we don't yet have a clue of what the long-term effects will be. If you want to be a guinea pig, just go ahead. It's entirely up to you.
>
> RNA vaccines affect your DNA structure, so, technically, you will not be the same person you were before you took the vaccine, just so you know.

In particular mRNA, which is sometimes referred to as RNA, has become a symbol for technological medical "achievements" that cannot be trusted. Sometimes the words are mentioned together with words such as 'guinea pig' (*försökskanin*), indicating that the Public Health Agency and the physicians working there – who are controlled by the pharmaceutical industry according to some comments – use innocent people to test futuristic, unreliable vaccines that may cause life-long disturbances of the immune system. Here, as the TM analysis also shows, the commentators search for the "truth" by sharing facts and figures, displaying their knowledge to others. And they can come across as quite sure of themselves. Explicitly and implicitly, they express a confident attitude, seemingly believing that they know more about these technologies than epidemiologists and other vaccine experts do.

The handling of mRNA fear in the discussion thread reveals an ideological shift in society, we argue. In the countries of the industrial North, vaccination hesitancy a century ago was fuelled by class-consciousness (Durbach 2005), while today, the vaccine question concerns the right to make a so-called individually informed choice based on knowledge, a right and responsibility that has been given growing legitimacy by a new rhetoric of healthcare (Blume 2006: 639). This rhetoric, some claim, took shape during the AIDS epidemic of the 1980s, when the health authorities were pressured to respect individual privacy and rights; this was a sign of an ideological shift toward individualism and gesellschaft (Bayer and Colgrove 2003). In relation to this change in society, Stuart Blume poses the question: "Isn't a critical stance towards vaccination, and hence the possibility of alternative viewpoints, a logical consequence of this ideological shift?". He continues:

> The market working that is encouraged elsewhere in the health care system is surely in tension with the demands made on behalf of the public health here. Decades of emphasis on personal rights and responsibilities have encouraged growing number of educated parents, many of whom have already learned to express their preferences in opting for natural childbirth for example, to reason for themselves. For such parents the

> vaccination literature available and the attitudes of practitioners are deeply dissatisfying (Blume 2006: 639).

Blume points to an inconsistency between The National Health Service policies' emphasis on patients' rights to informed consent and practices of mass-vaccination that risk failing to respect those rights, or so it is interpreted by people who are critical of vaccines. For example, COVID-19 vaccination certificates were viewed by many involved in the discussion thread as a coercive measure, undermining the agreement of informed consent and freedom of choice. It is reasonable to believe that, *if* some of the Flashback members engaging themselves in this conversation decided to take the COVID-19 vaccination, they are likely to demand a protein-based vaccine, underscoring both their (professed) knowledge about mRNA vaccines and their personal right to choose for themselves.

The technocratic expert jargon in the Flashback discussions, as exemplified above, is also an illustration of how illness stories today, at least to some extent, are being replaced by fragments of information, and the development of modern medical technology has a great deal to do with this (Frank 2013: 163). People have successfully learned to deliver technical accounts of their suffering – incoherent stories constructed around chemical compounds, cells, molecules and medical treatments – describing the factual cause and progression of the disease without expressing the multiple shocks of illness in everyday life (Frank 2013: 6). Bourdieu's interviewee would not be able to write something similar to the Flashback quotes above, lacking a language for her hereditary material, in the form of cells and genes, and the diseases they might bring. This indicates a knowledge struggle where "[t]he story of illness that trumps all others in the modern period is the medical narrative", which means that the story told by the physician becomes the story against which all other illness narratives are measured (Frank 2013: 5). Thus, we suggest that the "flirting" with the expert role, exemplified above, should be seen in this light, namely as a means to reclaim the knowledge of one's own body and its suffering.

Another basic assumption we make is that, *if* people who strive to resist the mRNA-vaccines and diminish and even ridicule COVID-19 catch the virus and develop pneumonia as a consequence – a not uncommon form of disease progression – most of them will turn to traditional medical care for help. What we attempt to pinpoint here is that the sense of individual safety – "I trust in my immune system" – that is expressed in the discussion stems from the fact that there *is* professional modern healthcare around the corner when needed, thus drawing on the restitution narrative. We see this as an expression of a tacit belief in modern medicine that does not conform to the spiteful, antagonistic attitude of Flashback and its users' self-

positioning as the marginalised Other. Consequently, to conform to the cultural climate, this belief must be replaced by doubt.

6.3 Avoiding chaos

As can be seen in the TM and the nodes overviews, words such as 'narcolepsy' and 'swine flu' signal an awareness of the chronic neurological disease that occurred as a very unusual but severe side effect of the mass vaccinations in 2009–2010 (Lundgren 2015a; Aasgaard Jansen 2018). It is the most common example of adverse vaccine effects in the text corpus. When narcolepsy, the swine flu or Pandemrix (the swine flu vaccine) are commented on, the words are used symbolically or metonymically, i.e., the Flashback members mention them briefly, without elaborating on them, but, at the same time, reminding the reader of the "devastating results" of the mass vaccination at that time. We will illustrate this with a few examples that, together, summarise the general mode of using the words.

> Sweden bought half of the whole world's production of the swine flu vaccine in 2008–09 for distribution in the schools. Afterwards, it was these snake oils that destroyed the lives of so many children and young adults.

> There were surely about 500 children that developed narcolepsy because of the swine flu vaccine. There are only a couple of children who have been hit badly by COVID, so if this vaccine ends up with the same result, COVID is, in comparison, safe.

> I wonder if the relatives to the approximately 400 that developed narcolepsy because of Pandemrix are eager to try this vaccine out…

When these topics are referred to in the Flashback conversations, distrust of both the knowledge claims of modern medicine and the legitimacy of the public health authorities' measures to fight the coronavirus is displayed. Many types of feelings are expressed, such as fear of suffering, empathy, fellowship and anger. Typically, the reader is provided with little information about narcolepsy. Only one comment among the 1,493 in the thread that focuses on side effects and narcolepsy describes (second-hand) experiences of the illness.

> I have a good friend who took the swine flu vaccine. Suffers now from narcolepsy. A happy-go-lucky 15-year-old whose life was devastated. We can sit together at a restaurant, and his face plunges into the food, and he sleeps for a quarter of an hour.

These findings encourage us to try to understand this lack of words, which we will return to below. In her work on narcolepsy and the swine flu aftermath, Lundgren investigates how parents of the children and young

adults who were affected by the disease handled the situation 4–5 years after the swine flu pandemic outbreak. She sheds light on how they shaped their experiences of this side effect into a political and critical narrative, not least through the formation of the Association for Narcolepsy[23] with the goal of lobbying for more effective medication and economic compensation (Lundgren 2015a). Furthermore, she illustrates the suffering that the affected children and their parents have to cope with every day, such as sudden sleep attacks, cataplexies, paralyses and hallucinations. The school years are usually doubly challenging as the children find it difficult to keep awake during the daytime. As adults, they will be limited in various ways; there are professions that they cannot have and restrictions concerning one's driver's license. Needless to say, narcolepsy patients' social life can be rather limited due to the symptoms.

The narcolepsy narratives in Lundgren's research are intertwined with many others in public life. During the last decade, established media in Sweden have provided their audiences with many reports on narcolepsy affected teenagers, leading to a national awareness of a very rare neurological affliction that most people had never heard of before.[24] However, there are also other forms of public expression. Pia Dellson, an MD in oncology and psychiatry, has a son who developed narcolepsy after having taken the Pandemrix shot in 2009, at the age of six. Dellson has published a book of poetry about her experiences, *Sovsjuk: En mammadoktor skriver om narkolepsi* (2015) [Sleeping-sick: A mom doctor writes about narcolepsy]. In 2021, the Dellson family took the recommended COVID-19 vaccinations. It was as much a self-evident action as a difficult one, causing all sorts of emotions. At this time, Dellson began to poetically reflect on the potential interconnections between the mass-vaccinations during the swine flu and the COVID-19 pandemic.[25] She writes:

It is not ignorance
that makes people hesitate.
It is the knowledge
of how badly things can go
and how lonely you are then.

23 https://www.narkolepsiforeningen.se/ (accessed on 2023-03-14).

24 See, for example, Linnéa Persson's story in public service channels, in which Pandemrix is discussed in relation to the new COVID-19 vaccines: https://www.svt.se/nyheter/lokalt/halland/linnea-fick-narkolepsi-av-pandemrix-nu-tveksam-infor-covidvaccin (accessed on 2023-03-14).

25 These poems are still unpublished, and shared here by the author's permission, in translation from Swedish to English by Pia Dellson.

In another poem, she writes:

> *For ten years, the narcolepsy*
> *has been a private grief of ours*
> *Now, the shadow of it*
> *is a problem*
> *nationwide.*

And the last example:

> *My sixteen-year-old son*
> *takes narcotic medication*
> *three times a day*
> *and three times a night.*
> *He will never be able to*
> *work full-time.*
> *And the state has compensated him*
> *with 5 000 euros*
> *A risk like that you only take*
> *once a generation.*

What is at stake here is a *collective memory formation* that has been ongoing since 2010. This memory-formation process, we believe, was reinforced by the COVID-19 pandemic a decade later, which the Flashback conversation, the many media reports and Dellson's poetry exemplify. In contrast to both the restitution narrative and the quest narrative, the illness narrative about narcolepsy, as it takes shape in the Flashback thread, is an example of a chaos narrative; it is a *non-plot* in which the teller – the sick person – is not perceived as telling a "true" story. In Frank's (2013: 97) words, "the teller of the chaos story is not heard to be living a 'proper' life, since in life as in story, one event is expected to lead to another. Chaos negates that expectation." He even calls the chaos narrative a "mute illness" (2013: 97). What emerges here is the cultural tension between the collective memory formation regarding narcolepsy and the will to avoid chaos, i.e., a fearsome disease, not through taking the COVID-19 vaccines but by refusing them. On the one hand, the Flashback members seem to base their conviction on a presumption of a collective knowledge about narcolepsy, making details about symptoms unnecessary, as "we" are already aware of the life-long suffering that the disease may cause, underscoring the fact that it provides no room whatsoever for being "successfully ill". Consequently, it is a disease to fear, ultimately, as it may lead to social and cultural disintegration, which Dellson refers to as loneliness (Frank 2013: 64, 171). On the other hand, narcolepsy is an illness that is difficult to talk about and hear about because it is threatening, leading to a lack of words, a story that

"traces the edges of a wound that can only be told around" (Frank 2013: 98), which, in turn, makes the shape of the collective memory indistinct.

From the perspective of the Flashback members, narcolepsy is, no matter how unusual, a much more frightening disease than COVID-19, which, after all, is reminiscent of a regular cold or flu for most people who become infected. The elderly will naturally be sicker than children. The main purpose of regarding COVID-19 as a seasonal flu or cold is to understate the risks with the virus, and that one can recover from it with or without the support of health professionals and, most importantly, without having to take the shot (Karlsson et al. 2021). These are stories that fit well with the restitution narrative, building on contemporary Western cultural ideas that being healthy is the normal state, which illness temporarily interrupts, and that one can easily avoid the threatening narcolepsy chaos or other imagined neurological side effects by not taking the new 'pushed through' (*framstressade*), 'emergency use authorised' (*nödgodkända*) vaccines. This reasoning points to the so-called *omission bias* tendency, meaning that it may be easier to accept harm caused by not taking action than to actually do something, such as taking a shot in this case, and eventually become chronically ill as a consequence (Lundgren 2015b: 111; Bish et al. 2011: 6482).

In Frank's vocabulary, these are actions of self-regimentation, indicating a disciplined body-self ideal type, distinguished by the effort to be in control. Through therapeutic regimens, orthodox medical compliance or alternative treatment, the response of such a body-self is to reassert predictability (Frank 2013: 41).

7 CONCLUSIONS

Further research on vaccine hesitancy should critically investigate the well-spread idea that poor public trust in vaccines is mainly a problem with the publics. Vaccine proponents often contribute to public shaming of vaccine hesitators, but are at the same time reluctant to admit problems in scientific governance (Goldenberg 2021: 169). This is not the way forward, we believe. Instead, we have suggested a compassionate approach to vaccine hesitancy, that is, at least to some extent, reasonable.

Through a mixed methods analysis, we have shown how vaccine hesitancy encompasses difficult and complicated matters, such as a fear of becoming disempowered and losing control over one's body. A pandemic is, to a large extent, a political matter, one handled through safety measures such as laws, regulations and recommendations. The fact that these result in protests on the part of some citizens cannot come as a surprise to anyone, and there is something to learn from these protests, both concerning pandemic politics and the individual body, as well as the limits between them. Critically debating the possibility of rejecting the COVID-19

vaccinations is a concrete example of how individuals seek to manage the burden of doubt and feelings of insecurity in the face of the inherent contingency of the pandemic and life in general.

When the Flashback members use their voice, they do it in the role of aware citizens who have read and spread numerous sources of knowledge in their specific communities, thus expecting to be treated as individuals who may or may not give their informed consent to become vaccinated against COVID-19. This also points to the social identity aspects of vaccine hesitancy expressions in digital communities; by favouring a certain tone of voice, they resist the perceived vaccine coercion together, expressing both empowerment and disempowerment in relation to the authorities and the body-self.

We have also shown how a new pandemic may enhance memories of earlier pandemics. The mass vaccinations against COVID-19 triggered memories of the swine flu mass-vaccination, which, at the time of this writing, happened more than a decade ago. An awareness of narcolepsy as a rare but severe side effect is evident in the conversations. This neurological disease becomes an example of a chaos narrative that seems both necessary and difficult to talk about. This leads to further questions concerning authorities' (ethical) preparedness to openly report and discuss side effects, which we aim to investigate elsewhere.

We conclude that the Flashback members, on one hand, seem to know quite a lot about new vaccination technologies. They don the role of experts by using a medical scientific language, which may come across as impressive to others and comforting in relation to the body-self. On the other hand, they express a fear of new, "poisonous" vaccines, which they seek to avoid, and recommend others to do the same. This should be seen in relation to society's development toward a new rhetoric of healthcare, we have argued, in which public health premises during the last decades have been pressured to respect individual privacy and rights. An ideological shift towards individualism and gesellschaft in health care has taken place, which may indicate future challenges concerning trust for the pharmaceutical industry and medical expertise.

This shift also reveals more complex societal and political matters. Criticism against established science is easily detected in the material. When regarding vaccine hesitancy as a value dispute, a sort of dichotomy between what is categorised as natural and unnatural takes shape in the discussions, where so-called new medical technology becomes a projection surface. The Flashback members protest against science and scientised politics value free ideals in the late modern era by turning the question of vaccines into exactly that; a value loaded question. An imagined power struggle over the individual body is used as an emotionally charged symbol to lend meaning to the conflict.

We cannot take it for granted that techno-scientific modernity and democratic values and decision-making necessarily go hand in hand, certainly not if people feel that technoscience and big business are working together because of profit making in the first place, with dedication to the well-being of citizens being a secondary concern (Hausman 2019: 218).

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A SYSTEMATIC LITERATURE REVIEW OF PREDICTORS OF SOCIAL MEDIA POPULARITY

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ABSTRACT

A growing area of research has examined the individual behaviors and social antecedents that enable and constrain the popularity of social media users. This systematic review gathers and summarizes 68 naturalistic studies that measure popularity based on users' reach (e.g., followers, fans and subscribers) or engagement (e.g., likes, comments and shares) on multiple platforms. It draws on Barnlund's (2008) transactional model of communication to organize the literature and provides a roadmap for future research by identifying areas of the research that are characterized by consensus and disagreement. It also reveals a gap in the literature. Previous research focuses on communication strategies that maximize reach and engagement and provides less evidence of social structural influences on popularity. More research is needed to understand how the social, economic, and cultural characteristics of users affect their success.

Keywords: Influencer marketing, social media influencers, popularity, engagement, social status

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1 INTRODUCTION

Popular social media users are having a growing impact on consumer behavior, public information campaigns, political debate, voting behavior, and crisis management (Stephen & Galak, 2012; Shaozhi, 2020; Sundermann & Raabe, 2019). For this reason, many scholars have investigated the origins of popularity on platforms like Instagram, YouTube and Twitter.[1] The academic literature on this topic, however, remains fragmented and concentrated in disciplinary silos. Researchers in the fields of business, marketing and advertising are interested in how companies can use their own accounts or collaborate with other users to increase brand value and revenue (e.g., Kwok & Yu, 2013). Political scientists, sociologists and economists are naturally more intrigued by the political, social and economic effects of popular users (e.g., Choi, 2014). Representing a third group, scholars of computer science are focused on the role of influential users in the process of information diffusion in social networks (e.g., Meng et al., 2018).

The aim of this article is to review and organize this sprawling literature, identify areas of consensus and disagreement, and encourage interdisciplinary cooperation and synthesis. The article begins by outlining the procedures used to locate studies for a structured literature review. In the next section, Barnlund's (2008) transactional model of communication will be discussed in order to organize and visualize the predictors of social media popularity and based on this model online interactions will be reviewed. In the third and fourth sections, the findings will be summarized and the parts of the transactional model that have received the most and least attention and consensus from scholars will be identified. In the final section, suggestions for future research have been emphasized.

2 METHOD

Following Sundermann and Raabe's (2019) approach to conducting structured literature reviews, the search for articles was carried out in two stages. First, a list of relevant literature was constructed based on electronic database searches of a university library's "Communication Source" (a merger of high-quality EBSCO databases, Communication and Mass Media Complete and Communication Abstracts), Jstor and Google Scholar. The keywords "influencer marketing," "social media influencer" and "influencer communication" were used to search each database. After exhausting these one-term searches, dual-word searches were utilized with the term "social media" and each of the following: "followers," "engagement," "popularity," and "content analysis." Backward searches of all related sources cited in original articles were carried out, as well as forward searches using Google Scholar to identify later studies that referred to original articles.

[1] The company name "Twitter" will be used in this study, as it may be more familiar to most readers and all the studies reviewed for this article were published prior to Twitter's name change. It should be noted, however, that the owner of Twitter, Elon Musk, formally changed Twitter's legal name to X Corp in April 2023.

These procedures would produce a massive number of articles, most of which predate the rise of social media and pertain to the decades-old literature on social influence and persuasion. Strategic criteria were required to narrow the scope of this review to a feasible number of articles. For this reason, only studies based on quantitative, naturalistic observations of users on Facebook, YouTube, Twitter, Sina Weibo, or Instagram were included in the sample. This excluded three important areas of the literature. First, studies of popular people who engage their audiences through blogs and other websites were not considered. Also excluded was a vast portion of influencer marketing research that utilizes experiments and surveys. While providing valuable findings, experimental and survey-based studies typically focus on a range of dependent variables, such as source credibility, that are conceptually different from this study's operational definition of popularity, which is rooted in naturalistic behaviors, such as likes, shares and follows. Finally, studies based on qualitative research designs were not selected. Qualitative methods like digital ethnography are useful for understanding communities and real-life social interactions online, but their findings are difficult to compare to the bulk of research based on quantitative analysis. All studies in this review utilized some form of quantitative content analysis based on manual methods (coding by humans) or automated methods (using computer software to assist in the coding process).

Four additional inclusion criteria were as follows: 1) a measure of popularity based on users' *reach* (e.g., followers, fans and subscribers) or *engagement* (e.g., likes, comments and shares) on Facebook, YouTube, Twitter, Sina Weibo, or Instagram, 2) analysis of at least one predictor of popularity, 3) written in English, and 4) published in a peer-reviewed journal or conference proceeding. The selection procedure produced 68 articles, from which 88 distinct predictors of popularity were identified. Any significant statistical measure indicating a relationship between two or more variables was considered a predictor. As shown in Tables 1 and 2 in the appendix, for each predictor, the type of user, the social media platform, the measure of popularity, and a citation to the respective study were noted. By accounting for user and channel types, this review evaluates the literature's degree of consensus on the various predictors of popularity, as well as assesses each predictor's consistency across different types of users and platforms.

The following types of social media users were found in this review: Business organizations, celebrities, governments, ordinary people, original social media influencers (SMIs), and universities. Original SMIs are defined as people who became well-known via social media, whereas celebrities are famous for their work outside social media (Piehler et al., 2021). This review identified studies of original SMIs working in multiple industries, including alcoholic beverages, automotive, banking, beauty and cosmetics, environmental sustainability, fashion, fitness, news, politics, public health, health care, science, sports, travel and video games.

3 A FRAMEWORK FOR ORGANIZING RESEARCH ON SOCIAL MEDIA POPULARITY

Two prior literature reviews were organized around Lasswell's transmission model (Sundermann & Raabe, 2019), or a revised version of it (Hudders, De Jans, & De Veirman 2021). Laswell's model is typically used to explain one-way, asymmetric flows of communication. It assumes that the effects of messages are determined by characteristics of sources, messages, channels and receivers. Positioning the source as the primary agent, the transmission model has been applied in several studies of persuasion, advertising, and organizational communication (Sundermann & Raabe, 2019). While the transmission model accounts for key components of the communication process, other frameworks may be more appropriate for organizing the literature around social media interactions.

Barnlund's (2008) transactional model was used for this review because it includes most of the components of the transmission model, but also theorizes communication as a back-and-forth, continuous process as opposed to a linear one. Barnlund defined communication has a dynamic exchange, a progression of information flows where communicators cocreate meaning by encoding and decoding messages. Communication occurs when communicators turn thoughts into messages (encoding) and messages into thoughts (decoding). Through this process, people make sense of information by attending to the content of messages, characteristics of the source, and cues in the environment continuously and simultaneously.

Barnlund's assumptions about how this happens were informed by the work of Erving Goffman (1973). Goffman theorized communicators as goal-directed impression managers. They are self-aware and pursue their goals with a sensitivity to their surroundings and the perceptions of their audience (Barnlund, 2008). Given that communicators create and interpret messages as if they were the other communicator, the act of encoding and decoding messages is always socially situated, interactive, non-linear, and interdependent.

Goffman's theory of social interaction has been criticized for neglecting the differential power and status of communicators, and the broader social context that enables and constrains the outcomes of interactions (Gouldner, 1970). Yet, Barnlund's transactional model does include the psychological, relational, cultural, and social contexts that shape the communication process (Barnlund, 1968, 7). The co-created meanings of two or more communicators influence, and are influenced by, the communicators' cognitive and emotional experiences (psychological), the history of their interactions (relational), their shared or unshared values and beliefs (cultural), and the rules, norms and social structures that govern communication (social). In summary, Barnlund's model was chosen for this review because it is more appropriate for theorizing the back-and-forth communication of social media than Laswell's model, while also accounting for social-structural constraints on the communication process.

Barnlund's transactional model was originally intended to theorize face-to-face conversations, but some scholars have applied it to interpersonal computer-mediated communication (Eysenbach, 2018). To account for interactions between social media users, the diverse characteristics of social media platforms (channels) must be added to the model. Technical differences between platforms like Twitter and Instagram directly affect outcomes of communication; each platform also fosters a unique psychological, relational, cultural, and social context. As illustrated in Figure 1, a transactional model adopted for social media interactions posits that the mutual effects of user communications, including changes in users' popularity, depend on the characteristics of communicators and their messages, the channels through which they create and interpret messages, and the contexts of communication. Although the act of clicking a like button may seem simple, perhaps trivial, its causes and contingencies, as illustrated in Figure 1, may be varied and complex.

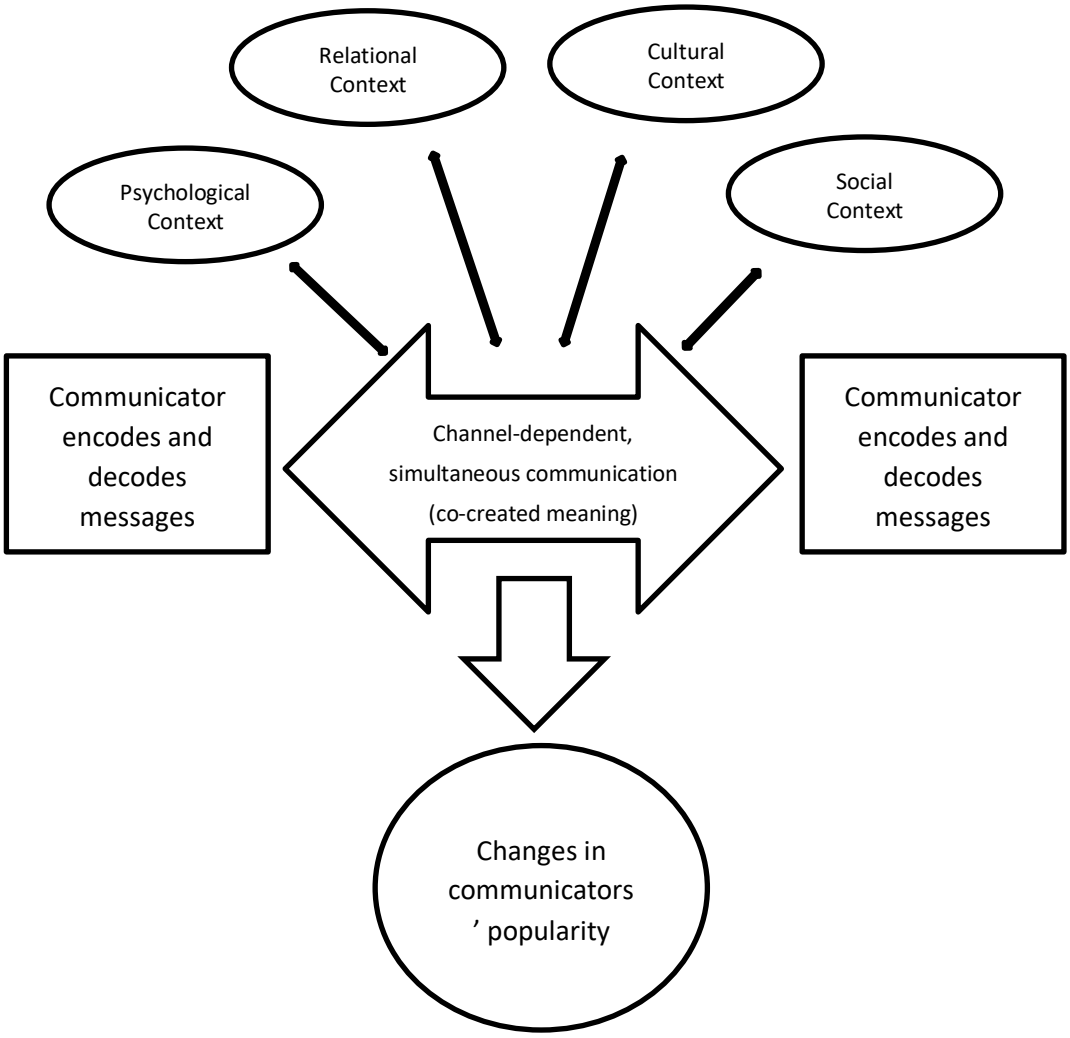

Figure 1. Framework for Organizing Research on Social Media Popularity

4 RESULTS I: SOCIAL MEDIA BEHAVIORS AS PREDICTORS OF POPULARITY

Among the 68 studies in the sample, 54 examined the relationship between a social media behavior and popularity. The behaviors were grouped in seven categories and labeled as follows: 1) frequency and timing, 2) originality, 3) vividness, 4) interactivity, 5) emotion, 6) information, and 7) self-orientation. These labels were established inductively with the goal of matching the labels to the conceptualizations used in the studies under review. For the sake of organization, however, the categories included studies with related but distinct concepts and labels. For instance, the category "originality" encompassed studies on the effects of posting *organic* and *unique* content. Likewise, not all studies in the "vividness" category employed the term vividness or conceptualized this characteristic of content in the same way.

4.1 Frequency and Timing

According to ten studies, the popularity of users was related to how often (frequency) and when (timing) they posted content. For instance, Jensen et al. (2014) analyzed 87 high-profile NCAA football coaches on Twitter and found a significant positive relationship between the coaches' total number of tweets and their followers, "with each additional tweet being worth an additional six followers" (273). As shown in Table 1 in the appendix, four additional articles reported similar results. A study by Hutto et al. (2013) looked at the effect of tweeting many times over a short period of time, known as "bursting." They showed that bursting was associated with higher follower counts. However, the positive effect of bursting may be unique to Twitter and other microblogging sites where multiple interlinked messages or "threads" are common. On Facebook, in contrast, longer time periods between posts were positively related to likes, comments and shares (Banerjee & Chua, 2019; Brech et al., 2017). Finally, pertaining to the best days to interact, two studies found that posting content during weekdays compared to weekends was positively associated with popularity (see Table 1, appendix). These findings were consistent across Facebook and the Chinese microblogging platform Sina Weibo (sometimes referred to as Chinese Twitter).

4.2 Originality

Original content refers to social media posts that occur naturally and without paid promotion (organic), or those which are newly created by the users themselves (unique), as opposed to shared content, such as retweets. Five articles showed that posting organic content was associated with greater engagement, and that posts containing advertisements reduced their popularity (see Table 1, appendix). For instance, in a study of top fitness influencers on Instagram, Neal (2018) found that organic posts received more likes and comments than sponsored ones. As shown in

Table 1 (appendix), similar results were produced by two studies of original SMIs on YouTube ("YouTubers"), one study of Sina Weibo and one Facebook study. Unique content was also associated with popularity. Zou et al. (2021) showed that unique content created by top health influencers on Sina Weibo produced more likes than their shared content. In a longitudinal study of Major League Baseball teams' Twitter accounts, posting unique content predicted increases in followers over time (Watanabe et al., 2015). The positive effects of organic and unique posts were consistent across five social media platforms and two types of users.

4.3 Vividness

Nineteen studies looked at the relationship between the use of various media types and popularity. Social media platforms allow users to post text, images, photos, animations, videos, links and audio recordings. These media are thought to have varying levels of "vividness," which facilitate varying levels of engagement from audiences. Although vividness was measured in different ways, which made it difficult to aggregate findings, there was strong, cross-platform evidence that visual content produced higher levels of engagement than other media types. For example, Cvijikj and Michahelles (2013) coded the vividness of 5,035 company Facebook posts from low to high as follows: 1) text only, 2) photos, 3) links and 4) videos. According to Cvijikj and Michahelles, posts with higher levels of vividness received more likes and shares and longer interaction durations from followers. Luarn et al. (2015) used a similar measure of vividness and produced matching results. As shown in Table 1 in the appendix, three studies combined videos with other types of theoretically vivid media and confirmed the positive relationship between vividness and engagement rates; four studies identified videos alone and an additional four studies measured photos/images alone as positive predictors of engagement.

Some evidence questioned the assumption that videos, which have the highest level of vividness per some scholars, represented the most popular type of media. In a study of company Facebook pages, Dae-Hee et al. (2015) found that posts with photos received significantly more likes, comments and shares than posts with videos. Still, both videos and photos have greater vividness than text-only posts, which further supports the general assumption that posting images is positively associated with popularity. This finding held in studies of two types of users (businesses and ordinary people) and all three platforms that allow for high and low vividness, including Facebook, Twitter and Sina Weibo (note that Instagram and YouTube are specifically designed for sharing photos and videos). Only one study stood in contradiction: Kwok and Yu (2013) found that text-based posts on company Facebook pages generated more engagement than other media types, including videos and photos.

The evidence was intriguingly mixed on the effects of posting URLs on microblogging platforms. As shown in Table 1 in the appendix, four studies based

on Twitter samples showed that including URLs in tweets was a positive predictor of retweets; however, three studies drawing on data from Sina Weibo revealed the opposite relationship. These contradictory findings suggest the need for cross-cultural research that compares the effects of posting links on the US-based Twitter versus the China-based Sina Weibo.

4.4 Interactivity

Certain types of social media content are designed to encourage users to react. Twenty-five articles explored the effects of interactive strategies on engagement and reach. These studies involved eight variables, including the use of 1) contests and incentives, 2) questions and polls, 3) platform optimization, 4) profile completeness, 5) responding to followers' replies, 6) tagging, 7) hashtags, and 8) following back. Like the case of vividness, interactivity was operationalized in different ways. Some studies used a scale of interactivity, classifying posts from low to high, while others employed a dichotomous measure and classified certain behaviors as interactive or not. Despite differences in operational definitions, the first five interactivity variables listed above were consistently and positively related to popularity (see Table 1, appendix). Much of this research analyzed company Facebook pages, but the positive effects facilitating interactions by asking questions, taking polls, and replying to the comments were similar for ordinary people on Twitter and original SMIs on YouTube.

More intriguing were the three variables that generated empirical controversy. The first variable involved tagging—that is, including the handle of another account within the body of a message, presumably for the sake of generating interaction with that user. Six studies based on data from multiple platforms (Twitter, Sina Weibo, Facebook) found a positive relationship between tagging and popularity, but two studies, both based on Twitter, found the opposite relationship (see Table 1, appendix). Second, the use of hashtags was examined in eight studies of microblogging websites. As seen in Table 1 in the appendix, four of them revealed a positive relationship between hashtag use and retweets; one suggested that limiting hashtags to two or fewer per post predicted increases in Twitter followers over time; and three studies found a negative association between hashtag use and popularity on Sina Weibo and Twitter. Third, while Hutto et al. (2013) found that following many other accounts was a positive predictor of having followers, two competing studies showed that following fewer other accounts was positively associated with retweets and likes (Zhang & Peng 2015; Valsesia et al. 2020). Studies of tagging, hashtag use, and following back represent a contested area of the literature.

4.5 Emotion

Twenty-five articles examined the relationship between expressing emotion and popularity. The bulk of evidence, drawn from studies of multiple platforms and user types, showed that expressing various types of emotion in posts was positively associated with engagement and follower counts. Consistent results were found in research rooted in diverse methodological frameworks and based on various operational definitions of emotion. Four studies identified emotional content, without specifying its valence, as a positive predictor of multiple popularity metrics (see Table 1, appendix). Nine studies found that the use of positive sentiment, feeling or emotion was a predictor of popularity (see Table 1, appendix). Content coded as entertaining or interesting was also linked to engagement. For instance, investigating brand marketing on Facebook, three studies revealed an association between entertaining content and more likes, comments and shares; another study identified a link between posting interesting tweets and being retweeted (see Table 1, appendix). Expressing negative sentiment, feeling or emotion was also a positive predictor of popularity, according to nine studies (see Table 1, appendix). Negative or critical content appeared to be especially engaging to audiences in the context of news topics and political debate. In addition, Naveed et al. (2011) found that using negative emoticons encouraged retweets, and Kivran-Swaine and Naaman (2011) demonstrated a positive association between expressing sadness on Twitter and follower counts.

A small minority of studies offered caveats or findings that conflicted with the majority view. For example, although certain types of controversial messaging generated engagement, using negative emotional language that stigmatized groups was shown to diminish retweets and likes on Twitter (Schwartz & Grimm, 2017; Jain et al., 2020). As shown in Table 1 in the appendix, research on the effects of fear appeals produced mixed results.

4.6 Information

Thirteen articles considered the informational appeal of social media messages. Content coded as informative was shown to increase engagement in four studies (see Table 1, appendix). Yesiloglu and Waskiw (2021) found that providing information in a conversational tone increased the number of comments on Instagram. Beauty influencers on YouTube received more comments when posting information-rich product reviews compared to four other video types (Delbaere et al., 2021). YouTubers in the automotive sector who used more "concreate language" tended to have more views and subscribers than those who used less concrete language (Lee & Theokary, 2021), while the use of tentative words like "maybe" and "perhaps" on Twitter was negatively associated with retweets (Kim et al., 2016). The presence of longer, more complex words was correlated with an uptake in follower counts on Twitter (Hutto et al., 2013). The total number of words in posts

was positively related to retweeting on Sina Weibo (Zhang & Peng, 2015) but negatively related to engagement indicators on Facebook (Banerjee & Chua, 2019). Focusing Twitter content on a narrow coherent set of topics attracted more followers over time (Wang & Kraut, 2012) and more retweets (Cha et al., 2010), suggesting that practical information, tailored to a specific audience, tends to boost the popularity of users.

4.7 Self-orientation

Seven studies examined the link between various forms of self-orientation and popularity. Lee and Theokary (2021) found that the use of self-referential pronouns was positively associated with increases in views and subscribers on YouTube. Thoughtful discussions centered on the YouTuber's personal experiences with a product ("reflective theme") were more engaging than five other video themes (Lim et al., 2021). Including a human face in Instagram posts increased the number of comments (Yesiloglu & Waskiw, 2021). However, the effectiveness of centering the self in social media posts may only hold for original SMIs. Four studies of ordinary people and business organizations found that placing an emphasis on the account holder diminished reach and engagement. For the average person on Twitter, using self-referential pronouns was negatively associated with follower counts (Hutto et al., 2013). Tweets about one's self tended to generate fewer retweets than posting content that addressed broader public interests (Naveed et al., 2011). In the case of company Facebook pages, self-oriented content involved references to a corporation, brand or product rather than a person, and was shown to diminish likes, comments and shares (Dae-Hee et al., 2015; Swani et al., 2017).

5 RESULTS II: CHARACTERISTICS OF USERS AS PREDICTORS OF POPULARITY

While most studies focused on the behaviors of users, 31 of the 68 studies in the sample looked at how the users' social characteristics predicted their reach and engagement. The predictors were categorized as 1) popularity, 2) organizational resources and status, 3) individual status, and 4) geography. These categories were established inductively and labeled based on the language used in the corresponding studies, though some conceptual differences exist among the studies in each category.

5.1 Popularity

One of the strongest and most consistent predictors of social media popularity was popularity itself, a conclusion drawn in thirteen studies. Much of this research conceptualized popularity as reach, and showed that users with more followers, fans or subscribers generated more engagement than those with fewer followers (see

Table 2, appendix). Rodríguez-Vidal et al. (2020) found that having more influential followers (those with many followers themselves) was positively associated with having more followers in general. As shown in Table 2 in the appendix, six studies of Twitter demonstrated that being retweeted in the past was a strong predictor of being retweeted in the future. Research showing the cumulative advantage of being popular covered three user types and four social media platforms.

5.2 Organizational Resources and Status

Six articles examined the economic resources and status characteristics of organizations as predictors of popularity. Sports teams with higher operating incomes (Scelles et al., 2017) and teams that hired advertising agencies to manage their social media accounts had more fans and followers on Facebook and Twitter than teams with fewer resources (Hopkins, 2013). Six related variables—appearing on national television, employing players with large social media followings, having high attendance turnouts at games, playing in older stadiums, being a historically newer team within a league, and winning games—were also strong positive predictors of the reach of professional sports teams on Facebook and Twitter (see Table 2, appendix). A study of university Facebook pages showed that schools that enrolled more students and achieved higher prestige rankings generated more engagement and reach than schools with fewer students and lower prestige rankings (Brech et al., 2017).

5.3 Individual Status

Eleven studies focused on the status characteristics of individual account holders. The variables considered were verification status, occupational status, level of experience, age and race. Having a "verified badge" on Twitter increased the likelihood of retweets in three studies, but one study of Sina Weibo found that verified status was negatively related to retweets (see Table 2, appendix). The authors of the latter study argued that most verified accounts were controlled by the Chinese government and perceived by many people as propaganda, which made them less likely to be retweeted.

Five articles looked at occupational status. Celebrities tended to have more followers than original SMIs on Instagram (Zeren & Gökdağlı, 2020). In the context of Covid-related crisis communication, celebrity and original SMIs produced greater engagement rates on Instagram than politicians, public health officials, science communicators and accounts representing news organizations (MacKay et al., 2022). The public health establishment and other institutional users were also retweeted less frequently than other types of users in the discussion of the opioid crisis (Jain et al., 2020). In the context of natural disasters, however, institutional users, such as emergency-related agencies, were retweeted more often

than other types of users (Liu et al. 2012). Jensen et al. (2014) found that the most influential factor explaining the popularity of big-time college football coaches on Twitter was their university's prestige and the long-term success of its football program.

Four articles showed that users with more years of experience on Twitter tended to have more followers and were more likely to be retweeted than those with fewer years on the platform (see Table 2, appendix). Only one study looked at the effects of race on user popularity. Watanabe et al. (2017) compiled a large sample of Twitter accounts held by active Major League Baseball (MLB) players from the 2014 and 2015 seasons. Hispanic players had significantly fewer followers on Twitter, even when controlling for several other variables, than white players. The study also considered the age of players; older players tended to have more followers than younger ones, but popularity gains declined over time as players aged.

5.4 Geography

Four studies looked at differences in popularity across geographical regions. Most of them compared the reach of users located in areas of varying population sizes. Mainka et al. (2015) examined the social media accounts of several international cities and found a positive relationship between the city's population size and its number of followers, fans and subscribers. Two studies showed that major league sports teams located in highly populated areas had greater reach on Facebook and Twitter than sports teams in less populated areas (see Table 2, appendix). Although the many studies reviewed for this essay originated from several countries, only one study demonstrated that the effects of certain types of social media content on popularity varied across nations and cultures (Khan et al., 2016).

6 DISCUSSION

This study systematically gathered, categorized and evaluated a reasonably large sample of naturalistic studies of social media popularity. The aims were to identify the variables that have generated the most and least interest from scholars and locate areas of the literature marked by consensus and disagreement. An adapted version of Barnlund's (2008) transactional model of communication was used to map this intellectual terrain. In brief, the model assumes that interactions between two or more users are shaped by who they are, how they communicate, and how they interpret each other's messages. This process is further influenced by the technical attributes of the given social media platform and by the psychological, relational, cultural, and social contexts.

Each of the assumptions in Barnlund's model has attracted some scholarly attention, but researchers appear to be more interested in the communication behaviors that maximize popularity than the social structural forces that enable and constrain it. Among the 68 studies in the sample, 80 percent of them contained at

least one predictor involving the behaviors of users, such as posting frequently or sharing emotional content; only 46 percent of studies investigated the effects of users' social positions, such as their age or race, on popularity. Among the 87 predictors of popularity identified in this study, 71 percent involved user behaviors; 29 percent involved their social, cultural and economic circumstances. Scholars were most interested in how emotion, interactivity, and vividness affect popularity, and least interested in the influences of geography, originality, and organizational status of users. Research on the effects of users' race, gender, sexuality, and socioeconomic status on their popularity was notably scarce.

The relative disregard for the social origins of popularity echoes Hampton's (2023) claims about the negligible role of sociology in the field of digital media and the need for more sociological theory and research. Social theory may be particularly useful for investigating social antecedents of popularity, such as race, class and gender, but it also may enrich the agency-focused literature on the behaviors of users. For example, many scholars have examined how emotional language can be used to attract and engage followers. Most studies, however, are agency focused and assume that individuals use emotions as a form of strategic communication. While rich in empirical insight, this literature has largely missed the opportunity to demonstrate how emotion work on social media links individual agency to social structure. Decades of sociological research has shown how the ability to manage emotions and use them strategically varies across gender and social class, and that reactions to emotional displays by men and women are likewise socially dependent (Hochschild, 1979, 1983). To the extent that emotional expression regulates the distribution of a socially valued resource – popularity – the use of it by users reproduces the gendered and class structures in which individuals are embedded.

This review also identified areas of the literature characterized by general agreement among scholars and areas where conditional or contradictory findings were common. To briefly summarize the most widely supported claims, users who posted frequently, produced original content and utilized visual images tended to be more popular than users who used alternative strategies. Messages that were overtly interactive, such as posting questions, organizing contests and actively responding to followers, consistently engaged audiences. That both emotional and informative content boosted multiple popularity metrics was also well-established in the literature. In most cases, these predictors of popularity were consistent across different social media platforms and user types.

Though fewer in number, scholars who examined the link between popularity and social position rarely disagreed. As shown in this study, the past popularity of users was a positive predictor of their future popularity. That popularity itself was among the strongest and most consistent predictors of increases in reach and engagement may not be surprising, but it yields important evidence that social media, rather than nurturing equal opportunity, widen social inequality (see Table 2, appendix). Popularity, as argued by sociologists for decades (Merton, 1968), readily accumulates for those who already have it and leads to an ever-increasing

gap between the popular and the unpopular. Users who enjoyed other structural advantages—access to economic resources and high social prestige—also tended to generate more reach and engagement than those who lacked these resources (see Table 2, appendix). The geographical context played a role, as users located near highly populated cities tended to be more popular than those in less populated areas. Only one study looked at how the effectiveness of social media strategies depends in part on the users' cultural and national context.

In some cases, the effects of predictors depended on the type of user or channel being studied. Posting several messages over a short period of time was more effective on micro-blogging sites than on Facebook. Including links in posts was associated with more popularity on the US-based Twitter but with less popularity on the China-based Sina Weibo. The posts of verified Twitter users were more likely to be retweeted; yet, this relationship reversed on Sina Weibo, where the posts of verified government agencies may be perceived as less worthy of being shared. Engagement increased with the number of words in posts on Sina Weibo but decreased with word counts on Facebook. Centering the self in posts and expressing personal interpretations of products and events appeared to be an optimal strategy for increasing reach and engagement for original SMIs on Instagram and YouTube, but not for company brands on Facebook.

These conditional effects, rooted in user and channel types, suggest the need for multidisciplinary research and more exploration of the contexts included in Barnlund's model. To account for the full complexity of social media interactions, a research team needs technical knowledge of platform capabilities, cultural knowledge of the values and beliefs associated with communities on each platform, and sociological knowledge of the structures that enable and constrain the various types of users. Given that the three predictors that produced the most disagreement (tagging, hashtags, and following back) involved overtly interactive behaviors, scholars should also attend to the relational context of communication—the personal relationships between users and the development and outcomes of their conversations.

7 LIMITATIONS

The primary weakness of this review is its narrow focus on studies based on naturalistic quantitative content analysis. This sampling criteria excluded survey-based and experimental studies, which have provided a foundation for decades of related research on social influence and persuasion (Gass & Seiter, 2022). Studies based on qualitative research designs were also excluded. Qualitative methods such as digital ethnography capture the naturalistic dimension of social media interactions. Research in this tradition, particularly qualitative studies involving the relational (Abidin, 2015; Mäkinen, 2021), cultural (Raun, 2018), and social contexts (Duffy, 2017) of Barnlund's transactional model, could have provided important empirical and theoretical insight on social media popularity. Although

the goals and concepts of related qualitative studies were deemed too difficult to incorporate and compare with the studies reviewed in this article, future reviews of qualitative research on social media popularity are in demand.

Given the practical need to identify a manageable portion of the literature, similar review articles have selected studies based on whether they included a certain type of social media user, such as original SMIs, or focused on articles that examined research questions typically covered by particular academic disciplines, such as business and marketing (Hudders, De Jans, & De Veirman, 2021; Sundermann & Raabe, 2019; Vrontis et al., 2021). This review's selection criteria were intended to provide a unique, interdisciplinary pool of studies that include a similar measure of popularity and share an interest in predicting the reach and engagement of a wide range of social media users. As the global population of active social media accounts continues to rise, popular users, from celebrities and original SMIs to businesses and governments, will likely shape important social, economic, and cultural outcomes. For this reason, research on the origins of social media popularity should interest scholars from a wide range of disciplines.

Identified by Ye et al. (2021) as a "future direction in influencer marketing research" (172), naturalistic research also has some advantages over other methods. In contrast to experimental research, naturalistic inquires tap into the interactions and relationships between influencers and followers. These relationships develop over time through multiple interactions and are difficult to replicate with mock influencers, experimental stimuli or cross-sectional survey designs (Delbaere et al. 2021). Experiments and surveys openly elicit responses from subjects, which threatens the validity of findings, whereas content-based indicators are unobtrusive and measure popularity based on observations of real-life behaviors. Mixed-method research combining qualitative and quantitative content analysis may be a particularly useful approach to studying the back-and-forth communication and relational context of social media.

8 CONCLUSION

Based on the 68 studies reviewed here, research on social media popularity has coalesced around four specialized areas. Business scholars are primarily focused on predicting customer engagement on company Facebook pages. Another group examines the impact of original SMIs on specific industries such as fashion and fitness and gravitate toward the study of interactions on Instagram and YouTube. Drawing primarily on automated coding procedures and natural language processing, a third group of scholars concentrates on message diffusion (retweets) on microblogging websites. And a fourth group looks at the effects of popular users on a range of social issues, political controversies and public health concerns. Though conceptualized in different ways – as a form of social currency, social capital or popularity – the reach and engagement of users have origins and consequences that are captivating researchers from multiple academic disciplines.

Scholars have made broad strides in identifying the communication strategies and types of social media content that maximize popularity, but social structural influences have received far less attention. While the status characteristics of users, such as their race, gender, socio-economic status, age, culture and national origin, likely affect how audiences and sponsors react to them, relatively few studies in the naturalistic tradition have investigated the social origins of internet fame (Hampton, 2023). Given that much of the research reviewed here has been carried out in disciplinary silos among scholars with similar academic backgrounds, future studies may benefit from assembling multidisciplinary teams to study social media popularity.

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10 APPENDIX

Table 1. Positive Behavioral Predictors of Social Media Popularity

Predictors	User Types	Platforms	Measures of Popularity	References
Frequency and Timing				
Posting more often	Original SMIs	Twitter	Followers	Jensen et al. 2014
	Business orgs	Twitter	Followers	Watanabe et al. 2015
	Business orgs	Twitter	Followers	Hopkins 2013
	Original SMIs	Sina Weibo	Followers, likes, retweets	Wang et al. 2020
	Business orgs	Twitter	Followers	Ashley & Tuten 2015
Posting many times over a short period	Ordinary people	Twitter	Followers	Hutto et al. 2013
Longer time intervals between posts	Business orgs	Facebook	Likes, comments, shares	Banerjee & Chua 2019
	Universities	Facebook	Likes, shares, comments, fans	Brech et al. 2017
Posting on weekdays compared to weekends	Business orgs	Facebook	Comments	Pletikosa et al. 2013
	Business orgs	Sina Weibo	Retweets	Zhang & Peng 2015
Originality				
Posting organic content compared to sponsored content	Original SMIs	Instagram	Likes, comments	Neal 2018
	Original SMIs	YouTube	Comments	Costello & Urbanska 2021
	Original SMIs	YouTube	Engagement rates	Lim et al. 2021
	Business orgs	Sina Weibo	Retweets	Zhang & Peng 2015
	Business orgs	Facebook	Likes, comments	Kwok & Yu 2013
Posting unique content compared to sharing others' content	Business orgs.	Twitter	Followers	Watanabe et al. 2015
	Original SMIs	Sina Weibo	Likes	Zou et al. 2021
Vividness				
Posting media with higher levels of vividness	Business orgs	Facebook	Likes, shares, comments	Luarn et al. 2015

	Business orgs	Facebook	Likes, shares, interaction duration	Cvijikj & Michahelles 2013
	Ordinary people	Sina Weibo	Retweet	Liu et al. 2012
	Business orgs	Facebook	Likes, shares, comments	Khan et al. 2016
	Business orgs	Facebook	Likes, shares, comments	Coursaris et al. 2016
Posting videos	Ordinary people	Twitter	Retweets	Jain et al. 2020
	Business orgs	Facebook	Likes, shares, comments	Banerjee & Chua 2019
	Business orgs	Facebook	Likes	Cvijikj et al. 2011
	Business orgs	Facebook	Likes	De Vries et al. 2012
Posting photos	Business orgs	Facebook	Likes, shares, comments	Banerjee & Chua 2019
	Business orgs	Facebook	Interaction duration	Cvijikj et al. 2011
	Business orgs	Facebook	Likes, comments, interaction duration	Cvijikij & Michahelles 2011
	Ordinary people	Twitter	Retweets	Meng et al. 2018
Posting photos compared to videos	Business orgs	Facebook	Likes, shares, comments	Dae-Hee et al. 2015
Posting text compared to other media types	Business orgs	Facebook	Likes, comments	Kwok & Yu 2013
Posting URLs	Ordinary people	Twitter	Retweets	Shi et al. 2018
	Ordinary people	Twitter	Retweets	Tsugawa et al. 2017
	Ordinary people	Twitter	Retweets	Naveed et al. 2011
	Ordinary people	Twitter	Retweets	Suh et al. 2010
Avoiding URLs	Business orgs	Sina Weibo	Retweets	Zhang & Peng 2015
	Ordinary people	Sina Weibo	Retweets	Liu et al. 2012
	Ordinary people	Sina Weibo	Comments	Wang et al. 2019
Interactivity				
Posting content with higher levels of interactivity	Business orgs	Facebook	Likes, shares, comments	Luarn et al. 2015
	Business orgs	Facebook	Likes, shares, comments	Khan et al. 2016

Posting contests or other incentive-driven calls to action	Business orgs	Facebook	Likes	De Vries et al. 2012
	Business orgs	Facebook	Comments	Cvijikj & Michahelles 2013
	Business orgs	Facebook	Likes	Luarn et al. 2015
	Business orgs	Facebook	Fans	Ashley & Tuten 2015
	Business orgs	Twitter	Followers	Ashley & Tuten 2015
Posting questions	Business orgs	Facebook	Comments	De Vries et al. 2012
	Business orgs	Facebook	Comments	Cvijikj et al. 2011
	Ordinary people	Twitter	Retweets	Naveed et al. 2011
	Original SMIs	YouTube	Views, subscribers	Lee & Theokary 2021
	Business orgs	Facebook	Comments	Cvijikij & Michahelles 2011
Optimizing platform's technical capacities for interacting with followers	Business orgs	Facebook	Followers	Hopkins 2013
Completing profile information	Ordinary people	Twitter	Followers	Hutto et al. 2013
	Ordinary people	Facebook	Fans	Lampe et al. 2007
Reacting to comments	Business orgs	Twitter	Followers	Hopkins 2013
Tagging (@s)	Ordinary people	Twitter	Followers	Hutto et al. 2013
	Business orgs	Sina Weibo	Retweets	Zhang & Peng 2015
	Ordinary people	Sina Weibo	Retweets	Liu et al. 2012
	Business orgs	Facebook	Likes, shares, comments	Banerjee & Chua 2019
	Ordinary people	Sina Weibo	Retweets, comments	Wang et al. 2019
	Ordinary people	Twitter	Retweets	Nesi et al. 2018
Avoiding tagging (@s)	Ordinary people	Twitter	Retweets	Shi et al. 2018
	Ordinary people	Twitter	Retweets	Naveed et al. 2011
Using hashtags	Ordinary people	Twitter	Retweets	Shi et al. 2018
	Ordinary people	Twitter	Retweets	Tsugawa et al. 2017

	Ordinary people	Twitter	Retweets	Naveed et al. 2011
	Ordinary people	Twitter	Retweets	Suh et al. 2010
Using two or fewer hashtags	Ordinary people	Twitter	Followers	García et al. 2016
Avoiding hashtags	Ordinary people	Twitter	Followers	Hutto et al. 2013
	Original SMIs	Sina Weibo	Likes	Zou et al. 2021
	Ordinary people	Sina Weibo	Comments	Wang et al. 2019
Following more accounts	Ordinary people	Twitter	Followers	Hutto et al. 2013
Following fewer accounts	Business orgs.	Sina Weibo	Retweet	Zhang & Peng 2015
	Original SMIs	Twitter	Likes, retweets	Valsesia et al. 2020
Having more followers per followee	Ordinary people	Twitter	Followers	Hutto et al. 2013
Emotion				
Expressing emotion	Business orgs.	Facebook	Likes, shares, comments	Coursaris et al. 2016
	Original SMIs	Instagram	Comments	Yesiloglu & Waskiw 2021
	Ordinary people	Twitter	Retweets	Stieglitz & Dang-Xuan 2013
	Business orgs.	Facebook	Engagement rates	Huertas & Marine-Roig 2016
Avoiding emotional appeals	Business orgs.	Chinese micro-blogging site	Retweeting	Zhang & Peng 2015
Avoiding the use of exclamation points	Ordinary people	Twitter	Retweets	Naveed et al. 2011
Expressing positive sentiment, feeling or emotion	Ordinary people	Twitter	Followers	Hutto et al. 2013
	Ordinary people	Twitter	Retweets	Bakshy et al. 2011
	Ordinary people	Twitter	Retweets	Kim et al. 2016
	Ordinary people	Twitter	Retweets	Naveed et al. 2011
	Ordinary people	Twitter	Retweets	Gruzd et al. 2011
	Ordinary people	Twitter	Retweets	Ferrara & Yang 2015

Expressing positive sentiment in non-news-related content	Ordinary people	Twitter	Retweets	Hansen et al. 2011
Expressing joy	Ordinary people	Twitter	Followers	Kivran-Swaine & Naaman 2011
Expressing hope	Ordinary people	Sina Weibo	Retweets, comments	Wang et al. 2019
Avoiding negative sentiment	Ordinary people	Twitter	Followers	Hutto et al. 2013
Posting entertaining content	Business orgs.	Facebook	Likes, comments	Khan et al. 2016
	Business orgs.	Facebook	Comments, shares	Luarn et al. 2015
	Business orgs.	Facebook	Likes, shares, comments	Cvijikj & Michahelles 2013
Posting interesting content	Ordinary people	Twitter	Retweets	Bakshy et al. 2011
Expressing negative sentiment, feeling or emotion	Ordinary people	Twitter	Retweets	Stieglitz & Dang-Xuan 2013
	Ordinary people	Twitter	Retweets	Meng et al. 2018
	Ordinary people	Twitter	Retweets	Naveed et al. 2011
	Ordinary people	Twitter	Retweets	Tsugawa et al. 2017
Expressing negative sentiment or critiques in news related content or political discussions	Ordinary people	Twitter	Retweets	Hansen et al. 2011
	Ordinary people	Twitter	Retweets	Choi 2014
	Celebrities	Twitter	Likes, retweets, comments	Pérez 2020
	Ordinary people	YouTube	Likes	Briones et al. 2012
Using negative emoticons	Ordinary people	Twitter	Retweets	Naveed et al. 2011
Avoiding positive emoticon	Ordinary people	Twitter	Retweets	Naveed et al. 2011
Expressing sadness	Ordinary people	Twitter	Followers	Kivran-Swaine & Naaman 2011
Avoiding language that may stigmatize others	Ordinary people	Twitter	Retweets, likes	Schwartz & Grimm 2017
	Ordinary people	Twitter	Retweets	Jain et al. 2020
Using fear appeals	Original SMIs	Sina Weibo	Likes	Zou et al. 2021

	Ordinary people	Sina Weibo	Comments	Wang et al. 2019
Avoiding fear appeals	Ordinary people	Sina Weibo	Retweet	Wang et al. 2019
Information				
Posting informative content	Business orgs.	Facebook	Likes, shares, comments	Khan et al. 2016
	Business orgs.	Facebook	Likes, comments	Cvijikj & Michahelles 2013
	Ordinary people	Twitter	Followers	Hutto et al. 2013
	Business orgs.	Facebook	Likes, shares, comments	Dae-Hee et al. 2015
Posting informative-conversational content	Original SMIs	Instagram	Comments	Yesiloglu & Waskiw 2021
Posting about the functionality of products	Original SMIs	YouTube	Comments	Delbaere et al. 2021
Using functional appeals in B2B messages	Business orgs.	Facebook	Likes	Swani et al. 2017
Focusing content on a single topic	Ordinary people	Twitter	Followers	Wang & Kraut 2012
	Ordinary people	Twitter	Retweets	Cha et al. 2010
Using concrete language	Original SMIs	YouTube	Views, subscribers	Lee & Theokary 2021
Avoiding tentative language	Ordinary people	Twitter	Retweets	Kim et al. 2016
Using longer words	Ordinary people	Twitter	Followers	Hutto et al. 2013
Using more words	Business orgs.	Sina Weibo	Retweeting	Zhang & Peng 2015
Using fewer words	Business orgs.	Facebook	Likes and shares	Banerjee & Chua 2019
Self-orientation				
Using self-referencing pronouns	Original SMIs	YouTube	Views and subscribers	Lee & Theokary 2021
Describing personal experiences with a product	Original SMIs	YouTube	Engagement rates	Lim et al. 2021
Including a human face	Original SMIs	Instagram	Comments	Yesiloglu & Waskiw 2021
Avoiding self-referencing pronouns	Ordinary people	Twitter	Followers	Hutto et al. 2013
Avoiding self-oriented content	Business orgs.	Facebook	Likes, shares, comments	Dae-Hee et al. 2015
Avoiding mentions of corporate brand	Business orgs.	Facebook	Likes	Swani et al. 2017

names in B2C messages				
Posting content addressing broader public interests	Ordinary people	Twitter	Retweets	Naveed et al. 2011

Table 2. Characteristics of Users as Predictors of Popularity

Predictors	User Types	Platforms	Measures of Popularity	References
Popularity				
Having more followers, fans or subscribers	Ordinary people	Twitter	Retweets	Bakshy et al. 2011
	Business orgs.	Sina Weibo	Retweets	Zhang & Peng 2015
	Ordinary people	Sina Weibo	Retweets	Liu et al. 2012
	Ordinary people	Twitter	Retweets	Kim et al. 2016
	Ordinary people	Twitter	Retweets	Pezzoni et al. 2013
	Ordinary people	Twitter	Retweets	Zaman et al 2010
	Ordinary people	Twitter	Retweets	Cha et al. 2010
	Ordinary people	Twitter	Retweets	Tsugawa et al. 2017
	Ordinary people	Twitter	Retweets	Suh et al. 2010
	Ordinary people	Twitter	Retweets	Hong et al. 2010
	Business orgs.	Facebook	Likes, shares, comments	Banerjee & Chua 2019
	Ordinary people	Sina Weibo	Retweets, comments	Wang et al. 2019
	Original SMIs	YouTube	Views, likes, comments	Sui et al. 2022
Being followed by other top influencers	Original SMIs	Twitter	Followers	Rodríguez-Vidal et al. 2020
Having a high retweet rate in the past	Ordinary people	Twitter	Followers	Hutto et al. 2013
	Ordinary people	Twitter	Retweets	Bakshy et al. 2011
	Ordinary people	Twitter	Retweets	Xu et al. 2012
	Ordinary people	Twitter	Retweets	Hong et al. 2011
	Ordinary people	Twitter	Retweets	Luo et al. 2013.
	Ordinary people	Twitter	Retweets	Xu et al. 2012

Organizational Status				
Having high operating income	Business orgs.	Facebook, Twitter	Fans, Followers	Scelles et al. 2017
Hiring an advertising agency to manage platforms	Business orgs.	Facebook, Twitter	Fans, Followers	Hopkins 2013
High sports performance (wins/playoffs/championships)	Business orgs.	Facebook	Fans	Scelles et al. 2017
	Business orgs.	Twitter	Followers	Scelles et al. 2017
	Business orgs.	Twitter	Followers	Watanabe et al. 2015
	Business orgs.	Twitter	Followers	Watanabe et al. 2016
	Business orgs.	Twitter	Followers	Pérez 2013
Appearing on national television	Business orgs.	Twitter	Followers	Watanabe et al. 2015
Employing players with high follower counts	Business orgs.	Twitter	Followers	Watanabe et al. 2015
High attendance at games	Business orgs.	Facebook, Twitter	Fans, Followers	Scelles et al. 2017
Having an older stadium	Business orgs.	Facebook, Twitter	Fans, Followers	Scelles et al. 2017
Being a newer team in the league	Business orgs.	Twitter	Followers	Watanabe et al. 2015
Having more students	Universities	Facebook	Likes, shares, comments, followers, fans	Brech et al. 2017
Having a high prestige ranking	Universities	Facebook	Likes, shares, comments, followers, fans	Brech et al. 2017
Individual Status				
Having a verified account	Business orgs.	Sina Weibo	Retweets	Zhang & Peng 2015
	Ordinary people	Sina Weibo	Retweet	Liu et al. 2012
	Ordinary people	Twitter	Retweet	Xu et al. 2012
Not having a verified account	Ordinary people	Sina Weibo	Retweets, comments	Wang et al. 2019
Being an original SMI or celebrity compared to a business or government	Original SMIs, celebrities, business orgs, governments	Instagram	Engagement rates	MacKay et al. 2022

Being a celebrity compared to an original SMI	Celebrities, original SMIs	Instagram	Followers	Zeren & Gökdağlı 2020
Being an original SMI or media channel compared to a health organization	Original SMIs, business orgs., governments	Twitter	Retweets	Jain et al. 2020
Being a media channel, government or emergency organization compared to other types of users	Business orgs., governments, ordinary people	Sina Weibo	Retweet	Liu et al. 2012
Working for a prestigious university	Celebrities	Twitter	Followers	Jensen et al. 2014
Having a longer account history	Celebrities	Twitter	Followers	Jensen et al. 2014
	Ordinary people	Twitter	Followers	Hutto et al. 2013
	Ordinary people	Twitter	Retweets	Suh et al. 2010
	Ordinary people	Twitter	Retweets	Xu et al. 2012
Being older	Celebrities	Twitter	Followers	Watanabe et al. 2017
Not being Hispanic	Celebrities	Twitter	Followers	Watanabe et al. 2017
Geography				
Located in highly populated area	Governments	Twitter, YouTube, Facebook, Instagram	Followers	Mainka et al. 2015
	Business orgs.	Facebook, Twitter	Followers	Scelles et al. 2017
	Business orgs.	Twitter	Followers	Watanabe et al. 2016
Depends on national context (Australia, UK, USA).	Business orgs.	Facebook	Likes, comments and shares	Khan et al. 2016

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UTOPIAN AND DYSTOPIAN SOCIOTECHNICAL IMAGINARIES OF BIG DATA

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ABSTRACT

Data feminism, a way of thinking about and "doing" data utilizing feminist tools and perspectives, has emerged in recent years as a part of a critical discourse surrounding datafication. The aim of this study is to analyze and identify shared perceptions of big data as expressed in a corpus of scholarly writings published in the domain of data studies and data feminism. We analyzed a set of 44 scholarly texts engaging in feminism concerned with the concept of big data. For the purpose of this article, we refer to this set of texts as data feminism and examine how authors frame and describe big data. We compare future visions in data feminist material with policies by the European Commission and explore what tensions arise among them. Furthermore, we explore and delineate social and political alternatives that emerge from data feminist texts. Both corpora describe futures inclusive of big data and imagine possible positive outcomes from different perspectives and with different ideas of the current role of big data. We found that sociotechnical imaginaries of big data within the data feminist corpus are considerably richer and more nuanced than those of the European Commission. In the data feminist corpus, big data is described as a multiplicity of things and often implicated in perpetuating power imbalances and large societal issues. The European Commission corpus employs the perspective of "data as a resource" to be exploited.

Keywords: big data; data; the European Commission; feminism; sociotechnical imaginaries; VOSViewer.

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1 INTRODUCTION

The rise of the Internet and social media, as well as the accumulation of vast amounts of data have created a setting for practices and structures associated with what has come to be called big data. It is a curious concept that has served as the foundation for both optimistic and pessimistic visions of the future. Big data is a contested concept and there is no consensus on its definition. In lieu of the lack of an agreed-upon definition, the "three V's" attributed to Gartner (Ward & Barker, 2013, p. 1) are often used to explain big data. The "three V's" are Volume, Velocity, and Variety, and new words have been introduced since (such as Value and Veracity). Simultaneously, critical discussions are continuing to shed light on the array of systems, decisions, and processes that influence what we perceive as big data. Together with predominant narratives about big data, they help shape how we envision and prepare for the future with big data.

According to the theoretical approach of sociotechnical imaginaries (Jasanoff, 2015; Jasanoff et al., 2007), visions of the future are formed among groups in society and frequent conflicts can occur between the imaginaries of different groups. Sociotechnical imaginaries are self-fulfilling and agenda-setting: today's dominating imaginaries set the boundaries for how the future will unfold. This has proven particularly relevant in the current decade, as long-term planning and investments by governments and corporations in the West are focused on images of smart cities, the Internet of Things, 5G telecommunications, augmented reality, virtual reality, and much more. The creation and application of big data involve practices that bind together many of these imaginaries.

The notion of big data as fostering both utopian and dystopian discussions goes back at least a decade, when boyd and Crawford (2012) stated that the application of big data at a scale triggers both utopian and dystopian rhetoric. According to them, utopian rhetoric describes big data as a helpful tool for simplifying and streamlining complex systems. In contrast, the dystopian rhetoric predominantly regards big data as capable of enabling privacy invasions and decreased civil freedoms. In this text, we use the notions of dystopian and utopian sociotechnical imaginaries to signal the utilization of the dystopian and utopian rhetoric described by boyd and Crawford. This is not to imply or feed into narratives describing feminists as being against technology or progress. In fact, women have long been at the forefront of technological development, even though their contributions were often unrecognized and erased.

With this in mind, *utopian sociotechnical imaginaries* encompass those imaginaries that depict big data as capable of improving social systems and economies. These sociotechnical imaginaries are promoted by two very different but highly influential groups. The first comprises IT companies, particularly those

that have their headquarters in Silicon Valley. These companies often appear unified in marketing positive perspectives about technologies in the making (Lindh & Nolin, 2017). The second group entails policymakers who aspire to boost their economies by implementing data-driven innovation. These two groups frame big data as a resource and a tool for empowerment and social change (Levina and Hasinoff, 2016). Big data is described as beneficial across domains, from commerce to health and government (Intel, 2021; Chen et al., 2012) and helpful for solving local and social problems (e.g., Guha, 2021). Zuboff (2019) argues that positive discourses are dominated by Big Tech through the power of declarations. They function by "impos[ing] new facts on the social world while their declarers devise ways to get others to agree to those facts" (p. 177). According to Zuboff, Big Tech companies move into uncharted territories to claim them, subsequently tailoring the direction of their development.

In dystopian rhetoric, big data is seen as problematic and capable of inflicting damage (Gregory & Halff, 2020; O'Neil, 2017). Considering this, discourses developed by scholars from various fields who choose a critical perspective toward big data fall under the scope of *dystopian sociotechnical imaginaries*. Critical data studies, surveillance studies, and feminist studies are examples of the critical lenses used to problematize and scrutinize various aspects of big data. Another way of describing the dystopian rhetoric would be to call it anti-utopian, as such accounts can provide constructive and positive ideas. In this article, we are particularly concerned with understanding the *dystopian* in the sociotechnical imaginaries within data feminism.

The term data feminism was popularized in recent years with the publication of the book "Data Feminism" in which it was defined as "a way of thinking about data, both their uses and their limits, that is informed by direct experience, by commitment to action, and by intersectional feminist thought" (D'Ignazio & Klein, 2020, p. 3). Feminist scholars have a tradition of developing tools and theories for studying structures of power and how they are subverted by and intertwined with different phenomena in society. Although data feminism is a relatively new concept associated with a specific program, for simplicity, we will use it broadly to cover an array of feminist critical approaches. We will contrast this by comparing data feminist sociotechnical imaginaries with those of the European Commission, as identified by Rieder (2018). We also want to better understand the relationship between the utopian and the dystopian within the sociotechnical imaginaries of big data. The questions that we explore in this article are therefore:

- What characterizes the dystopian sociotechnical imaginaries of big data within data feminism?

- In which ways do these dystopian sociotechnical imaginaries differ from the utopian sociotechnical imaginaries within European Commission policies?
- What are the particular contributions and added value to critical studies that data feminism provides in this area?

In order to perform a meta-analysis of the contributions of data feminism to the topics of this study, we aim to analyze the contributions of data feminism as researchers who are not active within it. We do this by conducting a text analysis of the data feminist corpus in addition to a comparison of official European Commission documents as analyzed by Rieder (2018).

2 SOCIOTECHNICAL IMAGINARIES

One of the most prolifically employed frameworks for studying the confluence of society and technology is the Actor Network Theory (ANT). However, the ANT has been criticized for flattening the thickness of social relationships, hierarchies, and power distributions (Jasanoff, 2015). The concept of sociotechnical imaginaries was developed as a response to this flattening and is used to describe the role of collective imagination in society. Social imaginaries upon which the concept is built have been predominantly defined as:

> [T]he ways in which people imagine their social existence, how they fit together with others, how things go on between them and their fellows, the expectations that are normally met, and the deeper normative notions and images that underlie these expectations (Taylor, 2003, p. 106).

According to this theory, the role of collective imagination is to enable the development and legitimization of practices and routines through the creation of common understandings of what is or is not acceptable, desirable, or even thinkable. However, Taylor's theory does not account for the increasingly important role of technology in the collective imagination. Since technology mediates so many aspects and routines of the everyday and mundane, accounting for it in the collective imagination has been grounds for developing the concept of sociotechnical imaginaries.

In this paper, we employ the theoretical perspective of sociotechnical imaginaries as developed by Sheila Jasanoff. According to Jasanoff, sociotechnical imaginaries are "collectively held and performed visions of desirable futures" (2015, p. 28). In other words, the way we imagine the future impacts our practices through the ways we prepare for it. Moreover, visions of undesirable futures can signify the emergence of competing sociotechnical imaginaries between different groups. Jasanoff explains that sociotechnical imaginaries are "animated by forms of social life and social order attainable through, and supportive of, advances in science and

technology" (2015, p. 28). According to this view, dramatic technological changes, such as those in the 20th and 21st centuries, have an impact on social life and social order. This is not a technological determinist perspective; rather, it is situated in the tradition of Marshall McLuhan as articulated by Culkin (1967, p. 70): "we shape our tools, and thereafter our tools shape us". In addition to being mutually influenced and mediated by technology, sociotechnical imaginaries are important for how practices and technologies take shape.

3 IMAGINING THE FUTURE OF BIG DATA

When attempting to define big data beyond the "three V's", different authors mention scalability, frequent or continuous generation of data as well as methods used to process and analyze it (boyd & Crawford, 2012; Kitchin, 2014; Secundo et al., 2017). One way to think about the phenomenon is suggested by Mayer-Schönberger and Cukier (2013) who refer to big data as:

> [T]hings one can do at a large scale that cannot be done at a smaller one, to extract new insights or create new forms of value, in ways that change markets, organizations, the relationship between citizens and governments, and more (p. 6).

The changes in relationships they mention indicate how deeply big data is embedded in societal and cultural contexts. Women have played a central role in developing a critical understanding of big data, Women of Color and nonbinary/trans women in particular. Women have described the social consequences of big data their racial implications and how they reinforce existing inequalities. They pioneered research on the use of big data for algorithmic decision making that is often impossible to audit and correct when blunt mistakes are made, and inequalities perpetuated. Some examples of their contributions concern big data reinforcing social inequalities in education and work force (O'Neil, 2017) and over policing (Benjamin, 2020). Furthermore, women of color have described how training datasets tend to overwhelmingly represent lighter-skinned subjects (Boulamwini and Gebru, 2018) and how digital spaces can be sites of racialization (Nakamura, 2013). These and other contributions enriched the understanding of big data as a technical as well as a social phenomenon.

Since the start of the 2010s, big data as an imaginary has been at the center of numerous discussions of the future. Considering the lack of consensus regarding how the concept should be defined, the way big data is imagined plays a significant role in how it figures in society and what kinds of futures are implied. Utopian visions of big data emerged quickly in the early 2010s. Big data seemed to offer a promise of new forms of rational planning that could also provide solutions to societal challenges such as climate change. Resources could be used with much more

efficiency with the continued development of social media as well as smart homes and smart cities. All such developments depended on a combination of big data and artificial intelligence.

Within critical scholarship, discussions aligning with the dystopian rhetoric emerged within numerous disciplines and interdisciplinary fields. The commercialization of online space during the early 2000s resulted in a handful of companies seizing control of massive amounts of data that could be relatively freely combined into valuable prediction products (see for example McNamee, 2019; Zuboff, 2019; Cheney-Lippold, 2019). The sheer volume of available data signals the shaky promise of objectivity, truth and accuracy (boyd & Crawford, 2012). Nonetheless, authors such as McNamee (2019) and Zuboff (2019) explore how Big Tech and Silicon Valley shape narratives and thus the impact that they can have on how futures are shaped.

A key concept used within the discussions of big data is datafication. It is a concept that explains how social action is translated into data that, in turn, makes accessing, understanding, and monitoring human behavior possible (van Dijck, 2014; Mayer Schoenberger & Cukier, 2013). The concept of datafication became another buzzword within the IT industry, carrying positive connotations. The mathematical understanding of the concept was launched by Mayer Schoenberg and Cukier (2013), who emphasized the aspect of quantification of human behavior and contextual information. They were among the first within the big data context to suggest that human behavior can be treated mathematically and thus open the possibility of collection and analyses of various forms of data. Scholars have also critically discussed the potential of datafied mechanisms and automation to perpetuate inequality and discrimination (e.g., Benjamin, 2020; Eubanks, 2019: Noble, 2018; O'Neil, 2017). In this article, we position discussions about datafication as part of big data imaginaries.

In a sense, big data appears as the ultimate form of the sociotechnical imaginary. It conjures up a future in which planning of automated and human practices can be organized for optimal efficiency in basically any realm of society. Indeed, the sociotechnical imaginaries approach has previously been used in critical studies of unfolding technologies related to big data. Reviewing such studies, a remarkable pattern can be discerned in which the imaginaries of Big Tech have become so powerful and uncontested that they are appropriated by the very people that are, seemingly, exploited.

Such research shows how users have come to accept profiling as a natural part of the online experience. Lupton (2020) explores how people imagine and talk about personal data profiling on social media. She defines the profiles created by collecting data generated through user participation in online life as "data personas".

Lupton uses this term to provoke a conversation about which data are collected, to whose benefit, as well as the perceived effect they have on her participants.

Corporations such as Google and Meta (formerly Facebook) have an advertisement-driven business model based on big data. The viability of this business model is dependent on minimizing the risks associated with public backlash and government regulation. To that end, it becomes necessary for these companies to position data profiling as a public good, perhaps even as a public service. One study found that even individuals with a sophisticated understanding of datafication and surveillance described the trade-off of control over personal data in positive terms (Sörum & Fuentes, 2022). The prioritization of receiving information in a seamless manner is closely connected with accepting datafication and framing it as positive. Furthermore, in a study where participants received guidance about developing critical consciousness toward digital futures, Markham (2020) found that it was difficult for the participants to envision alternatives. These results demonstrate how deeply ingrained such imaginaries can be, especially when established by big corporations that invest heavily in creating and establishing standards for the online practices of the future. These imaginaries can be called utopian as they identify diverse problems of contemporary life and present technological workarounds. In this way, Big Tech companies take on roles traditionally reserved for public institutions and governing bodies, increasingly dominating the imaginative power for various groups in society (Mager & Katzenbach, 2020).

In many other ways, the role of the policies that regulate Big Tech is heavily influenced by the utopian visions produced within Big Tech. Trying to understand how technology can be reimagined has prompted studies of smart cities (Deitz et al., 2021; Sadowski & Bendor, 2018; Sandeep, 2017); studies of agency in social media (Saariketo, 2020; 2014); search engines (Mager, 2016); and algorithms (Kazansky & Milan, 2021; Bucher, 2017). In the following section, we look at how big data can and has been reimagined within critical feminist perspectives.

3.1 Feminist critical discussions

Feminist thinkers and scholars have developed perspectives that place structures and dynamics of power at the center of their attention. A tradition of studying intricate and ubiquitous oppression equipped feminist scholars with tools and theories that inspect and illuminate power dynamics, thus making it possible to criticize systems that support discriminatory practices and inequality in power distribution.

The introduction of intersectionality to mainstream feminisms reflects aspirations to advocate for the importance of localities and minorities (Daniels,

2015; Carbin & Edenheim, 2013; Davis, 2008). Intersectionality was introduced by legal scholar and civil rights advocate Kimberlé Crenshaw. She described the specific situation of Black women facing discrimination both by race and gender (Crenshaw, 1991). These compounded experiences of discrimination were situated at the intersection of racial and gendered identities, and as such are particularly difficult to advocate for within a system that favors whiteness and maleness. Appropriation of the term intersectionality has been controversial, the main criticism being that the use of intersectionality among feminist scholars has become increasingly vague and wide in scope, reducing its potential as a critical tool (Carbin & Edenheim, 2013). Even so, intersectionality remains a significant focus among feminist scholars, as many established norms tie into perspectives that were previously overlooked in (white) feminisms (Lykke, 2020; hooks, 2000). In digital landscapes, intersectionality implies opening to, and actively drawing from, indigenous and postcolonial research (Odumosu, 2020), LGBTQ+ research (Baucom, 2018; Drabinski, 2013, Huffer, 2013), and critical race studies (Knight Steele, 2021; Love, 2018), among others.

Feminisms have long operated between utopian and dystopian visions of the meaning that emerging technologies can have for women (Wajcman, 2004). On one hand, digital technologies are seen to enable spaces of freedom from gender norms and old social relations. On the other, the dramatic gender differences in access to and control over new technologies reiterates old power disbalances at scale. Women as innovators of technology have historically been overlooked and had their contributions erased (D'Ignazio & Klein, 2020a; Perez, 2019; Onouha, 2016). Feminist discourses on these topics address the issues of seeking equal representation in data as well as concerns about excessive surveillance and threats against privacy caused by such representation (Dubrofsky & Magnet, 2015). Simultaneously, feminist interest in topics of visibility and representation within datafied systems – in a world where maleness is the default – predates the current upscaling of datafication.

In the context of contributing to critical perspectives on data, feminist approaches such as standpoint epistemology (Harding, 1986; 1991) and situated knowledge (Haraway, 1998) emerge as useful tools for scrutinizing the notions of data as inherently objective, reliable, and trustworthy. Haraway and Harding are influential in the feminist refutation of absolute objectivity, i.e., "a view from nowhere" that is often perpetuated by removing the contexts in which data are created and exist. This critical tradition frames data as situated and embodied, not isolated from the circumstances in which they were produced. Feminist critical perspectives also highlight the processes that data underwent since their creation and the circumstances under which they are employed.

The application of feminist discourse to a data-driven society can help interrogate and challenge power relations (D'Ignazio & Klein, 2020a) and broaden the understanding of the challenges they engender. According to boyd and Crawford (2012), the mythology of big data is a significant part of this socio-technical phenomenon, resulting in "the widespread belief that large data sets offer a higher form of intelligence and knowledge that can generate insights that were previously impossible, with the aura of truth, objectivity, and accuracy" (p. 663). Indeed, the intentional mystification of big data can hinder critical inquiry by obfuscating the understanding that data are "not an autonomous force or a unidimensional technical fix"; rather that they are shaped by "social and material factors, including social institutions and technologies" (Beaulieu & Leonelli, 2022, p. XV).

4 METHOD

In this article, we explore a collective set of dystopian imaginaries by comparing a corpus of articles that are here labeled data feminist with discourses developed in the European Union. In order to identify and highlight conceptions of big data and visions of the future in our corpora, we utilize the concept of sociotechnical imaginaries, or collectively held ideas about how things work, what is conceptualized as good or bad, and what constitutes desirable or undesirable futures.

We identified scholarly texts concerned with datafication that employ feminist tools and perspectives through searches in academic databases, discovery engines, and citation chaining. The initial searches were conducted in the Winter of 2020 and Spring 2021. At this stage, a set of 103 texts was collected. We utilized VOSViewer[1], a software for constructing and visualizing bibliometric networks, to identify clusters of related terms. The largest cluster formed around the term big data, drawing attention to the term as a central concept warranting further exploration. We then reviewed the 103 identified texts to assess their engagement with the concept of big data. By early 2022, when final texts were added, we narrowed down the corpus to 44 articles, commentaries and essays. A description of our search strategy is provided in Table 1.

We conducted a close reading of the texts in the resulting corpus to determine how big data figures in these documents, identify the concerns raised about it, and analyze the implications of these concerns for understanding and integration of big data into future visions. Our analysis encompassed searching for contexts in which the term appeared in the corpus and examining the words and metaphors used to

[1] https://www.vosviewer.com/

discuss and describe it. For organizing our notes and creating mind maps of instances of the term "big data" in the texts, we utilized Miro software[2]. Much like the widespread adoption of the concept of datafication has been widely adopted for critical discussions (see above), data feminist authors have also adopted big data. We refer to this corpus as data feminism, with the understanding that data feminism is a larger discourse and an umbrella term that surpasses the materials identified in this study.

Table 1. Collection of the data feminist corpus

Outcome	**Details**	
Goal	Finding literature engaging in a meaningful way with both data and feminism	
Databases and, discovery and search engines searched	WoS, Scopus, ProQuest, Taylor&Francis, Springer, SAGE journals, EbscoHost, Emerald Insight, Google Scholar	
Search terms clusters	**data feminism or feminism** critical data studies data studies data science data activism/t data ethics datafication algorithm(-s/-ic) big data artificial intelligence machine learning	**surveillance studies** data feminism data science gender critical race studies data studies
Additional strategies	Citation chaining	
Final corpus	103 texts collected, 44 engaging meaningfully with the concept of big data	

Following the construction of our data feminist corpus, we compared the results of our analysis of the corpus to the results of a 2018 study of sociotechnical imaginaries of big data in European Commission policies (Rieder, 2018). We created a table of Rieder's findings and complemented those with close readings of three additional texts published since the 2018 study. In the final stage, we surveyed and analyzed

[2] https://miro.com/

policy documents of the European Commission for mentions and considerations of minorities, gender, and other traces of intersectional and (data) feminist issues. Jasanoff and Kim (2009) have positioned textual criticism as a crucial method for the construction of imaginaries, and comparing these corpora aided us in teasing out sociotechnical imaginaries of big data. Overall, the study used a combination of bibliometrics, data visualization, and close reading techniques to analyze and understand the literature related to feminism and data studies.

4.1 Comparison as a method

Comparison is a common research method employed across disciplines, such as history, anthropology, and literary studies. In its most elementary form, comparison refers to a systematic process of contrasting two or more cases to each other, enabling the exploration of parallels and differences among them (Azarian, 2011). Comparison has the potential to elucidate nuances that are difficult to identify in conventional single case studies and to explore assumed knowledge and perspectives within the different cases. As a prevalent method in studies investigating sociotechnical imaginaries, comparison helps to identify the content and contours of those imaginaries by highlighting and contrasting the epistemic and ethical assumptions that are situated and particular (Jasanoff, 2009). Studies that implement comparison as a method to investigate sociotechnical imaginaries are numerous. One study conducted a comparison of cross-national science and technology policies (Jasanoff et al., 2007). Another (Levenda et al., 2019) focused on sociotechnical imaginaries of governance in energy innovations, comparing the cases of Portland, OR and Phoenix, AZ in the United States. Most recently, a comparative analysis of US and EU data governance and their respective sociotechnical imaginaries of personal digital data was published (Guay and Birch, 2022). Sociotechnical imaginaries are embedded with normative implications. Jasanoff and Kim (2009) state that descriptions of potentially attainable futures tend to become prescriptive and positioned as futures that *ought to* be attained. According to Jasanoff (2019), comparison helps tease out sociotechnical imaginaries and can reveal underlying assumptions and normative commitments by identifying commonalities and differences between them.

Comparison helps sketch out different sociotechnical imaginaries or visions of the future that depend on understanding existing technologies as well as future technological innovation. Comparing two corpora of texts can imply variations in terms of affiliations, types of authorship, and ways of achieving legitimacy. In our case, data feminist texts are usually affiliated with one or more universities and attributed directly to the individuals who wrote them, often by a single author. By contrast, the Commission's policies represent the work and reflect the values of the

European Commission. Keeping in mind instances of authorship transparency issues (Nelhans & Nolin, 2022), these policies are published and legitimized under the name of the European Commission. We chose these two corpora to compare in order to contrast assumptions in data feminist and European Commission corpora. This juxtaposition highlights the sociotechnical imaginaries within data feminism, and those that arguably reflect a significant influence on the formation of big data imaginaries in Europe, particularly stemming from the European Commission.

Comparing one corpus of texts to another, using analysis performed by another author, means that this article relies heavily on the analysis conducted by Rieder in 2018. Perhaps the most consequential difference between the two corpora is that of genre. Moreover, when comparing corpora, disparities in underlying assumptions and taken-for-granted aspects become apparent. For example, having been written for different audiences with different perspectives, the studied texts assume different levels of *a priori* knowledge of certain concepts. Furthermore, their perspectives and intended audience differ. The intended audiences further influence the actors that the texts address and that are deemed central.

5 RESULTS

We found that data feminist texts and European Commission policies diverge in the ways in which they frame, understand, and discuss big data. European Commission documents identify and explain interpretations of socioeconomic and political realities to provide guidelines for policy. Such documents are designed to create broad-scale changes across the European Union. These are, therefore, powerful utopian imaginaries, situated at the core of a centralized decision- making system. Being a policy-making body and attempting to work in the interest of citizens of the European Union, the perspective of the European Commission is decidedly top-down.

Contrarily, authors who write with a data feminist lens take on *bottom-up* perspectives, with a focus on local communities and knowledge, as well as the protection of vulnerable members. Local minority groups and localities are central within data feminist texts, whereas legal bodies, businesses, and governments are the actors in focus for the European Commission. If the utopian imaginaries are, therefore, all-inclusive and symmetrical, all citizens across the 27 member states are to be treated in the same way by emerging algorithms. Our own, as well as Rieder's (2018), readings of European Commission documents indicate that citizens are imagined as strong and healthy and flexible enough to adapt to change. Interestingly, class, race, age, and ability are barely mentioned in relation to big data. Data feminism focuses on the marginalized and the vulnerable in society,

those that are most likely to suffer when citizens are classified according to various big data plans.

The academic genre of data feminism presupposes a critical and investigative approach. Differences in these two contexts have implications for their perspectives and the way language is employed. Feminist writing is not intended to be prescriptive, unlike the policy documents of the European Commission. Furthermore, the utilization of feminist tools contributes to the critique and destabilization of dominant narratives, particularly where they reproduce problematic hierarchies and enable or recreate discriminatory practices.

Table 2 describes the result of the encoding of the differences between points of the dystopian and utopian sociotechnical imaginaries. It contains the results of close reading data feminist and European Commission texts, as well as our analysis of Rieder's (2018) findings.

Table 2. Encoding of main differences in data feminist texts and European Commission policy texts

	Data feminism	European Commission
Main focus	Groups pushed to the margin	Centralized steering and control
Level of focus	Micro, meso and macro perspectives	Macro perspective
Argued effect of big data	Increased exploitation	Improved economy
View of citizens	Citizens are vulnerable	Citizens are technology oriented and flexible
View of data	Data as process	Data as resource
Ambition of texts	Destabilizing dominating narratives	Stabilizing dominating narratives
Effect on society	Big data leads to marginalization	Big data as a tool for a better society
Main characteristics of big data	Big data as domination and violence	Big data as new oil, goldmine, and magic material
View of classification systems	Basic classification system is biased	Data is neutral and raw
View of collection and processing of data	Collection and processing of data is biased	Data is the lifeblood of economic development
View of the paradox of exposure	Dual problems of the paradox of exposure	There is no problem of exposure

View of flexibility of classification systems	Concepts of classification systems will age	Classification is made on raw data, need not be revised
View of privileging of classification systems	Classification systems privilege coding of the majority society	Classification is made on raw data, total objectivity
Big data and gender	Big data underprivileges women	Implicitly, technologies are masculine, but this has no consequences
Public and private	Categories of public and private need to be analyzed separately	Categories of public and private are collapsed
Big data as power	Instrumental, structural, and symbolic power	Economic power
What big data strengthens	Strengthened imperialism	Strengthened European Union
Control of data flows	Citizens have no control of data flows	Growing corporations have control of data flows
Purpose of ordering people	Ordering people for domination and exploitation	Ordering people for economic growth
Policy addressed at	Minorities and vulnerable groups	National Governments, Silicon Valley
Timescale of development	Need for slow developments to avoid multiple problems	Urgency to become early adopters
Scale of problems identified	Major problems	Minor problems
Data	Embodied	Separation of data and bodies

The results of the encoding will be discussed further below. We first present the motifs and phrases that occur within each of the corpora followed by each of the three prominent themes that occur across the data feminist texts. The first, titled *Visibility and representation*, focuses on discussions about big data and minorities and the relationship between the private and the public. The second is *Power and domination*, discussing the two in relation to datafication. The final focuses on the differences between those corpora employing the rhetoric of big data as a resource and those that challenge it. The final theme is *Exploitation and vulnerability*.

5.1 Motifs and phrases

In data feminist texts, big data is described in various ways, with the consensus being that it is an inevitable part of the future. As long as big data is tightly wrapped into dystopian imaginaries, a problematic development seems to be inevitable. That said, there are also data feminists who are attached to utopian imaginaries. Proximity to natural sciences and technology is correlated to positive visions of big data in some data feminist materials (e.g., Diaz Martinez et al., 2020; Vaitla et al., 2020; Larrondo et al., 2019).

Some authors in our data feminist corpus assert that big data projects can be transformed and therefore serve to create attractive future outcomes. Vaitla et al. (2020, p. 18) argue that big data "can have a profound influence on improving the lives of all", adding that it can only happen if "it is intentionally managed as a vehicle for equity and empowerment". Hong (2016) claims that big data "offer a chance to open up new opportunities to produce a more egalitarian society". Other authors refrain from making such claims and contributing to similar discourses. They do not describe a future rid of, or with less, data extraction either. Instead, some authors explore the representational limits of data in the context of a societal system in which dominating societal norms already exist. They suggest *Queering data* (Gieseking, 2018) and *Black data* (Rueberg & Ruelos, 2020) as two respective methods of centering perspectives of minorities in datafied systems and data narratives. Foucault Welles (2014, p.1) suggests searching for outliers and minorities within big datasets and putting them in focus but points out that "a large dataset quickly becomes small when you focus on a minority population".

Themes of marginalization and bias occur throughout the data feminist corpus that we surveyed. This is reflected in the phrases used in relation to big data, including *bias* (Diaz Martinez et al., 2020), *violence* (Hong, 2016), and *oppression* (Gieseking, 2018). Big data is described in the corpus as a part of a positivist, colonialist, imperialist, and capitalist paradigm (e.g., in Hoffman, 2020; Corple & Linabary, 2019; Leurs, 2017).

In his 2018 study of the sociotechnical imaginaries of the European Commission, Rieder finds the utilization of stable phrases and a limited set of discursive elements recurring across the European Commission's policy documents. An additional reading of the policies published since 2018 that we conducted for this study corroborates that Rieder's findings still hold true. The variety of phrases represents different ways of conceptualizing big data. The phrases that occurred in the European Commission documents included *new oil*, *gold mine*, *game changer,* and *magic material* (Rieder, 2018). These are all highly positive metaphors that link big data with economic wealth.

Additionally, this way of framing big data feeds into the discourses of data as *raw* and isolated technical artifacts, as opposed to the data feminist understanding of data as a *process* (Cruz, 2020) or as a set of ongoing negotiations. Data as a resource, such as oil or gold, makes data disembodied, removed from the subjects that produce data, or are targeted for data collection. On the other hand, data as a process implies that humans, together with the algorithms they design, make a multitude of decisions in shaping what is characterized as "raw data". The implication is that data-driven decision-making, whether done by humans or machines, does not build upon neutral data. Rather, it is a matter of a sequence of (potentially biased) decisions being made about the various perspectives and ideologies that govern processes when creating the *appearance* of neutral data.

Other important concepts used by the European Commission are *key asset*, "motor and foundation of the future economy", and the *lifeblood of digital markets* (Rieder, 2018). Similar rhetoric persists in the policies of the Commission: data is labeled as the *lifeblood of economic development* (EC, 2020) and as an *essential resource* (EC, 2022a). These phrases point in different directions, with data being portrayed either as a stepstone upon which prosperity can be reached, or an entity that enables and fuels successful systems and practices. However, all the phrases employed by the European Commission have a strong connection to capitalist vocabulary. Imaginaries of big data in the European Commission hinge upon three storylines: big data as the cornerstone of a thriving data economy; big data as a way to transform and improve public services; and big data as a tool for evidence-based decision-making (Rieder, 2018). Prominent themes in data feminism are *visibility and representation*, *power and domination,* and *vulnerability and exploitation*.

5.2 Visibility and representation

Topics of under- and misrepresentation, as well as data bias, have been extensively covered in the data feminist corpus. The topics of silencing voices of minorities based on gender, sexual orientation, and race are characteristic of intersectional data feminism and occur across the material (e.g., Cruz et al., 2020; Ruberg & Reilos, 2020; Gieseking, 2018). Ruberg and Ruelos (2020) state that data play a role in valuing or devaluing the identities and experiences of marginalized groups. This *paradox of exposure* (D'Ignazio & Klein, 2020b) is evidenced in simultaneous advocacy for better representation and arguing against collecting data on already vulnerable and marginalized populations. The argument is that classification systems precede data collection and processing. Therefore, critical scrutiny of the ideologies underpinning the classification system itself is needed, particularly as they concern marginalized groups. Ideally, these groups should be considered during the construction of classification systems to avoid structural bias within the

big data that is created. However, visibility increases exposure to over-policing, surveillance, and discrimination (Favaretto et al., 2019; Corple & Linabary, 2019). As Snapp et al. (2016, p. 135) noted, "[t]he right for participation, and thus representation in data, science, and policy, is often understood as conflicting with the right for protection, that is, safety from the disclosure of a marginalized orientation or identity". However, O'Neil (2017) stresses that certain big data systems can be specifically designed to exploit vulnerable people, by steering them toward questionable universities and other financial scams. According to dystopian imaginaries, the complex problems of the paradox of exposure are likely to increase in the future, as today's big data sets are unlikely to be redesigned and will only grow in size and scope.

Bogers et al. (2020) discuss online representations of pregnancy as featuring predominantly white, able-bodied, CIS women, while overlooking non-white, disabled and LGBTQ+ people. This is an example of a taken-for-granted classification system, implicitly constructed to ignore certain groups. For Hong, a woman who is "allowed" visibility must be "white, pleasant, and subversive only to the extent that she does not disturb the expectations of normal feminine behavior" (2016, p. 3). Extending this line of thought, classification systems can be built upon conservative notions of core concepts such as gender and will therefore be unable to change over time by, for instance, considering non-binary gender identities. Within dystopian imaginaries, big data resources age in size only, becoming increasingly larger, while the core ideas of classification remain stagnant.

Overrepresentation is also discussed by Bogers et al. (2020) in what they call *power shadows,* or the hypervisibility of a selected identity or group that casts a shadow rendering other identities or groups less visible. That numerous classification systems of big data do not typically highlight the experiences of minoritized groups is an issue with no simple solution. Big data does not account for all people, and as currently often utilized, is not good at representing the experiences of minorities (Gieseking, 2018). Categorization and datafication of fluid identities and minorities is therefore an issue highlighted by data feminism in relation to big data. As Gieseking argued, datasets representing queer people may never be *big enough* in scale (2018, p. 150). Moreover, analytical tools are not built to *see* data concerning queer lives, which means that existing data are not immediately legible when they are available (Ruberg and Ruelos, 2020). These dystopian imaginaries signal a future in which the traits of individuals and minorities are overpowered and disappear within power shadows.

Regarding the ways machines can both see and overlook people, Agostinho (2019) notes that optical visual metaphors enhance the role of the senses and heighten the conviction of knowability. According to Agostinho, sensory imaginaries of big data as microscopes or magnifiers perpetuate the misconceptions

of inherent objectivity and reliability. This perspective can be applied to both the European Commission policy documents and our data feminist corpus. Similarly, Gieseking (2018) points out the inherent masculine undertones of equating the *bigness* of data with legitimacy. Data feminist texts adopted these concepts to enter the discussion, but few have explicitly characterized the implications of using them. The concepts utilized by the European Commission, as analyzed by Rieder (2018), imply that the adoption of masculine terminology also draws from capitalist and economic narratives. Indeed, before programming became a male-dominated profession, the title *computer* had little pedigree, and was predominantly used to describe women who performed computations on early computers. In this instantiation, engineers were considered to do the *real* work. This changed as programing became more prestigious, and alongside the change in terminology, the number of women in computing dropped as its perceived importance increased. The concerted effort to align technology with masculinity ultimately resulted in the underrepresentation of women in computing (Van Oost, 2000; Terras & Nyhan, 2016). Several authors explore this phenomenon, both in literature on the history of women in computing and in analyses of the perceived pedigree of professions in relation to gender distribution within them.

In the majority of the European Commission policies and the data feminist corpus we examined, the notion of privacy and what constitutes personal data is implied, but not explicitly discussed. In her study of privacy in the context of the digital economy, Weinberg (2017, p.16) writes: "[w]ithout critically engaging the underlying assumptions of the categories of public and private, the forms of political resistance against data exploitation remain tethered to presuppositions about the liberal democratic subject". Weinberg (2017, p. 11) also argues that corporations and governments have found ways to aggregate data by using the "fiction of the sovereign subject to resist surveillance" in ways that are technically legal, and by fragmenting the information about individuals and combining them into mass collections of data. This imaginary warns of a future where the boundary between the private and the public has been renegotiated, blurred, and provided with false legitimation.

5.3 Power and domination

Critical data perspectives discuss data as a form of power. The data feminist materials in our corpus actively contribute to that discussion. Hoffman (2020) investigates instrumental, structural, and symbolic power and how big data can underwrite and manipulate the informational bases of other forms of power. Access to data is one form of power, alongside the power to decide what is or is not included in datasets, and the extent to which certain topics are represented. Bogers et al. (2020) and

Cooky et al. (2020) are among those authors that identify the absence of women in data streams as an issue of power. Leurs (2017) equates power differences grounded in gender and race with the imperialistic and sexist design of technological systems. Thompson (2020) in particular reflects on the kinds of power given to "factual" numerical data that is intended to represent all people, despite its underrepresentation of women, and how this affects governmental, educational, and legal systems. Foucault (1980) famously discussed the inextricable connection between knowledge and structures of power. Many feminists have been inspired by Foucault and go further than associating power with knowledge. Rather, data feminists conceptualize data, the bedrock of knowledge, as associated with power structures.

Situating data used across various systems as representations of real-world conditions of power means that data bias has material consequences within and outside the digital. Cooky et al. (2020) pinpoint access to data which privileges powerful corporate bodies as an example of inequality in power dynamics. Moreover, Suarez and Gonzalo (2019) note that companies and corporations have control over data flows and benefit from them, while citizens whose data are collected know little of what is collected and to which end. These imaginaries warn of a future (and a present) where big data is used to shift power from citizens to corporations. Classification systems utilizing big data are developed so quickly and with such complex consequences that governments simply cannot design appropriate legislation fast enough. As such, the imaginaries of Big Tech drive the transformation of society.

Domination of and through data is a recurring motif in the data feminist corpus (e.g., McQuillan, 2016; Luka & Millette, 2018). Suarez and Gonzalo (2019) call it *data domination*; conceptualizing data as a tool for those already in power to increase or solidify their dominance over vulnerable groups. It is also implied that big data serves to reinforce existing structures of dominance and plays a role in building new structures of oppression. In our corpus, data feminists are concerned with power and disruption of solidified power structures, especially where they (re)inforce discriminative practices. Indeed, big data is repeatedly related to exploitation, violence and power that are exerted over groups of people (e.g., Weinberg, 2017; Gieseking, 2018; Leurs, 2017). Some data feminist authors also claim that big data is capable of inflicting and facilitating harm and violence (e.g., Hoffmann, 2020; Cooky et al., 2018; Luka & Millette, 2018). According to Hoffman (2020, p.4), these harms reproduce "racist, sexist, and other norms and stereotypes that position some people as subordinate, inferior, or irredeemably 'other'". Some of the explicit forms in which harm is inflicted through big data include surveillance, harassment, commodification, privacy issues and abuse, most notably of minorities (e.g., in Cooky et al., 2020; Corple & Linabary, 2020;

Hoffmann, 2020). For Hoffman (2020), *data violence* occurs when people are labeled and classified, and can be material, symbolic, and representational.

Imbedded in the topics of power, violence, and domination through technology are discussions about capitalism and colonialism in relation to datafication. Whereas data feminist texts in our corpus direct attention to complex social issues that would require significant time for key actors to negotiate and address, by contrast, European Commission policy texts denote a sense of urgency to capitalize on big data (Rieder, 2018). These policy texts argue that the EU needs to collectively act as early adopters of new innovations developed through big data practices. Otherwise, the next wave of dominating digital corporations will be US-based, just like Apple, Google, Amazon, Microsoft, and Meta. Framing big data as a resource reiterates the capitalist agenda and a narrative of data as a raw material that needs to be exploited. It should be noted that the European Union has made significant attempts at regulating security, privacy, and surveillance online. Such inroads are made through legislation, primarily the General Data Protection Regulation (GDPR) from 2018, the Digital Markets Act (DMA) and the Digital Service Act (DSA) from 2022.

Our data feminist corpus also draws parallels between the corporate capture and selling of user data and the capture of territory to extract value and exert control (e.g., in Corple & Linabary, 2020; McQuillan, 2016). Gieseking (2018) notes that big data cannot be disconnected from historical examples of domination and exploitation, without replicating them in the digital context. For the same author, the perceived objectivity and authority of big data is derived from "masculinist, racist, colonialist, ableist, and heteronormative structural oppressions" (2018, p. 150). Denying the context in which data are collected and organized and the oppressions that they reflect allows for the perpetuation of the same destructive practices.

5.4 Exploitation and vulnerability

Both our and Rieder's analyses suggest that within the European Commission imaginaries, big data is described as fostering a large economic potential that needs to be "tapped into" (EC, 2020, p. 1) and "exploited" (Rieder, 2018, p. 5; EC, 2022b, p. 1; p. 47). Rieder states that the broader European imaginary of a technological race with the United State has a large influence on the formation of big data imaginaries of European Commission. This broad imaginary further influenced the perspective of the Commission and the actors that figure in policies. There is a sense of urgency, a race to exploit data before someone else does it. For the Commission, balancing power on an international scale is of great importance, and seizing opportunities as well as protecting European citizens is a priority. A sense of missing out on the first

wave of digital innovation dominated by Big Tech companies based in Silicon Valley fuels the urge to jump on the figurative big data train (Rieder, 2018; Burgelman et al., 2010). Because of the urge to tap into the resource that is big data, European Commission policies situate companies in Silicon Valley and national governments as key players. This is in stark contrast to data feminist texts, which place minority groups and local communities at the center of discussion about big data. Rieder found that in the policies of the European Commission, the benefits are "believed to outweigh any potential harm", and detrimental effects are considered exceptions to that rule (2018, p. 6). In the sociotechnical imaginaries of the European Commission, high velocity of data collection is equated to increased technological advances, economic prosperity, as well as the identification and mitigation of societal issues. Data feminist authors in our corpus are particularly concerned with how big data mining renders people vulnerable (Favaretto et al., 2019; Leurs, 2017) and further oppresses the already marginalized (Gieseking, 2018). The bottom-up approach of data feminism highlights detaching data from bodies as a structural feature. Envisioning data as embodied and situated challenges the discourses about the need for exploitation that are identified as part of a "gold rush" mentality (Luka & Millette, 2018). Centering the bodies and locations from which knowledge arises (Corple & Linabary, 2020) helps to counter big data neo-positivism. Across the corpus, data are envisioned as introducing or reinforcing various types of harm to vulnerable groups. As such, there is a notion of resistance against (D'Ignazio & Klein 2020b; Gieseking, 2018) and refusal of (Linabary et al., 2020) big data oppression.

The difference in perspectives between the European Commission and data feminist corpora are visible in the actors that are considered, the language that is employed, and how power is perceived and seen to be enacted. Within data feminism, exploitation through big data is repeatedly connected to colonialism (e.g., Cooky et al., 2020; Linabary et al., 2020; Dionne, 2019; McQuillan, 2017). Likewise, exploitation often denotes economic exploitation through datafication (e.g., Weinberg, 2017) but in several instances refers to the exploitation of free labor on social media (e.g., Corple & Linabary, 2020; Cooky et al., 2018). The focus on workplace optimization through big data has been shown to have negative consequences on the workloads for health workers (Dionne, 2019), women (Michailidou, 2018), and people of color (Cooky et al., 2018; Corple & Linabary et al., 2020; Michailidou, 2018). Some authors explore how the use of big data for research, particularly when utilizing social media, can make researchers complicit in inflicting harm (Corple & Linabary, 2020; Luka & Milette, 2018).

The struggle for the power to capture and shape political and social imaginaries influence the directions of technology development and common understandings of what constitutes attainable futures. Subsequently, the tension

between dominant and alternative imaginaries is ultimately the struggle to sketch out boundaries of current understandings of the possible and future (technological) developments.

6 DISCUSSION: UTOPIAN AND DYSTOPIAN IMAGINARIES OF BIG DATA

In our data feminist corpus, big data is understood in a variety of messy and fuzzy ways. It is described as susceptible to change and imagined as a process. Big data is not depicted as a fixed technical artifact; rather it is understood as determined by social contexts and decisions made during stages of collection and processing. The data feminist corpus highlights big data as created by someone, for someone and for a specific purpose, indicating an awareness of big data as a sociotechnical phenomenon. In these texts, the conceptualization of big data entails multiplicity, and as such, allows for different perspectives and interpretations. This multiplicity introduces nuance into sociotechnical imaginaries and decentering of the Big Tech narratives. Conversely, the European Commission corpus engages with big data as a thing that simply is and tends to overlook the implications big data for the society beyond its alleged potential to improve the economy. Describing data as a raw material overlooks the choices during data collection, the decision-making processes during integration into various systems, and the social consequences after integration. In other words, the social aspects of big data.

The data feminist corpus we analyzed is often aligned with what boyd and Crawford (2012) have called the dystopian rhetoric, problematizing power and highlighting the potential for bias and perpetuating discrimination. Dystopian rhetoric is therefore often collapsed with critical perspectives stemming from the feminist tradition. While data feminist texts do offer visions of optimistic futurities with big data, the focus is on critical inspection and questioning of big data-related systems and practices. The European Commission corpus is more consistent with the utopian rhetoric, visible in the use of metaphors like oil and raw material. Characterizing sociotechnical imaginaries of big data as dystopian and utopian sociotechnical imaginaries based on the type of rhetoric they predominantly employ helps contrast and compare the differences in corpora. However, it also collapses critical engagement with big data behind the dystopian rhetoric. In fact, critical perspectives are often lacking in the European Commission corpus, while sociotechnical imaginaries in the data feminist corpus are richer and more nuanced. Four themes separate these particular sets of sociotechnical imaginaries, addressed in the following text.

6.1 The concept of data

Discussions of data in the data feminist corpus are very rich. Numerous sub-themes can be noted regarding how data is collected, processed, and owned. In this aspect, the themes align with those most prominently described in critical data studies. Critical data studies cover topics of how datafied systems serve and privilege certain groups (O'Neil, 2017; Zuboff, 2019) while overlooking or discriminating against others (e.g., Benjamin, 2020; Eubanks, 2019, Noble, 2018). Data feminist texts add to the critical discourse by conceptualizing data as a process, embedded in politics, enabling discussions of datasets as created within a context and never fully representative of reality. Moreover, various strategies for teaching computers how to collect and categorize data are scrutinized within a firmly established feminist tradition.

The policy documents of the European Commission portray a far less nuanced notion of data. As argued by Rieder (2018), the concept is described as a resource that needs to be mined and thereafter can produce value as *the new oil*. Our own additional reading reaffirms this portrayal in more recent policies. Through this rhetoric, the European Commission upholds and perpetuates decidedly positive imaginaries of big data (Rieder, 2018). The language used in the policies is aimed at creating excitement by using phrases like *game-changer* and *magic material*. This mythology of big data (boyd & Crawford, 2012) creates a sense of urgency to exploit and capitalize on big data. Sociotechnical imaginaries of the European Commission rest upon the notion of a utopian future that will unfold with the mining and exploitation of big data.

Our study highlights the differences between the conceptualization of the relationship between personal data and big data in the corpora. An understanding of knowledge as situated gives feminist conceptualizations of big data a multiplicity in a way that is not present in the policy documents of the European Commission. However, it should be noted that in both data feminist and in European Commission documents, big data is often used as a shorthand to denote personal data. It is important to note that not all big data refers to personal information but avoiding explicit discussions of personal data altogether obscures the instances when it does have certain implications. While the problematic distinction between public and private spheres has been a longstanding discussion in feminist and data feminist discourse, these complexities are collapsed and simplified in the sociotechnical imaginaries of the European Commission. In the case of the European Commission and its characterization of big data as a resource, understanding personal information collected through datafication as a commodity would require consideration of compensation for citizens. In the imaginaries identified in the European Commission's texts, citizens are technology-oriented and flexible,

separate from and wholly unaffected by the presence, ordering, and classification of data. Moreover, in the Commission's view, big data is a positive and stable fixture of European society. Thus, whatever data are available today, they will remain so tomorrow, making them ideal for exploitation and economic gains.

6.2 Micro-, meso- and macro perspectives

The first theme concerns how the perspective levels differ in the data feminism and European Commission corpora. We have demonstrated that the top-down perspective of the Commission differs in implications from the bottom-up perspective of data feminists. Building on this, we introduce different ways that macro-, meso-, and micro-perspectives are present within these texts.

Firstly, our analysis discloses that the European Commission works with the top-down macro perspective, while data feminism engages simultaneously with macro-, meso-, and micro-perspectives. This is particularly visible in the way that data feminists position access to and utilization of data as a power negotiation, and how they build upon the tradition of discussing patriarchal macrostructures. The macro perspective is present in the strong tradition of talking about patriarchal macrostructures.

Secondly, in keeping with a feminist tradition, there is a strong trend of investigating local experiences, which aligns with the micro perspective. Data feminist interest in how classification biases privilege the powerful, while underserving marginalized groups such as women, people of color, and LGBTQ+ communities. Even though texts in the data feminist corpus define individuals and groups as resilient and holding agency, they perceive big data as capable of inflicting harm and rendering some people vulnerable to exploitation and oppression. However, optimistic visions of big data futures occur in data feminist texts as well. While they argue that big data is inherently tied up with masculine rhetoric and needs to be reframed and redefined, data feminists also see big data as a persistent element in the imaginaries of the future.

Finally, meso perspectives are visible through an emphasis on how institutions engage with and provide support for vulnerable people. In feminist imaginaries of data futures, big data often figure as a facilitator and a vehicle for capitalist narratives and aspirations. The feminist focus on localities and identifying vulnerable groups within established structures gives rise to imaginaries of domination, violence, and exploitation through data. Dystopian data feminist imaginaries build on different categories of data allowing for rich, critical discussions of future outcomes. By comparison, the top-down perspectives of the European Commission are tried and found wanting.

6.3 Addressing majorities and minorities

Dystopian imaginaries build upon the ways in which minorities and vulnerable groups in society may fare as big data technologies are increasingly incorporated into everyday experiences and interactions. Because, as we argue, the European Commission builds policy with dominant communities in mind, citizens are positioned as robust and flexible. However, this focus on an imaginary majority arguably creates vulnerable groups in society whose little power or voice within institutions are likely to suffer the consequences of becoming underserved. The commodification of data takes on different shapes for dominant groups compared to minority groups. However, much of data feminism builds upon intersectionality. This allows for critical engagement with imaginaries of exploitation that raise questions of what big data does *to* people, as well as who is prioritized as a citizen and how that prioritization perpetuates the privilege and discrimination described by critical race and intersectional feminist theory. The topic of hypervisibility and subsequent over-policing of marginalized groups that is reiterated and exponentialized in datafied systems is additionally complicated in the context of feminist traditions that seek to enhance the visibility and representation of marginalized identities. Such engagement with dystopian imaginaries also provides rich perspectives that are missing in utopian imaginaries.

6.4 Economy and human values

Following an intersectional feminist tradition, data feminisms center people as the focus of big data narratives. This is demonstrated by the language used in our data feminist corpus, which highlights that women, nonbinary people, people of color, and LGBTQ+ people are particularly exposed to discrimination, exploitation, and violence through data and classification. From this perspective, inequalities, bias, and discrimination come to the forefront.

Conversely, the European Commission is primarily concerned with continuously molding the European Union into an IT superpower that can rival the many successes of the United States since the 1990s. Betting on the development of big data within the EU is therefore deemed desirable and even necessary. This is not contextualized as a political choice fraught with underlying discourses of power and domination in the policy documents, it is instead framed as a logical imperative to stimulate European economic growth.

Macroeconomic aspects are not the focus of the data feminist corpus to the same extent that they are for the European Commission. Instead, there is an emphasis on the private sphere of experience which privileges the importance of basic human values. Several texts in the corpus equate mining data as a resource for profit with colonial tendencies. By contrast, the language used in the European

Commission documents implies much less critical consideration of how, exactly, infiltrating data markets will result in universal benefits and prosperity.

7 CONCLUSION: SOCIOTECHNICAL IMAGINARIES OF BIG DATA

Data feminism entails a bottom-up perspective with a focus on local communities and experiences. As a result, it positions vulnerable groups and minorities as key actors in discussions of big data. In their position as policymakers, members of the European Commission employ a top-down perspective of power that prioritizes the protection of European Union citizens. For the Commission, Big Tech companies in Silicon Valley, national groups, and governments are central agents of interest, while data feminist texts often do not afford them the same degree of importance.

In data feminism, big data is a multiplicity of things, always fluid and under development, and understanding big data requires an understanding of the diverse underlying perspectives through which data are generated. For the European Commission, big data is something that can be used and reused, which implies a fixed entity and focus on openness and exploitation over variability and understanding data contexts.

Imaginaries of both data feminism and the European Commission feature futures inclusive of big data and the systems built upon it. However, while imaginaries of the European Commission reflect economic narratives and a top-down perspective, data feminist bottom-up perspectives highlight new forms of power and structural imbalance that signify potential for harm of distinct groups of people. For the Commission and its economic imperative, the focus is on sharing, generating, and exploiting data. That perspective reflects the position of power to govern and aims to increase the financial gain and leadership role of the European Union with the help of big data. Situating big data in this way supports the idea that citizens of the EU will only benefit from its increased presence in society. However, in our data feminist corpus, questioning who benefits from datafication and whose livelihoods are jeopardized figures at the forefront.

Imaginaries within data feminist texts are considerably richer than those identified within the European Commission policy documents. Imaginaries present in data feminism build upon a broad and inclusive view of different intersectional social perspectives (macro, meso, micro) that allow for recognition of a multitude of vulnerable groups, a highly sophisticated understanding of data, as well as a focus on human values over economic growth. Without conscientious and intentional integration of (data) feminist and other perspectives, dominant Big Tech imaginaries will prevail in the narratives of European policymakers. In this study, we focused on the sociotechnical imaginaries present in data feminism research. Future studies

could identify existing big data practices and projects that inhabit and act within data feminist perspectives, and how they work with, use, and resist datafication when necessary.

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DIGITAL CAPITALISM AND FRIENDSHIP: A CRITICAL ANALYSIS

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ABSTRACT

This paper starts from an understanding of friendship as a series of gradients – a definition provided firstly by Aristotle – to observe the similarities and differences between interested friendship, disinterested friendship, and market relations. Introducing the notion of surveillance capitalism, the paper discusses the advent of social media and the implicit definition of friendship that underlies it. Social media favours the quantification and bureaucratisation of friendship, transforming it into a measure of personal achievement, i.e. widely promoting instrumental friendship. This transformation raises a number of issues related to alienation, self-exploitation, and the ability to relate to otherness.

Keywords: alienation; social media; commodification.

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1 FRIENDSHIP: A COMPLEX DEFINITION

How to define friendship? Often defining the things that seem most obvious turns out to be an extremely difficult task. It is virtually impossible to find a truly satisfactory and complete definition of friendship – indeed, depending on the type of variables and aspects considered, social sciences have provided several different definitions of it (Adams et al., 2000; Matthews, 1983). Friendship, as a significant and transversal aspect of all stages of life (Bukowski et al., 2009, p. 218), is closely linked to happiness (Argyle, 2002; Demir, 2015; Demir et al., 2007), affection (Floyd et al., 2005), identity construction (Wright, 1984), social development (Berndt, 2002) and inclusion (Baumeister & Leary, 1995). Friendship then implies other dimensions, such as the question of right living or the type of society we should aspire to (Fraisse, 1974, pp. 11–12). Instead of clarifying things, however, this information threatens to overwhelm our ideas.

This paper aims to analyse some of the shifts in the conception and practice of friendships related to social media. For this, a definition of friendship is required – but since it is so complex to provide a single definition that includes every aspect, a different strategy shall be followed, focusing instead on gradients of friendship. Aristotle is one of the first philosophers to establish a range of categories of friendship, a spectrum that makes it easier to cover the various aspects that would escape a more univocal definition. Hence, this paper builds on his proposal and then briefly compares it with two moments that are particularly interesting: the conception of friendship in the genesis of capitalism – thanks to a rapid excursus into the Scottish Enlightenment – and the conception of friendship during the apogee of neoliberalism – thanks to a discussion of the use of social media. From this programmatic summary it is already possible to guess some of the key elements of this paper – a perspective close to critical theory and not historiographically oriented – as well as its limitations – notably the almost exclusive focus on perspectives from the Global North.

Firstly, it should be emphasised that friendship is a central element of human life according to Aristotle, to the extent that "without friends no one would choose to live, though he had all other goods; even rich men and those in possession of office and of dominating power are thought to need friends most of all" (Aristotle, 2009, 1155a). Indeed, the importance of friendship is such in the Aristotelian system that it is a prerequisite for achieving a fully ethical life and approaching the εὐδαιμονία (Aristotle, 2009, 1169b; Sherman, 1987). Significantly, the importance of friendship for a good life goes beyond Aristotle's definition of εὐδαιμονία and is easily justifiable in a liberal, pluralist system (Badhwar, 1993). This is significant, because it means that friendship is a constitutive part of a good life regardless of the concrete content definition of a good life. This relevance, linked to the multiplicity of aspects that can be referred to friendship, means that every historical epoch and social structure has to address the issue and propose its own way of conceiving and integrating friendship into social structures.

Friendship is not only important for individuals, but also for communities (Aristotle, 2009, 1155a; 1161a; Mitchell, 1998). With its particular way of analysing and conceptually subdividing reality (Fortenbaugh, 1975), Aristotle argues for the existence of three distinct types of friendship. They differ in the object of *philia*: in some cases it is the useful, in others the pleasant, and finally the good (Aristotle, 2009, 1155b). Both friendship for utility and friendship for pleasure are primarily oriented towards achieving what seems good for oneself – although, as the philosopher reminds us, human beings easily confuse what appears to be a good for oneself with general good (Aristotle, 2009, 1155b). Indeed, both these modes of friendship are fundamentally centred on one's own self-interest, and only accidentally in the friend's characteristics. In these cases, it is not the friend that one desires, but only some accidental characteristics that distinguish him or her at that moment: his or her usefulness or pleasantness. "Therefore those who love because of utility love because of what is good for themselves, and those who love because of pleasure do so because of what is pleasant to themselves, and not because of who the loved person is but in so far as he is useful or pleasant" (Aristotle, 2009, 1156a). This, however, seems to conflict with the very definition of friendship.

> Here, then, is the paradox of friendship as Aristotle presents it: In seeking and choosing friends, we seek the good for ourselves, and apparently we only love another if and so long as he seems good for us; yet we are persuaded that we are not real friends unless we wish one another good apart from what is good for ourselves. (Pangle, 2003, p. 39)

In this sense, then, Aristotle's argument is that friendships for utility or pleasure are only partial friendships (Aristotle, 2009, 1157b; Pangle, 2003, p. 39); they mimic true friendship but fail to reproduce its essential nature, which is relational and takes into account the existence of the other as other (Aristotle, 2009, 1157a). We can call these conditional friendships: they depend on a number of factors that are not essential to the friend's personality, external or transient conditions. Hence, these friendships tend to be very fragile and context-dependent, and do not resist the passage of time. This is where we can introduce a conceptual division between instrumental friendship and disinterested friendship.

"Some friendships are valued chiefly for their usefulness. Such friendships are *instrumental* or *means* friendships. Other friendships are valued chiefly for their own sakes. Such friendships are *noninstrumental* or *end* friendship" (Kapur, 1991, p. 483). In the former, one hopes for the friend's good for one's own sake, while in the latter, the friend's good is hoped for as an end in itself. While in instrumental friendship the good sought is external – and therefore the friend is replaceable, since he or she is merely a means to an end – in disinterested friendship the end in itself is the friendship. The friend, in the latter case, is irreplaceable, since it is his or her person as such that is the end of the friendship. Since it is not replaceable, every disinterested friendship is unique, and as such cannot really be measured or compared – to establish a unit of measurement is in fact to render different realities

commensurable, to make them converge on the same plane (Schmitt, 2018), that is, to delete their uniqueness. Disinterested friendship, being deeply personal and singular, escapes the logic of measurement. This will be one of the focal points of this paper: how does making a friendship public or formalising it contribute to creating a metric of friendship and thus depersonalising it?

However, before trying to answer this question and address the contemporary context – especially with regard to neoliberalism and digital capitalism – it is important to make one last observation to show the complexity of talking about friendship. Indeed, the definitions on which we have based the theoretical framework are not without difficulties.

> How precisely does friendship based on the good differ from the two defective forms that rest on utility and pleasure? If we take with utmost seriousness Aristotle's assertion that each person loves what is or seems best for himself, we will most likely understand friendships of pleasure to revolve around the pleasures of the body, friendships of utility to turn upon material advantage, and friendships of the good to provide the highest benefits to both partners, supporting them above all in moral virtue and in learning. This would mean, however, that friendships based on the good are essentially just friendships of utility with a higher good as the end. If, on the other hand, we take with utmost seriousness Aristotle's statement that the perfect friend loves and seeks to benefit his friend for the friend's own sake, we should perhaps view friendships of pleasure and utility as including all those formed for the sake of all pleasures and benefits, high and low, and virtuous friendships as fundamentally different. (Pangle, 2003, p. 52)

The difficulty of explaining how friendships for good differ from those for interest or pleasure is one of the constitutive problems in defining what friendship or, more precisely, true friendship is. This theoretical introduction to the problem of friendship has shown how it is possible – and indeed useful – to subdivide friendship into different categories. If this division allows a better understanding of the existence of different forms of relationships that are described as friendship, it has also shown the difficulty of giving a clear and univocal definition of this concept. Indeed, it is not clear how to define pure friendship: this does not reduce the validity and interest of establishing a range of gradients of friendship from the instrumental to the more disinterested, but it does impose a certain caution in the way we discuss friendship. It is on this basis, with an unresolved theoretical problem but a set of categories useful for developing concrete analyses, that the argumentative development of this paper can begin.

2 CAPITALISM, FRIENDSHIP, AND BUSINESS

The conception of friendship, as a social phenomenon, is inextricably linked to the society in which it manifests itself – and so its definition is always changing (Chambers, 2017, pp. 27–29). Indeed, it could be said that the paramount importance of friendship is an aspect of human sociality, i.e. that human beings not

only inhabit the polis (Aristotle, 2009, 1097b, 2013, 1253a), but inhabit it by seeking friendships. To talk about contemporary friendship, it is therefore essential to discuss, albeit briefly and within the limits of this paper, capitalism.

Capitalism, as a dynamic structure in which economic production is at the centre of social processes, is characterised by a certain precariousness. Economic production is in fact constantly evolving, something that transforms and revolutionises social ties (Schmitt, 1996, p. 27). This dynamism and fluidity is also characteristic of the central element for obtaining and managing power in this society: capital (Han, 2020). This means that, compared to Ancien Régime ruling group, the bourgeoisie is much more unstable and precarious in its own definition. Whereas nobility is a hereditary trait, generally acquired at birth and lasting until death, belonging to the bourgeoisie depends exclusively on the possession of capital. In order not to diminish, capital must be continuously invested and exposed to risk (Marx, 1981). As a result, the bourgeoisie is subject to a continuous existential precariousness (Cometta, 2017). Whereas the power struggle among the nobility was limited by the common security of belonging to a ruling group, the bourgeoisie does not enjoy this existential certainty and is constantly at risk of losing its capital and, with it, its status. For while not possessing executive power or large property did not prevent nobles from considering themselves superior to commoners, the loss of capital also implies a change of class and thus exclusion from the bourgeoisie. This illustrates the dynamic nature of capitalism. Such society is sustained by the logic of continuous and total competition – a dynamic that is in fact capital-centric and not anthropocentric (Napoletano & Brett, 2020, p. 39; Vasan, 2018), which is why Marx does not criticise the bourgeoisie with a moral judgement but analyses its role in a systematic way (Marx, 1981). This, of course, does not exclude instrumental alliances, but hinders the formation of ties of disinterested friendship (Grayson, 2007).

This leads us to reflect again on the division between interested and disinterested friendship and, more specifically, the separation between business/power and personal relationships in capitalist society. The genesis of capitalism is marked, in part, by the coexistence of extreme tendencies of opposite sign: some areas in which individual self-interest is the only value, while in others disinterested love is taken as an ideal. This is the case, for example, of the gender division between productive tasks – where one must compete socially to survive – and reproductive tasks – which are considered natural and the result of selfless maternal or romantic love (Fraser, 1995, 2020). It is possible that, in a system in which economic competition becomes the determining social criterion of productive tasks, in order to conceive the centrality of friendship it was necessary to idealise it and relegate it to a separate sphere. This is what was proposed, at least, by the Scottish Enlightenment. The sharp division between business and disinterested friendship was actually considered beneficial by this school of thought. Concerned with overcoming the contradictions of the Ancien Régime, in which all friendship seemed to be imbued in power manoeuvres and calculations – this is, by

the pervasiveness of the friendship of utility among the nobles and merchants –, they thought that clearly establishing the absence of friendship in the realm of work would allow the creation of a protected space, outside of business, for disinterested friendship. Scottish Enlightenment thinkers "perceive commercial society, far from 'contaminating' personal relations with instrumentalism, as, 'purifying' them by clearly distinguishing friendship from interest and founding friendship on sympathy and affection" (Silver, 1990, p. 1487). This separation of public and private has allowed the constitution of a self-reflective individual (Burkart, 2010). In its historical development, however, this relationship is problematic. "This determined the evolution of polar human traits, of public utilitarian and private *expressive* individualism" (Lambert, 2013, p. 26).

Developing a history of the concept of friendship far exceeds the scope of this paper, but these observations on the Scottish Enlightenment shows on the one hand the persistence of the tension between interested and disinterested friendship, and on the other the attempt to resolve this contradiction by denying the notion of interested friendship and clearly distinguish the public space from the private sphere, where ideal and disinterested friendship can fully manifest itself. Yet this attempt is doomed to failure. Firstly, relegating friendship to the personal sphere in a society increasingly centred on economic dynamics seems to imply that friendship is no longer a pivotal element of human life, or that society is increasingly alienating to human beings because it does not allow for the development of disinterested friendships – this second hypothesis is the one favoured by Marxists in analysing an ever less anthropocentric and increasingly capital-centric society. Secondly, this division favours the romantic idealisation of friendship as a completely pure sphere, devoid of the power struggles typical of the economic world – a sphere that can only develop in the privacy of intimacy (Rosen, 2007, p. 26). This is also problematic because as we have seen, it is not possible to unambiguously and satisfactorily define disinterested friendship. Even more so, insisting too much on the absence of conflict in disinterested friendship relationships can lead to an erasure of otherness in friendship tout court: in fact, it is easy to have no conflict where the other does not exist, and therefore cannot, with its autonomy, stand in the way of the subject's desires – but the absence of the other is something fundamentally far removed from friendship, hence an important contradiction.

The sharp distinction of friendship from market relations has led to the conceptualisation of a tension-ridden duality, expressed for instance in the Habermasian thesis of the colonisation of lifeworld by market forces (Habermas, 1984; Jütten, 2011). From this perspective, instrumental friendship would be a symptom of the colonisation of the world of human relations by the market system. However, by amplifying the conceptual distinction between the two poles, this approach risks oversimplifying and idealising the lifeworld in opposition to the market, turning it into a non-historical ideal free of power relations (Fraser, 2014, p. 547; Fraser & Jaeggi, 2018). Again, this overly-marked division between a sphere of conflict between distinct individualities and a sphere of pure harmony tends to

contradictory results and fails to sufficiently explain various nuances of interpersonal relations in contemporary society. Thus, we need to understand that the division between friendship and the market, while interesting, cannot be taken as stable or clearly and easily defined. Indeed, it should be mentioned that trust, a constitutive element of friendship, is at the same time one of the most important aspects for facilitating economic exchanges (Browne et al., 1997; Foley et al., 2014). An excessively neat division between market and friendship – especially interested friendship – is therefore difficult to justify. Again, the conceptual division between disinterested friendship and market relations is interesting and fruitful (Table 1), but it must be thought of as a gradient and not as a series of sharp, unambiguous distinctions.

Table 1. Similarities and differences between the various degrees of friendship identified so far

Disinterested friendship	Interested friendship		Interested relationship
Friendship of the good	Friendships of pleasure	Friendships of utility	Business/power relationship
Interest in the essential characteristics of the other person	Interest in the accidental characteristics of the other person		
Uniqueness of the relationship: every friendship is incomparable	Various relationships can be compared according to the type of interest and gain they allow. Some sort of friendship metrics can be established		

3 FACEBOOK, SOCIAL MEDIA, AND THE DIGITAL TRANSFORMATION OF FRIENDSHIP

To analyse the effects of social media on friendship, it is first necessary to introduce, albeit briefly, the concept of digital capitalism. Indeed, social media develop in a context in which the recording of data becomes a central aspect of contemporary society (Ferraris & Torrengo, 2014; Floridi, 2014; Reinsel et al., 2018): this authoritarian drive predates digital technology, which can be seen more as a symptom of it (e.g. Horkheimer & Adorno, 2002; Chambers, 2017). This context makes mass surveillance increasingly crucial (Rule, 2002; Zuboff, 2018): digital capitalism feeds on the information it grabs for free from users, and exploits it for advertising, behaviour prediction and conditioning purposes – that is, to transform it into power (Barba del Horno, 2020). In fact, digital technologies allow the capitalist market to enter a new phase of surplus accumulation and capital

concentration (Frayssé, 2015; Fuchs, 2013, 2014; Rodríguez Prieto, 2020) precisely by extracting value from the freedom of individuals and thus transforming it into an instrument of coercion (Han, 2017b). This quest for monopoly and extreme extraction can indeed be read as the culmination of the reactionary trend that began with the advent of the neo-liberal discourse in the 1980s and a new alliance between public powers and private companies in the Global North (Fuchs, 2019; Robinson, 2018). In this context of capitalist and socio-political reconfiguration (Fraser, 2015), the transformative potential of new technologies is so often celebrated (Morozov, 2013) that they are expected to transform every aspect of our lives – including friendship. Indeed, social media aims to "transform" the way we handle interpersonal relationships on a daily basis (boyd & Ellison, 2007) – or, to put it in other terms, to exploit friendship for their economic purposes (Beer, 2008).

This being said, we can analyse some of the trends related to social media, while remaining cautious about oversimplifications, since these are diverse and very dynamic products (Edison Research, 2021; Lambert, 2013). The median amount of friendships in Facebook is between 100 (Ugander et al., 2011, p. 3) and 300 (Ellison et al., 2011, p. 880), but only 25 per cent of these are described as "actual friends" (Ellison et al., 2011, p. 880), underlining the difference between what is considered online and offline friendship. This adds a layer to our representation of friendship gradients: indeed, online and offline friendship seem to possess distinct characteristics. There are at least two noteworthy aspects here: firstly, what is referred to as friendship by some social media is a bond that can refer to different types of relationships (Miller, 2017) – indeed, different social media focus on distinct types of interaction: e.g. LinkedIn or Academia focusing on professional relationships, while Tinder and Grindr on romantic or erotic encounters – and, secondly, the very structure of the digital medium significantly change interpersonal interactions. Online friendship makes it possible to maintain a number of relationships that would have been abandoned in offline life – e.g. due to an excessively large geographical distance between the people involved, thanks to what has been termed ambient co-presence (Madianou, 2016) – but also create new, unexpected connections that would be difficult to reconcile with offline life (e.g. McDonald, 2019). Reconnecting with old friends and maintaining long distance friendships – and other types of relations – are the relevant ideas here (Joinson, 2008). This brings us to the second fundamental aspect related to social media: the central role of interaction. The idea being that a friendship can only be sustained through as much constant interaction between friends as possible, maintaining friendships that would have disappeared in the offline world requires an increased amount of interaction, e.g. "through activities such as funny comments, 'likes' and tags" (Niland et al., 2015, p. 134). As can be guessed, there are two elements at play here: on the users' side, a certain quantification of friendship management and, on the structural level, the underlying incorporation of this management into a market logic following the dynamics of digital capitalism – this is, the integration into this market of a genuine online affective labour, in a further act of appropriation of non-

socially recognised labour (see for instance Johanssen, 2018; Kiarina Kordela, 2023; Oksala, 2016; Zhongxuan, 2016).

Social media does not only involve a quantitative increase in interactions. Many works through the creation of a profile, that is, a series of self-descriptive activities – such as posting one's photo, inventing one's username, writing a biography. This kind of social media can be understood as a tool for self-construction and self-presentation – often in a public rather than private setting (Blatterer, 2010) –, allowing the individual to shape himself as a profile – indeed, the transition between the identity construction of the modern subject and the contemporary one of the profile is a theme raised by some psychoanalysts (Benasayag & Del Rey, 2015). This is significant for several reasons. Firstly, this relates to the apparent immateriality of the online world as opposed to the offline world. The immaterial is a ground of aspirations, of limitlessness (e.g. Hackl et al., 2022; a clear example of the solutionist perspective criticised by Morozov, 2013; but also the possibility of experiencing relationships that would be impossible in an offline setting, as presented in McDonald, 2019) – to put it in Aristotelian terms, of potentiality rather than act. Constructing an online identity therefore allows greater freedom of choice, the possibility of combining both characteristics one possesses and aspirational elements, e.g. liking a fashion house while not possessing any of its clothes (Wallace et al., 2012) – but also the possibility of transforming oneself completely or hiding one's identity (D. Fisher, 2019; Zakhary et al., 2017). This suggests the important mix of material, symbolic and imaginative elements in the process of virtual identity self-construction (Bullingham & Vasconcelos, 2013). This connects with a second key element: visibility.

Visibility is a fundamental part of the online experience, especially social media – indeed, even those who want to hide their offline identity still try, with their online profile, to be seen. Being seen through different eyes, as a distinct persona, is one of the great promises of political, symbolic and emotional liberation that the online world offers (Miller et al., 2016; Moore, 2018). It is no coincidence that the sense most stimulated by these spaces is sight.

> The boundary, response, privacy and identity work enacted by young adults in interaction with Facebook can be viewed as negotiations and resistances to a system that reinforces their friendship practices but also positions them as individual highly visible self-performing consumers (Niland et al., 2015, p. 135).

Facebook is a space for "social searching", i.e. analysing the profiles of people known offline (Lampe et al., 2006) and "participatory surveillance" (Albrechtslund, 2008): in the social media universe invisibility is a punishment, while visibility a reward (Bucher, 2012). More precisely, it seems that a user surveys 2.5 times more people than the amount of contacts he or she actively interacts with (Marlow, 2009). This is especially true in couples: social networks are used as a means of maintaining the relationship but also as a tool for surveillance of the partner (Utz & Beukeboom, 2011). "Importantly, this data does not suggest that Facebook creates bad

relationships. Rather, Facebook intensifies dispositions which already exist" (Lambert, 2013, p. 15; see also Haythornthwaite, 2005). How do these two elements, namely immateriality and visibility, influence the development of friendships on social media? In order to understand this, it is necessary to better explain the mechanisms of online profile construction, friendship relationships do indeed have an important impact on one's online representation.

For the presentation of the self that is sought to be robust, the material posted by one's contacts must also be consistent with this narrative, generating coherence and thus credibility (Walther et al., 2008). This means that the behaviour of others can be disruptive to one's own identity project – even more: the behaviour of others on social platforms can also affect people who do not have an online profile: a person not registered on Instagram can still be tagged in hundreds of photos, and thus unknowingly have a social profile (Miller, 2017) – and must therefore be managed and "tamed", that is, that the constitutive otherness of one's friends reveals itself as a potential threat (Binder et al., 2012). A study on MySpace seems to confirm this issue. As young people build their online identity, they claim to know how to avoid unpleasant situations or inappropriate communication. According to the author, "ironically, it is the intrusive actions of friends, rather than strangers, that pose a problem" (Mallan, 2009, p. 63). Studies of groups of young adults using Facebook also confirm that there is a particular sensitivity to protecting the reputation of one's friends: "friendship protection was also used when friends filtered photos to protect each other's privacy within a wider audience" (Niland et al., 2015, p. 134). The constant pressure to perform well, to be visible and get lots of likes is such that some Instagram users, especially young women, decide to use different profiles, some more public in which they have to obey the logic of visibility and performance, others more private, *finsta*, in which they only connect with friends and acquaintances from offline life, in what can be called a safe space where they can behave in a more spontaneous and less studied manner (S. Ross, 2019).

This shows an important shift in the governance of friendship. As friendship also develops in the public space of the web – an open space in which one wants to build one's public identity – it needs to be managed more carefully. "It is apparent that friendships can no longer be left to 'go on' according to their own rhythms. Friends are ranked and shuffled, their comments and images tagged, untagged, copied, and removed. Friendships are bureaucratised, while the labour of intimacy is intensified" (Lambert, 2013, p. 14). This process follows implicit rules that differ according to the intensity of the friendship (Bryant & Marmo, 2012). The construction of a public profile, of an online persona, is a socially mediated act (S. Ross, 2019). Thus, with the identity construction of the profile and the advent of social media, friendship becomes an aspect that requires constant public relations work, in which the rules of behaviour are no longer understood solely with respect to the friend but also and especially with respect to the public of other users who observe the friendship.

4 FINAL REMARKS

Social media manifest a transformation of certain aspects of friendship in line with broader social values of neoliberalism. In particular, they favour the quantification of a number of parameters. One of the most important aspects is that of interactions. Being friends, in a cross-social media perspective, implies interacting, and interacting often. The tendency to favour a quantitative approach to interaction, for instance by emphasising the date of the last interaction or the frequency of interactions – as in the semi-private safe spaces of WhatsApp and Snapchat – or by focusing on certain interaction tools – such as comment, like or retweet in Facebook, Instagram, Twitter – enforces a perspective that is less capable of differentiating various types and modes of friendship. This is significant for several reasons. Firstly, this promotes a vision in which *more is better* – something that is true for the mining of user data, but is arguably less true with regard to interpersonal relations. The loss of nuances to define different types of friendship makes its quantification a seemingly inevitable trend. Indeed, "friendship on these sites focuses a great deal on collecting, managing and ranking the people you know" (Rosen, 2007, p. 27). The message that seems implicit in social media is that friendship is a measure of popularity or personal success. Interestingly, the term "network" in social network refers to a term from the professional world, mainly related to the aspirations of those who want to build a career through their contacts (Rosen, 2007, p. 19). In this sense, social media seem to take the narrative of individual flourishment and development typical of capitalism and apply it to the world of personal relationships. Secondly, in an environment that fosters a competition for visibility, each profile struggles to stand out. The narrative supporting one's own profile must therefore become performative for the wider public, which entails a number of problems related to self-objectification and self-commodification (Berberick, 2010; Fardouly et al., 2018; Sheldon et al., 2019). In this very intense struggle for social-virtual recognition (Han, 2017a), friends play an important role, as they can become facilitators or obstacles to personal success. Thus, instead of being primarily based on spontaneity, friendship in social media calls for particular precautions – what has been called the bureaucratisation of friendship through metrics such as likes and shares. This, in turn, seem to be founded on the precept of instrumental friendship – as a type of friendship that is easier to quantify and therefore more suitable for inclusion in a metric.

To conclude, the generalisation of the instrumental friendship model, which seem implicit in the conception of friendship on social media as a measure of visibility and personal success, indicate a step towards the transformation of friendship from an end in itself to a means, something redolent of the notion of alienation (Jaeggi, 2014, p. 39). This transformation of friendship, its bureaucratisation, risks leading to the blurring of the ultimate goal of pure friendship, and, from a broader perspective, that of the good life that accompanies it. These changes are extremely complex and ramified, and it is obviously impossible

to attribute them directly or solely to the social media phenomenon – which itself is extremely plural. However, by adopting an analysis that places these technological phenomena within a more general societal shift towards surveillance capitalism (Zuboff, 2018) and neoliberalism, it is possible to notice some general trends – namely that of depersonalisation and commodification (Fraser & Jaeggi, 2018).

This paper has raised some of the key issues in the transformation of the conception of friendship through digital capitalism. In order to better understand the matter, it would be appropriate for this transformation to be conceptualised and framed in the empirical studies that attempt to address the issue of friendship on social media. In particular, it will be important for these studies to emphasise the type and characteristics of friendship underlying social media because, as we have seen, this concept is complex and polysemic.

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SMARTPHONE AS RITUAL FAN: POACHING IN WEIXIN-MEDIATED (CYBER)SPACE WITH NUOSU-YI RITUALISTS OF LIANGSHAN, SOUTHWEST CHINA

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ABSTRACT

This article explores the engagement of the *bimo* – the Liangshan ethnic Nuosu-Yi literati-ritualists of Sichuan Province, China – with Weixin (WeChat), a ubiquitous Chinese all-in-one app. Utilizing a nethnographic approach – an ethnography of culturally conditioned simultaneous online and offline practices – I argue that by using the smartphones in ways unforeseen by their developers, the *bimo* are poaching the property of those who designed the app primarily for the Chinese-speaking majority. The usage of technology stipulated by the modernization push of the Chinese authoritarian state then transforms both the *bimo* and technology. The resultant techno-culture not only builds upon, reinvents, develops and reinforces the allegedly diminishing Nuosu-Yi folkways – especially inter-clan competition – but also feeds the state-approved Yi folklore. The dialogic reconciliation of the top-down computerization of society and the bottom-up socialization of technology reveals itself as intrinsically connected to the culturally conditioned use of technology in our everyday lives.

Keywords: Nuosu-Yi, Liangshan, Weixin, everyday life, nethnography

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1 INTRODUCTION

Throughout almost the whole of 2018, I conducted ethnographic fieldwork with literati-ritualists (Nuo. *bimo* ꀕ) of the locally dominant ethnic Nuosu-Yi in Liangshan Yi Autonomous Prefecture. This administrative unit lies in the southwestern part of Sichuan Province, which belongs to the southwestern region of the People's Republic of China (PRC). The *bimo* I worked with used to gather in the large wholesale marketplace named "Shimazi" (Ch. 石码子). In a very loose literal translation, the name means "a construction made by putting one stone over another", which points to the embankment of the local river. The name has also been connected to a now non-existent stone statue of a "Water-stopping Bodhisattva" (Ch. *zhishui guanyin* 止水观音) that was erected at an elevated location above the riverbed to appease the natural elements and thereby protect the locals from harms caused by uncontrolled flash floods. For at least one century – but probably more – Shimazi was the region's biggest trading hub. It was located near the centre of Liangshan's prefectural seat, Xichang, next to its Old Town (Ch. *laochengqu* 老城区). Since around 2016, this particular part of the town has undergone a swift process of gentrification, and as a result the marketplace frequenters moved to the construction site on the opposite riverbank.

The Nuosu-Yi speak a Tibeto-Burman language distinct from Mandarin Chinese. Originally, the *bimo* used to have a monopoly on literacy in one of the unique ancient syllabic logographic Yi scripts. During recent decades, the new modern script derived from the ancient one became the standardized writing system for the Nuosu-Yi and potentially also for other Yi communities beyond Liangshan. Providing healing rituals and astrological consultations or invited to administer post-mortuary rites, the *bimo* of Shimazi mingled with vendors selling various commodities such as fruit, handicrafts, pets, or counterfeit DVDs, or even offering vernacular dentistry services. Coming mostly from the countryside, the motivation of the *bimo* was to cater to the increasing number of Nuosu-Yi folk in a similar situation to them: negotiating various stages of their temporary or permanent migration between rural and urban areas.

I engaged in discussions with the *bimo* on many different topics and observed their interactions with their peers, hosts, scholars and prefectural policymakers. In this article, I explore the previously virtually unaddressed engagement of the *bimo* with smartphones, which have swiftly permeated the everyday lives of a large proportion of Chinese citizens in the last decade (de Seta, 2015). In most narratives, the *bimo* are connected to Nuosu-Yi traditions. Since the 1980s, many Nuosu-Yi and other scholars have seen (and still see) the Nuosu-Yi culture's survival under the PRC's state push for modernization as being under threat (Harrell et al., 2000). The hasty folklorization of the culture, through which the Nuosu-Yi scholars perhaps unintentionally contributed to the perception of the traditional practices as a "living fossil" (Ch. *huohuashi* 活化石; cf. Mao, 2013, p. 77), reflects their anxiety.

Considerably less attention is dedicated to the question of how the *bimo* themselves creatively develop and actualize the Nuosu-Yi traditions.

To inquire into how the *bimo* utilize smartphones, apps and the mobile internet, and what this means for the everyday life of the Nuosu-Yi, I utilized a method I call "nethnography". Inspired by netnography, which exclusively researches online space (Kozinets, 2010, p. 60), the added letter "h" reconnects this form of research with its offline predecessor, the anthropological method of ethnography. Nethnography simultaneously inquires into the analytically divided online and offline spaces. Moreover, contrary to the initial popular view of the internet as the strongest tool of globalization, the concept presupposes that usage of the internet is locally and culturally conditioned. My nethnographic research did not only entail dwelling with the *bimo* in the Shimazi Marketplace and observing their utilization of technology. In parallel, I kept connected with them over Weixin (Ch. 微信, Eng. WeChat). Over the last decade, this native Chinese app developed by the Tencent corporation has grown into a ubiquitous, multi-functional platform combining messenger, social network, digital wallet and various services provided through mini-apps developed within its framework. We discussed the reflections of the *bimo* on their practices and debated my own. This para-ethnographic engagement between an anthropologist and the *bimo* – animistic "experts with shared, discovered, and negotiated critical sensibilities" – that shaped the directions, questions and findings of our research (Marcus, 2000, p. 3) thus gained another layer with the inclusion of digital technologies.

In what follows, I first lay out the particularities of the Nuosu-Yi culture together with the context of research on the Chinese internet and Weixin. The next three sections provide nethnographic data. These describe my entrance to the field, two types of differently conceived Weixin discussion groups, and an inquiry into how the *bimo* create their content. The following discussion reflects on how this newly conceived Nuosu-Yi techno-culture feeds into traditional Nuosu-Yi cosmology, especially their distinct hierarchical social order based on mutually competing genealogies (Nuo. *cyvi* ꆹꌠ), and what role the state-surveilled internet plays in the whole process. More broadly, the article also considers what the case of the Nuosu-Yi reveals about the nature of the relationship between the top-down computerization of society and the bottom-up socialization of technology (Lefebvre, 2014, p. 810) in everyday life in the contemporary PRC and potentially also elsewhere.

2 THE NUOSU-YI AND THE WEIXIN-MEDIATED CHINESE INTERNET

The designation for Nuosu-Yi consists of two components. "Nuosu" (Nuo. ꆈꌠ), literally meaning "Black people", is the autonym, which indirectly points to one of the principal features of their *cyvi* – an essentialist blood superiority of endogamous aristocrats associated with the colour black (Nuo. *nuoho* ꆈꉆ) in opposition to the

white non-aristocrats (Nuo. *quho* ꐚꉻ) (Pan, 1997). "The Yi" is the Chinese state-conferred exonym for a broader ethnopolitical category originally called "nationality" (Ch. *minzu* 民族). However, in parallel with the call for de-politicization (Ch. *quzhengzhihua* 去政治化) and subsequent culturalization (Ch. *wenhuahua* 文化化) of the *minzu* concept (Ma, 2004), during the last two decades it has increasingly gained the meaning of "ethnic group". In the recognition of nationalities campaign (Ch. *minzu shibie* 民族识别) in the 1950s, the PRC created the Yi nationality (Ch. Yizu 彝族) and labelled it with a character homophonous to the pre-1949 imperial generic exonym for local "barbarians" (Ch. 夷). In contrast, the new exonym was supposed to de-stigmatize the group, since it carries favourable meanings of wished-for prosperity and abundance.

From the beginning, the Yi were an internally diverse category composed of dozens of more or less linguistically related communities across southwest China. In an ethnic categorization based on linguistic analysis, the Nuosu-Yi of Liangshan were designated as "archetypal Yi" (Mullaney, 2011, p. 112) from which the other Yi sub-groups allegedly derived. One of the Liangshan Nuosu-Yi's language variants was set to become Modern Yi (Ch. Xiandai Yiyu 现代彝语) – a standard for the whole ethnopolitical category. The categorization was also influenced by the ideological centrality of Marxist historical materialism to the PRC establishment and its presupposition of the five stages of societal development derived from social Darwinism, according to which the Nuosu-Yi dwelt in the second lowest stage of slave society (Ch. *nuli shehui* 奴隶社会). This caused them to be perceived as the most ancient group and the least affected by neighbouring cultures, contributing to their centrality *vis-à-vis* the other Yi groups. The autonym and exonym by which the Nuosu-Yi of Liangshan refer to themselves are both formative of their ethnicity and identity. They use them separately as "Nuosu" and/or "Yi" on different occasions, depending on whether they are talking in variants of the Nuosu-Yi or Chinese languages, but often also together as presented here.

In the period of high socialism, between the late 1950s and the late 1970s, the Nuosu-Yi were stigmatized as backward due to their low place in the social development ladder, and their cultural practices were ridiculed. Following the end of the destructive Cultural Revolution, during which the cultural representations of all ethnic groups in the PRC were under attack, the Yi were once again allowed to promote distinct cultural features. In the 1980s, the emerging Yi intellectual elite, which continued the legacy of the Han anthropologists and ethnologists, founded a branch of ethnology called "Yi studies" (Ch. Yixue 彝学). Through this field, they strove to promote the positive aspects of Yi culture. Simultaneously, they aimed to participate in the PRC's nationalist discourse (Harrell & Li, 2003, p. 384) by presenting their culture as the earliest founders of Chinese civilization (cf. Liu, 1986). This entailed the promotion of an internally coherent Yi *minzu* as a building block of the Chinese civilizational nation (Ch. *Zhonghua minzu* 中华民族), for which they created a pan-Yi folkloristic concept of "Yi Culture" (Ch. *Yizu wenhua* 彝族文化). Its crucial component became the "Bimo Culture" (Ch. *bimo wenhua*

毕摩文化), through which the *bimo* literati-ritualists with their scroll-books (Nuo. *teyy* ꀕꁌ) featuring the ancient cryptic script came to be portrayed as village intellectuals and carrier-protectors of Yi heritage (cf. Bamo, 2000; Kraef, 2014). With the highest percentage of practising ritualists (cf. Cai et al., 2015) and through the efforts of Nuosu-Yi researchers such as Bamo Ayi and Bamo Qubbumo, the Nuosu-Yi and Liangshan gradually became central to both concepts.

The overwhelming majority of the *bimo* ritualists, who pursue a prestigious, intra-clan, hereditary, strictly male-occupied vocation, belong to the non-aristocratic *quho* stratum (Harrell, 2001, p. 97). In a scholarly development of a holistic "new ethnic culture" (Bamo, 1994, p. 2), Bamo (2004, p. 4) called on the *bimo* to develop a new mindset she called "*bimo* fellowship" (Ch. *bimo gongtongti* 毕摩共同体). The ritualists would have to universally share their knowledge across clans and facilitate the fulfilment of a coherent and self-conscious cultural identity. Shortly afterwards, the internet started to play an increasingly important role in these debates. Originally, it was accessible almost exclusively through desktop computers (cf. Kraef, 2013), which were publicly available through internet cafés (Ch. *wangba* 网吧) when I first visited the PRC in 2006. For the Nuosu-Yi, this meant that only bicultural, urban-dwelling individuals in Xichang or the provincial capital Chengdu could access the internet. Wireless connections were rare. Not long after, the situation further developed with the availability of affordable smartphones and mobile internet data plans. Due to Liangshan's preceding long-term socio-economic isolation and marginalization, the arrival of smartphones *en masse* in the hands of the locals (including the *bimo*) was delayed in comparison with other Yi areas outside Liangshan. It followed the poverty alleviation efforts of previous years (cf. Karlach, 2023), which were also connected with the availability of digital infrastructure.

The case of the Lisu people in Thailand, who took advantage of unlimited calling plans and mobile network coverage to start improvising with genealogical-historical songs which are performed over several nights (Amazing People, 2015), is one great example of how even dumbphones can make people creatively reinvent their cultural practices. However, research on the topic of the Chinese internet published beyond the PRC's borders initially focused almost exclusively on the political activism contesting the power of the ruling Communist Party of China (CPC) (Liu, 2011; Ng, 2015; Wang, 2019), and the related topic of ethnic consciousness development, often with an emphasis on religion (Grant, 2017; Harris & Isa, 2019; Leibold, 2015). For a relatively long time, calls for a shift beyond this interest in politics (Herold & de Seta, 2015, p. 79) to focus on how the internet and local cultures mutually influence each other in the process of the production of new techno-cultures and techno-societies (Herold, 2009, p. 89) remained unanswered.

The situation changed with ethnographic works on how the portable internet through its various software and hardware infrastructure influences the lives of the majority Han population (Chen et al., 2018; de Seta & Proksell, 2015; Liu, 2017;

McDonald, 2016; Plantin & de Seta, 2019; Wang, 2016; Zhao, 2017). Studies looking at similar topics, only considering various ethnic minorities, quickly followed suit (Cabras, 2022; He & Tan, 2020). In fact, they were behind the already established trend in academic work in the PRC, where a significant number of studies discussed how Weixin influences, strengthens, preserves, transmits, or reinvents minority cultures. Through online non-participatory observation and offline interviews, these studies looked at how whole ethnic villages were transplanted to online spaces and how this shift influenced local relationships (Lan, 2018; Yang, 2019; Zhang & Wen, 2018). However, only a few of these studies initially noticed the fundamentally changing relationship between the online and offline spaces. Xu (2019, p. 59) observed that as a result of the extension of online space, offline (material) space shrinks (Ch. *suoxiao* 缩小) and undergoes fragmentation (Ch. *suipianhua* 碎片化), while Ji and Zhou (2017, p. 48–50) concluded that online and offline spaces had already merged (Ch. *ronghe* 融合) and that the border between real and virtual had been broken (Ch. *dapo* 打破) – effectively de-virtualizing the internet as a space and making it a part of the "real world" (Herold, 2018, p. 55).

Metaphors of mutual spatial appropriation strongly resonate with Liangshan's eventful history, especially within the poaching raids of the semi-nomadic Nuosu-Yi – who resided in the mountains free from state control and surveillance – into the fertile valleys inhabited by the state-supported agricultural communities of different ethnicities (cf. Lawson, 2017). During these raids, they abducted people and over a longer period of time integrated them into their social order. Over multiple generations, the enslaved people could buy their way out of captivity and become free commoners (Nuo. *qunuo* ꐚꆈ). Although these times are long gone, Swancutt (2012a) persuasively argues that the Nuosu-Yi reinvented the practice of capture as a particular form of social interaction between themselves and outsiders, who often become symbolic captive guests of their hosts who might even include them in their clan lineages as honorary members. In a similar vein, the Nuosu-Yi also reinvented their space-appropriating tactics, which were until recently visible not only around Chengdu North Railway Station in Chengdu (Liao, 2008, p. 316–317; Liu, 2011, p. 59–60) but also during my fieldwork in Shimazi Marketplace (see Figure 1), where they carved out a large chunk of urban space – otherwise controlled and surveilled by the authorities – for their informal economy. With the online space being part of the real world, I wondered by what tactics they could poach from the proprietary powers behind Weixin – an app developed for Chinese citizens who can speak, read and write in Modern Standard Chinese (Ch. Putonghua 普通话) – and escape their surveillance (de Certeau, 1988, p. 37), and how the app influences their everyday life.

Figure 1. The author, one of his bimo *research partners (wearing a felt hat) and the surrounding audience. Photo credit: Renata Mirková.*

3 SHIMAZI, WEIXIN AND RITUALISTS

3.1 Connecting @ Shimazi Marketplace

For the first couple of months of my stay in the Shimazi Marketplace, Vyvy *bimo* and I did not have many interactions. He either followed hosts (Nuo. *visi* ꃚꌦ) who invited him to perform various rituals at their homes, or got to Shimazi and, looking drowsy, fell asleep on his motorbike. With a specific (body) language, fashionable haircut, shades, fingers adorned with Tibetan rings and a wild boar claw pendant around his neck – an amulet collected in the forest from the sacred wild animal serving as protection against the attack of wild ghosts – he gave an impression of arrogance. However, he was also considered one of the most knowledgeable *bimo* around. "I never went to school, never had any other job," he proudly stated during our first short exchange. As a member of a famous *bimo* clan, Vyvy started absorbing the skills of his prestigious vocation from a close relative at the age of six or seven. Ten years later, he was able to accept invitations and conduct rituals on his own, and he had continued to do so until now, when he was fifty-one.

One mid-April day, the roar of Vyvy's motorbike filled the place where other *bimo* were waiting for their invitations. He had arrived straight from one family living in a settlement near Xichang. "Can you install the input console (Ch. *shurufa* 输入法) for Yi language into this?" he asked me, handing over his smartphone. He had somehow got to know that one day earlier, I had helped one of the locals fix his dumbphone. Vyvy's new smartphone, including the registration of the Weixin account, had been set up by the vendor right at the shop where he purchased it. However, the seller was unfamiliar with the Yi language input console. I did my best, but the smartphone's operation system kept refusing to display Unicode Nuosu-Yi characters for some reason. Nevertheless, in the end, Vyvy and I exchanged our Weixin contact details.

Vyvy was illiterate in Chinese. In addition to multiple local Nuosu-Yi language variants, he was – like most of the *bimo* on Shimazi – fluent in spoken Sichuanese Mandarin heavily tainted with the phonological and grammatical features of his mother tongue. With his device unable to display Nuosu-Yi characters, the names in his Weixin contact list written in the Nuosu-Yi script remained blank. Vyvy thus oriented himself only by avatars. Every message he sent out was either a static image, a video snippet, an emoticon or a voice recording lasting up to sixty seconds. "We have our clan's *bimo qu*," he told me when I looked at a nameless element in his contact list displaying only "188", representing the number of group members. For the word "group", he used the Nuosu-Yi loan from the Chinese language (Ch. *qun* 群, Nuo. *qu* 𐀍). "Can I join?" I asked enthusiastically. "No way! You are from a different clan," Vyvy replied resolutely. This was because my friend Jjihxa, also a *bimo* from a very prominent lineage, granted me his clan surname years ago, thus practically capturing me within his clan lineage as an honorary member. By doing so, he had effectively barred me from entering similar exclusive spaces of another clan.

Two months later, a friend added me to an all-Liangshan *qu* called "Bimo Culture Exchange Group." It was founded by Amu, an influential *bimo*-cadre on a governmental mission (Lan, 2018, p. 21) to collect knowledge relevant to the folkloristic "Bimo Culture" project. It was conceived as a bilingual group, where communication took place in written and spoken Chinese as well as Nuosu-Yi. In the beginning, it contained over one hundred members: scholars, Yi culture enthusiasts and *bimo* ritualists, or people with various permutations of these vocations. It was a trans-local and multi-clan group. A couple of days later, Jjihxa *bimo*, who generously hosted me in his rented Xichang flat, permitted me to enter "our" clan's *bimo qu* containing close to a hundred members. Besides the visual elements, the communication was conducted exclusively through voice messages in Nuosu-Yi. It was a trans-local but exclusively uni-clan group that mostly contained people of Jjihxa's lineage. Jjihxa's beginnings as a *bimo* were similar to those of Vyvy. However, in his late teenage years, Jjihxa became involved with the cultural institution in his home county within Liangshan. Thereafter, he moved to Beijing for a couple of years. After coming back, he started to work as an artist and advisor

for the prefectural cultural bureau. As a result, Jjihxa could write and speak in Modern Standard Chinese and its Sichuanese variant in addition to modern spoken and ancient written Nuosu-Yi. Leading more of an urban than a rural lifestyle over several years, he increasingly became bicultural.

To my surprise, Vyvy suddenly appeared in Amu's group. From that moment, I was able to talk with him about the content he shared there. Naturally, coming from a competing lineage, Vyvy was not able to join Jjihxa's clan lineage group. None of Jjihxa's group members was in Amu's group. However, not all *bimo* of Jjihxa's lineage were present in his group. Therefore, Amu's group contained members of many different lineages of Jjihxa's vastly branched clan. Originally, Amu stipulated that every newcomer to the group must send a self-introductory voice message stating his name, residence and *cyvi* seniority (Nuo. cydde ꊪꄸ or cyr ꊬ). This demand was somewhat in line with one of the basic Nuosu-Yi habits related to their social order. When two individuals meet for the first time, in order to determine their respective seniority and place within the *cyvi* hierarchy, they declaim their genealogies to each other (Harrell, 2001, p. 91). Without an ancestor in common, one or another person could potentially be taken captive. Amu's directive equally spoke to the rhetoric of convenience (Bahroun, 2018, p. 3) by which Weixin had been promoted by its developers since the app made this Nuosu-Yi habit faster and more efficient by putting the newcomer in front of potentially hundreds of listeners at once.

In parallel to a trend already prevalent for a couple of years in Weixin groups of the Nasu-Yi from neighbouring Guizhou Province (cf. Zhang & Wen, 2018, p. 129), Amu's directive was replaced by another one after a couple of weeks. Everybody within the group was told to make their clan surname, *cyvi* seniority and dwelling place part of their Weixin nickname. Due to the relatively large difference between their language variants and those of Liangshan, Guizhou's Nasu-Yi did not want to use the Liangshan-based Yi-language standardized script. And since they lacked their own standard along with an input method, they had to rely exclusively on Chinese when transcribing all this information, including their Nasu-Yi names. Members of Amu's group presented the required information in Chinese, standard Yi script, or a combination of both. It swiftly became common sense to check the nickname field without the necessary ritual to determine each other's place in society. The list of group members gradually resembled those scroll-books of *bimo* which contained compilations of genealogical trees that represented ancestors of various clans and their relations. Only this digital version was more fluid due to individuals entering and leaving the groups, or oscillating between several groups.

3.2 Two Kinds of Weixin Groups

Over the following days and weeks, the screen of my smartphone turned into a palimpsest of the lively media practices (Hobart, 2010) of the different *bimo*. Amu's

group had strict rules on what to post, when to speak and what to discuss, which he as the admin (Ch. *qunzhu* 群主) reiterated to all members every morning by re-posting a bilingual notice. No sensitive (meaning political) debates; no quarrels; no sexually explicit content; no swearing; no discrimination based on a *bimo*'s native place; no interrupting when one of the *bimo* in the group chanted his texts over numerous voice messages; no chanting when drunk. Topics were determined either by Amu or by the unfolding, mediated conversations. There were also mp3 and m4v audio recordings, as well as pdfs containing digitally adapted or rewritten fragments of *bimo* texts and formulations of governmental culture-related policies.

One day, Vyvy asked me to read aloud four ancient Yi characters from a scroll-book he had brought to the marketplace. I recognized two, and so he advised me on the pronunciation of the rest. He shot a video snippet of me trying to read the characters and sent it to Amu's group. Then he switched to Amu's profile and sent him a personal message, giggling: "Look, Amu, even this foreigner can pronounce these few words better than you!" Amu could speak Nuosu-Yi, but Vyvy always ridiculed the flow of his chants (Nuo. *bifu bihxa* ꀘꃪꀘꉻ) and his accent. After a couple of days, suddenly, the number of members in Amu's group dropped by thirteen. Vyvy and some other *bimo* ostentatiously left the group together. "I observed the situation [in Amu's group] for a while… The voices… It did not sound nice," Vyvy explained during our chat in the marketplace, targeting Amu's content. Meanwhile, Amu was working on a project of "*bimo* papercutting" (Ch. *bimo jianzhi* 毕摩剪纸), with which he wanted to become registered as a "representative transmitter" (Ch. *daibiaoxing chuanchengren* 代表性传承人) within China's Intangible Cultural Heritage Protection Program (Ch. Zhongguo feiwuzhi wenhua yichan baohu 中国非物质文化遗产保护). This PRC-localized variant of UNESCO's intangible heritage program acted as a super-structure for local folkloristic projects such as "Yi Culture" and "Bimo Culture". Becoming part of it was evidently seen as prestigious. Amu's intention was apparent from the content and conversations he maintained in his group.

After a few days of sulking, however, Vyvy was tempted back. "Well, they begged me to join again, to lead the other people. They trust me," he replied with notable pride when we watched the video he had posted to Amu's group earlier that day. Through my smudged screen emerged a misty forest with a narrow, paved road slowly winding up the mountain. A ravine was on its left side and a rock face on the right. The loud sound of the motor emanated from my speakers with a loud crackling. I could almost smell the kerosene. Sounds of rustling wind interlaced with the rattling engine found their way around Vyvy's palm, in which he held his device when recording the snippet, into the aperture in which the microphone sat. There, these interfered with Vyvy's voice. "Dear friends, I am going to see my hosts," he said with his mouth close to the device. After finishing his short message, he turned the front side of the device's body with the camera lens to the left. Before the end of the clip, it provided a detailed look at the lush vegetation in the small valley, where the white vapour emanated from wet stalks and tree trunks. "Blessings

(Nuo. *zzyrmuo* ꍹꃀ)!" – a rain of messages containing this omnipresent wish flooded the wall of Amu's group where the ten-second snippet landed and was instantly consumed by the audience through their screens.

Amu strove to make the group simultaneously scholarly and educational. Some images and videos were shot not as fragments of everyday practice but rather as planned performances. Some were periodically re-circulated, suggesting that people were saving them in the memory of their devices. Streams of chants of *bimo* texts through voice messages overwhelmingly outnumbered photographs of pages of the scroll-books filled with Nuosu-Yi ancient or standardized characters. Some of the ritualists shared these, but the majority seemed to be reluctant to do so. Another visible element in Amu's group was the electronic red envelopes (Ch. *hongbao* 红包). They featured the names of their addressees and contained symbolic amounts of money. By placing them in between the other messages, the senders publicly showed an appreciation for whatever contributions their recipients had brought to the group. This was also competition between senders for the attention of addressees. However, even the relatively small differences between various regional and clan-based audiovisual representations of the *bimo* knowledge (Nuo. *sylu* ꌦꇉ; see Figure 2) – similar to those that prompted Vyvy to temporary sign off from the group – generated tensions between the group members. Endless debates raged around what kind of requisites – such as plant species, twigs of different amounts and sizes, or the colour of animal skin, fur or feathers – were suitable for specific *bimo* rituals. Moreover, they discussed which design is acceptable for which piece of *bimo* ritual paraphernalia – ritual fan (Nuo. *qike* ꋍꇐ), quiver (Nuo. *vytu* ꃅꄡ) and bell (Nuo. *biju* ꀘꐯ) –, how to set up a proper ritual space and what gestures attached to the pitches and flows of chants are acceptable. Amu sought to mediate these potentially heated exchanges with more *hongbaos*.

Figure 2. Still images captured from the video snippets posted to Amu's group by its admin and other members (from left to right): ritualist chanting from a scroll-book; Amu in the middle of the bimo *papercutting session; setup of a ritual space; a scholarly-political meeting related to "Bimo Culture". Photo credit: Amu and his group's various members + the author.*

Theoretically similar to Vyvy's exclusive clan group, which I was able to discuss only from an external, etic position, Jjihxa's group was actually managed in a completely different manner. It lacked tension, clear leadership, a central topic or stipulated rules. It served as a pool for any content imaginable shared between its members, who carried identical clan surnames and shared close blood ties. It was often flooded with a couple of thousand messages per day. There were no *hongbaos*. As in Amu's group, the first-person photographs and video snippets – often shot in selfie mode or by the outward-facing lens through Weixin's camera interface – depicted various *bimo* rituals. Along with voice messages containing chatter, these were by far the most dominant content in Jjihxa's group. Lengthy consecutive chants divided into several voice messages were rare, as members shared them only at someone's request. As for photographs of the scroll-book pages with *bimo* texts, they were also shared when requested, but in much greater numbers than in Amu's group. Some of them even carried page numbers – written in Arabic, Chinese or Nuosu-Yi numerals – that were added in post-processing to determine their order. Unlike Amu's group, this one contained myriad fragments depicting the mundane activities of a normal, everyday life. Also much in evidence were viral comic videos, heavily edited clips of allegedly supernatural events, and conspiratorial, outright illegal anti-governmental videos inspired by Falun Gong or locally present Mentuhui (Ch. 门徒会), a Christianity-based millenarian cult. Finally, although this was less in evidence, the group saw its fair share of pornographic content.

Figure 3. Visual representations in Jjihxa's group (from left to right): video snippet shot while strolling outside; ritual preparation in a rural household; visiting the traditional wrestling competition; photograph of one page of a scroll-book shared with the clan-exclusive audience. Photo credit: various clan members of Jjihxa's group + the author.

Apart from the fragments of *bimo* rituals, the video snippets of random length and photographs (see Figure 3) included: a skyline with mountains and clouds; a short countryside walk by a newly built brick wall; a long shot facing downwards on the

grass with a muffled voice in the background; a view through a front car window above a glowing speedometer at night. Some had more tangible micro-plots: a 6-second snippet depicting legs stretched on a grassland belonging to someone who was smoking and greeting other group members; a smartphone-wielding herder shouting "*sho… sho*!" while chasing a flock of black sheep, throwing small stones against their backs; a series of yawning workers on a running production line in a factory somewhere in the Pearl River Delta, where many Nuosu-Yi worked as cheap, unskilled labour; "*qobo gge su*, *yieyo zza la o*! (Nuo. ꇐꀧꈩꌠ ꑟꑻꊭꆹꉬ)" – a *bimo*-farmer jokingly inviting everybody in the group to eat Liangshan's cheapest but most beloved meal, the fire-baked potatoes. Pointing his smartphone's scratched and greasy lens towards the ploughed ground of his small field, the creator of the last snippet showed his audience a hoe that he held in his other hand, his muddy trousers and "Liberation sneakers" (Ch. *jiefangxie* 解放鞋) worn without socks. Resembling the classic Converse All Star shoes, only designed more simply with the use of military khaki-colour materials, the "Liberation" became iconic in Liangshan and generally in the whole of the Chinese countryside. Inexpensive, hence relatively affordable, they were seen as contributing to an effort to liberate Liangshan from rampant poverty that began decades ago. The poverty was epitomized by the lack of footwear seen not only in century-old photographs but also in some from the early 1990s. Forming a stream of Liangshan's visceral mundanity, these snippets often flew through Jjihxa's group as if unnoticed. They served as a "clock-in" method for its members, who were perhaps looking for a distraction from their daily routines, to announce their presence and availability for a short chat.

3.3 Content-making Practices of the *Bimo*

Vyvy was one member of Amu's group who provided recordings of his rituals that were clearly distinguishable from the more educationally conceived content. Similar to the videos in Jjihxa's group, his visual representations of rituals were posted as if "clocking in" to a particular time, space and practice for others to see. When it came to the digital representation of the *bimo* texts, the behaviour of Vyvy and Jjihxa revealed just as many similarities as differences. Well before the mobile internet permeated Liangshan, one of Jjihxa's uncles borrowed a not insignificant part of the scroll-books he inherited from his masters and other relatives. Allegedly, Jjihxa's mother had a soft spot for his uncle. When Jjihxa was not at his ancestral home in the countryside, she allowed him access to Jjihxa's *bimo* chest (Nuo. *jysse* ꏢꌦ), which contained the texts. Over time, the whereabouts of Jjihxa's uncle and the scroll-books were forgotten, and so he treated them as irreversibly lost. When I asked Jjihxa whether he regrets this, he replied that it was not possible to refuse a relative. However, the idea of his texts ending up in the hands of somebody from outside his clan made him anxious whenever he thought about it. Over several years, Jjihxa's work-related responsibilities gradually took him further away from the *bimo*

vocation and related obligations. He conducted rituals only occasionally, for his relatives and close acquaintances. In his Weixin group, Jjihxa now and then asked for photographs of various scroll-books. He utilized excerpts from them not only in his increasingly rare *bimo* practice but also for a *bimo*-themed play performed in Chengdu, in which he played one of the leading roles.

Figure 4. In the Shimazi Marketplace, Vyvy chants lines of his text for his disciples working in the Pearl River Delta. Photo credit: the author.

Vyvy was in a somewhat inverted position to Jjihxa. He was so preoccupied with pursuing the *bimo* vocation that he had no time for anything else. One hot, early July day, Vyvy and I caught up in the marketplace. I found him leaning over an improvised table made of an old wooden crate. On its surface, he had placed a scroll-book and a fresh scroll of blank paper on which he was hand-copying its content. "For my followers," he pointed to the smartphone with an opened Weixin

chat window that connected him to one of his apprentices (Nuo. *bisse* ꀘꌺ). After the ink of his lines written with a felt-tip pen had permeated the yellowish paper, he chanted the perfectly regular, errorless matrix of characters to the smartphone. He held the device close to his mouth with both hands, as if he wanted to whisper into it (see Figure 4). Pressing the long, rectangular voice-recording virtual button on the bottom of the Weixin interface, he chanted the whole text over several voice messages. Subsequently, he took a picture of the freshly written page and sent it not only to the apprentice but also to his clan-exclusive Weixin group, which I was able to glimpse over his shoulder. "They would not know how to do this," he added, pointing to the writing as well as to the chanting. "Some of them work in Guangdong Province, they need to keep studying."

"I would never do that," Vyvy reacted when I inquired whether he would also share photographs of his scroll-book pages with the members of Amu's group. Sharing some of Jjihxa's sentiments, Vyvy stuck to the old ways, and thus shared his text only with his disciples and with the people in his exclusive *bimo* clan group. However, in Amu's group, Vyvy shared short video snippets of his scroll-books without their protective cloth and laid out on a conference table. From there, Vyvy usually grabbed a book and held it against the lens for a few seconds. Sitting in his workroom, further equipped with a grandiose-looking sofa and a cabinet with piles of rolled-up scrolls and his *bimo* paraphernalia he only demonstrated to his audience his possession of the texts, sharing a negligible part of their content. This way, the heritage of Vyvy's clan lineage remained protected while he simultaneously accumulated fame (cf. Swancutt, 2012b) and authority by showing off his treasures to his audience in Amu's group. From Amu's point of view, all of Vyvy's content was potentially instrumental for his own folklore-constructivist purposes.

Several hours after we discussed the scroll-book sharing, Vyvy accepted an invitation from members of a family who personally came to search for him in the marketplace. The healing rite for one of its elderly members was to be carried out on the spot. We stopped by an improvised stand, where the hosts bought the requisites necessary for the ritual under the supervision of Vyvy and his smartphone camera lens. After finding a suitable spot by one of the pillars supporting the arch of a recently built traffic bridge, Vyvy sat down and started twisting the purchased dry Ophiopogon grass (Nuo. *yyryy* ꒉꏥ) into the shape of three different effigies (Nuo. rybbur ꏵꁌ). They represented a set of malicious ghosts causing Vyvy's elderly host to be afflicted with rheumatism. After the effigies took shape, he hung the red, white and yellow strings of paper over them. "They look better like this," Vyvy said, offering no further explanation of the deeper meanings underlying the usage of this material.

The wind caressed the paper, while Vyvy took up a live chick and plucked several feathers from its body. He sprinkled the feathers over the effigies to attract the ghosts to them and started to chant the strings of text he knew by heart from the relevant scroll-book placed on the ground in front of him, into which he occasionally glimpsed. In his right hand, he held his *qike* ritual fan. The host sat on

a small metal stool in between the effigies and Vyvy, while I squatted just behind the ritualist. Without interrupting his chants, the *bimo* suddenly put down the *qike* and reached into his pocket for his smartphone. Still chanting, with a few swipes, he entered Weixin, then Amu's group, and tapped on the icon of the photo-taking and video-recording interface. He hastily pressed and held the round digital button while directing the smartphone's lens towards the scene in front of him. Keeping the button pressed with his thumb, he waved his hand from left to right and back, as he would do with the *qike*. The ten-second recording time limit came to an end, and the recording button was replaced by one to confirm or cancel the posting of the video snippet to the group. After Vyvy's last tap on the confirmation icon and a short processing period, the snippet landed among other messages in Amu's group. Almost instantaneously, my pocket vibrated. Vyvy put the device back into his pocket, picked up his *qike*, and carried on with the ritual.

During the seconds in which Vyvy's snippet was taking shape along with its subsequent arrival in the digital territory, I was a bit surprised by the whole situation. I did not anticipate that the smartphone would temporarily replace the *qike* in Vyvy's hand. After taking out my own device to check the result a couple of minutes later, I realized that the aesthetic pattern of the snippet – and especially the swinging from one side to another – is similar to dozens, perhaps hundreds of those I had watched in Jjihxa's group. Vyvy's video snippet embodied the moment of transversality – a form of communication bridging two objects through unconventional routes (Guattari, 1995, p. 23–24) – shared by the *qike* and the smartphone through their affordances, the possibilities of an action on an object. The *qike* fan was used for diverting the paths of malicious ghosts that intersected with the space Vyvy had set up for the ritual. Due to its flat shape and the possibility to be held in one hand, the smartphone for a moment gained this function as well. In comparison with *qike*, the smartphone was further endowed with the capacity to record and store the habitual gesture of the *bimo* into a short video snippet. With its culturally unique cinematographic aesthetics, the recording became a result of the distinctly Nuosu-Yi way of using technology.

I realized all this only months after I had left the field, following repetitive analysis of these para-nethnographic episodes through fieldnotes scribbled into my notebook right on the spot and re-typed on my computer during the evenings. However, did I really leave the field? Even today, I am still consuming Vyvy's (see Figure 5) and others' content regardless of my whereabouts. I can be with Vyvy when he sits on the ground and switches the front-facing selfie camera to the rear-facing one to take in the space of the freshly decorated urban flat of his host, where he records a basket full of one-hundred-*yuan* bills. His feet extended forward, he continues to transmit *bimo* paraphernalia, ritual requisites and sacrificial animals such as chickens, goats and suckling pigs to the Weixin group through his lens. "The *bi*-ing [chanting] is about to begin… Ah, let's do this," he utters, with a notably tired voice. The fur of sacrificial animals soaked with their fresh blood and dragged around the white-tiled floor resembles a giant brush whose strokes paint

the ground red. In an open landscape, on the edge of the cliff behind the dwellings of his hosts, or in the semi-dry riverbed by the Shimazi Marketplace, Vyvy models straw as well as mud-clay effigies (Nuo. *zabbur* ꀉꁧ) to expel malicious ghosts. While trying to keep up with streams of similar content and make sense of it, I reflected on the whole process. At one point, I failed to draw a clear borderline between the animistic practices of the *bimo* and the scientific endeavour of scholars, including myself, especially when knowledge-making is conditioned by local meanings that arise from one's relation to a unique environment, and the result leads to the accumulation (or waning) of authority.

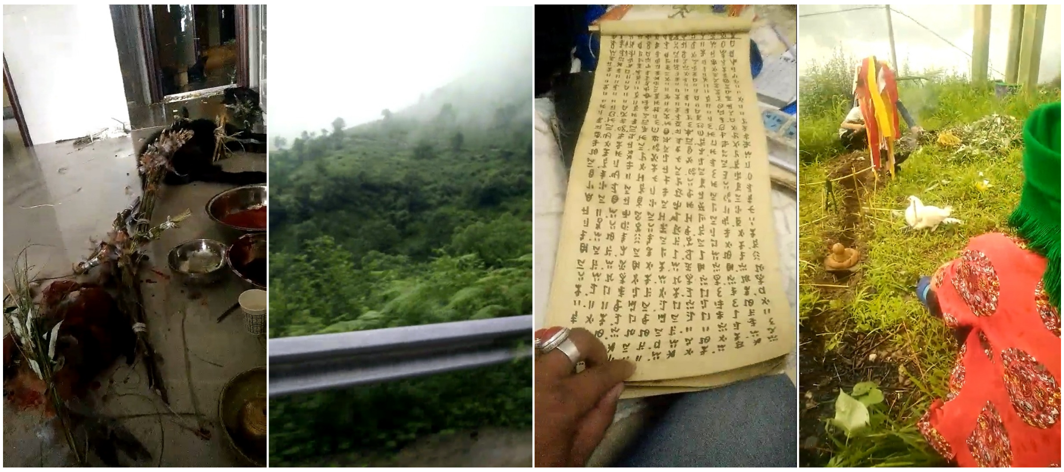

Figure 5. Still images captured from Vyvy's video snippets posted to Amu's group (from left to right): conducting a ritual in a flat in Xichang; on the road to his rural clients; showing off his scroll-book; conducting a ritual in the open-air area. Photo credit: Vyvy + the author.

4 DISCUSSION: FEATURES OF THE NUOSU-YI INTERNET

In her short article, Kraef (2013, p. 30) asked whether a "specifically Yi" internet would be possible. One decade later, the possibilities of accessing the network significantly changed with the spread of a widely accessible internet, smartphones and multi-function apps such as Weixin. One's presence online is no longer equated with one's presence in front of a desktop computer's heavy monitor. Even without literacy in Modern Standard Chinese, some of my research partners "raided" the space of the state-controlled internet through Weixin. The radical simultaneity of, as Liu (2017, p. 32–33) put it, "being there" (Ch. *zai bi* 在彼), "being here" (Ch. *zai ci* 在此) and "being at hand" (Ch. *zai shou* 在手), combined with the traits of Nuosu-Yi culture, permitted the genesis of a specifically Nuosu-Yi internet. The fact that we carry our connection points in our pockets effectively cancels spatial distances, as evidenced by the *bimo* apprentices working in different urban areas across the PRC and still being able to remain in touch with their masters and their teachings.

The media practices of Amu, Vyvy, Jjihxa and many members of their Weixin groups revealed that the *bimo* not only poach from the proprietary powers behind the app – namely, the CPC-ruled Chinese state and Tencent – but also poach each other's content. For example, Amu poached Vyvy's visual representations for the purpose of the folkloristic projects of "Yi Culture" and "Bimo Culture" – both still developing since the 1980s – in which he was involved. Through the conversations and the content of his group, Amu had a vested interest in becoming a powerful figure in the folkloristic scheme, which would endow him with significant power over the other *bimo*. Similarly, Jjihxa somehow poached the fragments of scroll-books from his own clansmen so he could include them in his theatre play. Vyvy, in turn, made use of the proprietary powers of Amu as the group admin, through whom he was able to expand the network of his admirers. In one instance, he even used me (also a poacher – namely, of the content that constitutes the lynchpin of this article) as his pawn.

The culturally conditioned use of Weixin – often seen as a form of infrastructure that enhances Tencent's and the PRC's governance (Plantin & de Seta, 2019, p. 9; 12), an app that sticks to the hands of its users (Chen et al., 2018, p. 10), where its presence becomes seamless (Bahroun, 2018, p. 3) – did not *a priori* turn the *bimo* into digitally-obedient Chinese citizens. With smartphones serving as an epistemic wallpaper (Thrift, 2006, p. 584–585) plastered over the segment of life beyond their rear-facing cases, the state-driven internet and the *bimo* are mutually appropriating, transforming each other. In this context, the *bimo* vocation shifts from the stewardship of anxiously guarded clan secrets to something to be shown off for the accumulation of authority by an individual, a lineage or the whole clan. This is achieved through the particular form of digital authorship, where one's avatar next to the posted content or face within the visual representations serves as a signature. This seems to lead halfway towards the promulgated goal of constructing a *bimo* professional fellowship, which could then serve the ruling CPC as an example of how it promotes and develops rather than represses minority culture.

Although Herold (2018) persuasively points out that the Chinese internet has recently begun to be more regulated, especially during the second term of Xi Jinping's presidency, there were still spaces open for digital anarchy. Jjihxa's group contained a lot of unwanted or even illegal material, yet it has survived until today. When it comes to religious content, which is often regulated or outright suppressed, it needs to be kept in mind that Nuosu-Yi spiritual practices are not treated as an official religion in legal terms but rather as state-supported folk belief, a "culture" (cf. McDonald, 2016, p. 180–181; Wang, 2016, p. 159–160). Therefore, unlike the cases of Chinese Christians, Uyghurs, Tibetan and Mongols, whose religious content is heavily regulated and even repressed online, the Nuosu-Yi have been virtually unaffected by a series of governmental crackdowns (cf. Chang, 2018, p. 43). As a result, they are probably also less surveilled by the proprietary powers for other potentially harmful content, and the digital sanitation personnel cannot find

a legal justification for deleting video snippets of *bimo* rituals, which often resemble scenes from everyday life in the Chinese countryside, regardless of ethnicity. The gestures that those who potentially oversee them are unable to decode give the *bimo* much more leverage to appropriate digital space through their culturally conditioned and unconventional use of smartphones, the internet and apps.

The Nuosu-Yi internet has also proven to be a tool for the simultaneous reinforcement and subversion of the decades-old folkloristic projects of "Yi Culture" and "Bimo Culture". Firstly, all the Weixin groups provide a fragmentary glimpse into the everyday life of the *bimo*. Many of them simply do not resemble the eulogized otherworldly figure of literati-ritualist that their folkloristic image suggests. Their content reveals the mundanity of their lives, which are indistinguishable from those of the Nuosu-Yi laypeople. The recorded and circulated fragments of ritual then provide, as Zhao (2017, p. 7) puts it, a "non-encyclopedical knowledge" (Ch. *fei baike quanshu shi de zhishi* 非百科全书式的知识) of *bimo* practices. Far from presenting a standardized picture, they come out as slightly mutually differing heritages of clan lineages. Secondly, since the 1950s, the PRC government has painstakingly sought to replace the Nuosu-Yi's *cyvi* genealogical social order and its essentialist notion of blood superiority (Pan, 1997) with an emphasis on cultural markers. After the economic reforms and opening up in the 1980s, these markers were supposed to be transformed into the cultural capital of increasingly tourism-oriented local economies. However, this did not turn out as expected, because the *cyvi* and the cultural markers collapsed into each other and maintain a complex co-existence to this day.

As witnessed through the mutual poaching of all actors, the internet has further reinforced the inter-clan competition for fame and authority. Paradoxically, this cultural marker prevents the *bimo* from approaching the final stage of the "*bimo* fellowship" project. While some have reluctantly shared fragments of their scroll-books, others have refrained from doing so altogether. This competition prevented the "liquefaction" (Ch. *yehua* 液化) (Yang, 2019, p. 138) of the *bimo* practices, which would lead to a greater cultural homogeneity. The digital artefacts of Vyvy conceived in the "vernacular" (de Seta & Proksell, 2015, p. 8) manner and those staged using Amu's practices of digital folklore (de Seta, 2019) have circulated through all the groups. However, although they could perhaps have been used as building blocks of "Yi Culture", they keep disintegrating into an unfathomable cacophony of related but practically irreconcilable representations of individualized ritual practices. As such, they serve as a currency within the local ritual economy for each separate ritualist and their lineages and clans. In such an environment, the dichotomies of offline and online, folk and folklore, minority and majority, science and animism, and tradition and modernity keep visibly collapsing into each other only to re-emerge in unexpected and often equally volatile forms.

5 CONCLUSION

I have shown that the Nuosu-Yi internet emerged as a result of mutual appropriation and transformation of the technological infrastructure – smartphones, apps and state-driven internet governance – and its users. Using the technology in unforeseen ways, the *bimo* literati-ritualists manage to poach on the property of this infrastructure to extend themselves into (cyber)space, which at one point constituted a largely untapped territory for them. This encounter permitted the *bimo* to develop and reinforce some of their cultural traits and also proved to be instrumental in the further construction of Yi (digital) folklore. Simultaneously, by providing a glimpse into the everyday lives of different *bimo*, it problematizes some of the stereotypical descriptions of the (Nuosu-)Yi literati-ritualists within the decades-long and ongoing folkloristic projects of "Yi Culture" and "Bimo Culture". Inter-clan competition, one of the Nuosu-Yi cultural traits the usage of technology has reinforced, prevents homogenization of the individual *bimo* clan heritages. Every *bimo* strives to promote his vision of the ritual practices that often (to a greater or lesser extent) differ from those of his peer competitors.

Nethnography, the simultaneous inquiry into previously separated and now increasingly indistinguishable online and offline spaces, is instrumental in social digital research for uncovering complex relationships that problematize simplistic dichotomies. Furthermore, by promoting the para-nethnographic approach, during which researchers and their research partners collaboratively influence (or appropriate) each other, the method can work towards the de-orientalization of the ethnic (minority) cultures inhabiting spaces beyond the Global North and the presuppositions attached to their usage of technology the whole world increasingly shares. Connected to one network, people can merge their online and offline existence through their mobile devices and create their own techno-cultures and techno-societies. Not only in places with authoritarian regimes but also in states with a more liberal approach to governance, the ability to do so depends on the creativity of those living within reach of the surveillance capabilities of technology's proprietary powers – be they corporations, governments, or variously conceptualized tangles of both. Thus, the case of mutual appropriation among the Nuosu-Yi provides one of the possible answers to the question of the relationship between the top-down computerization of society and the bottom-up socialization of technology. The *bimo* teach us that depending on creativity, this relationship can be dialogic rather than universally dialectical.

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