# "I'm Never Happy with What I Write": Challenges and Strategies of People with Dyslexia on Social Media

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## Abstract

This work studies the experiences, challenges, and strategies of people with dyslexia when using social media. We interviewed 11 people with dyslexia to understand their general experiences with reading and writing content on Facebook. The interview study findings highlight the challenges they face when writing content on Social Networking Sites (SNSs), and their strategies for mitigating these challenges. Following up on this, we surveyed 492 participants, among whom 67 self-reported as having dyslexia. The survey results confirm challenges with and strategies for writing unique to people with dyslexia, although they also suggest that better writing support on SNSs may be more broadly beneficial.

## Introduction

Dyslexia is one of the most common learning disabilities (Carnine 2003). Its prevalence varies by language, affecting approximately $10 - 17.5\%$ of English speakers (Brunswick 2010; US Interagency Committee on Learning Disabilities 1987). It is a neuro-cognitive disorder, impacting a person's ability to process the orthography and phonology of language (Vellutino et al. 2004). Although its severity varies, most people with dyslexia experience difficulty in word recognition, reading fluency, spelling, and writing (Shaywitz et al. 1992). As a result, challenges usually surface during traditional learning activities, affecting their school performance, despite their efforts and intelligence levels. However, as dyslexia is frequently a persistent condition with no known cure (Shaywitz and Shaywitz 2005), it can create problems beyond the school setting, imposing social and emotional challenges such as poor self-image and less peer acceptance (Ingesson 2007; Riddick 2009).

This study examines the challenges faced by people with dyslexia on social media. As more than $79\%$ of Americans online use Facebook and $24\%$ use Twitter, social media is increasingly integrated in social lives, work, and the news cycle (Greenwood, Perrin, and Duggan 2016). However, with 500 million tweets (Internet Live Stats 2017) and 55 billion WhatsApp messages sent each day (Tung 2017), social media is often text-based, potentially creating accessibility issues for people with dyslexia.

Efforts to make online communication more accessible to people with dyslexia have largely focused on text read-ability. Web accessibility guidelines have been developed for the dyslexia community (British Dyslexia Association 2011; WebAIM 2013; Collinge 2017). People have experimented with and implemented ways to alter the visual element of text on digital displays to facilitate reading faster and with more comprehension (OpenDyslexic 2013; Korn 2016; Rello et al. 2013). Researchers have also explored language modification approaches such as substituting complex words with simpler synonyms and restructuring complex sentences (Saggion et al. 2015; Rello et al. 2013).

However, our research suggests that people with dyslexia find writing on SNSs more challenging than reading. Writing challenges span from the difficulty of the task itself to the emotional consequences it may induce, including: the time and energy required to write adequately, concerns about mis-representing oneself in writing due to quality issues, and worries about negative feedback about writing errors. As a result, our participants sometimes struggle to express themselves as much and as freely as they want to, ending with self-censorship. When they cannot effectively communicate and present themselves on SNSs, they miss benefits such as gaining social capital (Ellison, Steinfield, and Lampe 2007), increasing well-being (Burke, Marlow, and Lento 2010), and boosting self-esteem (Gonzales and Hancock 2010).

We present the first study of how people with dyslexia experience social media. In phase 1, we interviewed 11 people with dyslexia, exploring their experiences, challenges, and coping strategies when using social media. In phase 2, we surveyed nearly 500 people, 67 of whom have dyslexia, to validate the interview themes and compare the experiences of people with and without dyslexia[1]. We report the benefits and challenges associated with SNSs for people with dyslexia, highlighting writing as an issue that undermines the ability and willingness to fully engage with social media. Although most participants have learned technical and non-technical strategies to cope, our study identifies a gap between current assistive technology and the needs of people with dyslexia. Our findings shed light on future directions for accessibility research for the dyslexia community and provide insights for SNSs designers and researchers.

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[1]All survey data was anonymized after collection.

## Related Work

### Accessibility issues for people with dyslexia

As a condition that affects people's ability to recognize and spell words, dyslexia can largely limit a person's access to and understanding of written information and knowledge (Rello 2014; Al-Wabil, Zaphiris, and Wilson 2007; de Santana et al. 2012). Most accessibility research for people with dyslexia has focused on reading, aiming to improve text readability and reading comprehension. Leveraging experimental results on how text readability is impacted by the visual display of text (Rello and Baeza-Yates 2016; 2017; Rello, Pielot, and Marcos 2016; Zorzi et al. 2012; O'Brien, Mansfield, and Legge 2005; Dickinson, Gregor, and Newell 2002), people have built technologies to alleviate reading challenges by manipulating text presentation, such as adding colored overlays, deploying special typography, increasing font size and margin space, and a combination of these changes (Rello et al. 2013; Korn 2016; de Santana et al. 2013). Rello et al. also experimented with methods of content modification, such as replacing complex words with basic synonyms, and representing numbers in digits instead of words (2014).

In contrast, little research has explored the writing challenges faced by people with dyslexia or the development of assistive technologies aimed at writing. One of the most comprehensive works that studied writing errors by people with dyslexia is Rello's dissertation, which identified and categorized typical spelling errors (2014). Rello's work, similar to several other work on this area (Tops et al. 2013; Pedler 2007), studied primarily text samples from school assignments, which potentially have a very different writing style than text posted on social media. Previous work also focused on the misspellings of individual words, overlooking other challenges, such as capitalization, punctuation, grammar, sentence structure, and content organization.

Our work highlights the anxiety experienced by Facebook users with dyslexia in terms of writing, and their desire for assistive technologies that support them to express themselves confidently and comfortably. General writing tools, such as spell and grammar checkers, have provided great value, but as most of them were not developed with this community in mind, they are missing some crucial features. For example, most spell and grammar checkers tend to miss real-word errors (e.g., "their" vs. "there"), which comprise 17% of errors made by people with dyslexia in English (Rello, Ballesteros, and Bigham 2015). Although there have been efforts to develop dyslexia-specific spellcheckers (Rello, Ballesteros, and Bigham 2015; Pedler 2007; Li, Sbattella, and Tedesco 2013), most are limited by the errors they can detect or the availability of corrections to offer, and have not been widely adopted by our participants.

### Self-presentation and self-disclosure on SNSs

Self-presentation refers to strategic behaviors to "convey an impression to others which is in his interests to convey" (Goffman 1959). It is often selective, by keeping one's "true" self private while exaggerating favorable attributes or behaviors (Goffman 1959). It may help foster relationships and accumulate social capital from a desirable public image (Walther 2007). However, it can be undermined by *face threats*, which are acts or statements, either by oneself or by others, that are incongruent with one's self-presentation (Cupach and Metts 1994; Goffman 1967).

Self-presentation on social media has been studied extensively (Dimicco and Millen 2007; Zhao, Grasmuck, and Martin 2008; Bazarova et al. 2013). Recent work suggested conceptualizing self-presentation on social media as both "performance" and "exhibition", emphasizing the situational and long-term efforts required to manage it (Hogan 2010; Zhao et al. 2013).

Closely related, self-disclosure is "revealing intimate information about oneself to others" (Greene, Derlega, and Mathews 2006). Most self-disclosure on SNSs (e.g., status updates, tweets) is broadcast to a mass audience (Bazarova 2012) to achieve social validation, self-expression, and relationship building (Choi and Bazarova 2015).

The asynchronocity of social media affords content curation options (Zhao et al. 2013) and a longer grace period for regret (Wang et al. 2011), but has also created new challenges for self-presentation and self-disclosure. Compared to face-to-face communication, the larger and more diverse audience combined with the elaborate content ranking algorithms on SNSs has made it difficult to estimate the size and reaction of their audience (danah boyd 2008; Bernstein et al. 2013; Eslami et al. 2016). As a result, people are exposed to a higher risk of privacy breaches, involuntary information disclosure, and unintended presentations of self (Bazarova and Choi 2014; Haimson et al. 2015; Dimicco and Millen 2007; Vitak 2012). Furthermore, public face threats, like ones on social media, have more negative impact than private ones (Cupach and Carson 2002). To mitigate such risks, people engage in complex audience control (Bazarova and Choi 2014; Hogan 2010) and self-censoring (Sauvik Das 2013; Sleeper et al. 2013; Hogan 2010).

Most of these studies were conducted with a general population or college students, with very few studying self-presentation and self-disclosure by people with disabilities. Because of social stigmas, people with disabilities often have concerns about disclosing their condition (Bowker and Tuffin 2002; Marco's Accessibility Blog 2014). Even if they are comfortable with sharing this part of their identity and talking about disabilities on social media (Wu and Adamic 2014; Morris et al. 2016), they care about how it is perceived by their audience, wanting to present themselves as capable and independent while de-emphasizing the challenges created by their condition (Brady et al. 2013). Managing self-presentation and self-disclosure may be even more delicate for people with "hidden" disabilities, such as autism spectrum disorder (ASD) and learning disabilities. Morris *et al.* found that half of tech workers with ASD and ADHD chose not to disclose their diagnosis in the workplace, due to concerns about being judged negatively by colleagues and possible discrimination (Morris, Begel, and Wiedermann 2015).

Our work contributes to the literature by presenting the first formal study of how people with dyslexia experience social media, highlighting the challenges imposed by dyslexia for self-presentation and self-disclosure. Other research ex-

| ID | Age | Age at diagnosis | Gender | Occupation |
|----|-----|------------------|--------|------------|
| P01 | 36 | 13 | M | IT |
| P02 | 19 | 11 or 12 | M | College student |
| P03 | 23 | 19 | F | College student |
| P04 | 28 | 7 | F | Special Ed Teacher |
| P05 | 53 | early teen | F | Dispatcher |
| P06 | 57 | in 30s | F | Guidance counselor |
| P07 | 26 | 7 | F | Non-profit |
| P08 | 47 | 21 | F | Make-up artist |
| P09 | 21 | 6 | M | College student |
| P10 | 24 | 8 or 9 | F | Non-profit |
| P11 | 25 | 6 | F | Digital advertising |

Table 1: Demographic details of interview participants. All participants live in the US.

amines the role of language in identity construction and self-disclosure on social media, uncovering the importance of language in negotiating relationships and controlling impressions (Schwartz et al. 2013; Bazarova et al. 2013). Our work complements these studies by demonstrating the tendency for people to disengage in self-presentation and self-disclosure on social media when writing is a challenge.

## Interviews

### Method

We conducted semi-structured interviews with 11 participants from across the US, recruited from dyslexia organizations. Table 1 summarizes key details about the participants. All participants had been formally diagnosed with dyslexia at least four years prior to the interview. Consistent with previous findings that dyslexia often co-exists with other conditions (Rello 2015), several of our participants also had other learning or cognitive disabilities such as dyscalculia, dysgraphia, or dyspraxia.

Each interview lasted approximately one hour. We conducted three in person and eight via phone, and all were audio recorded and transcribed for analysis. Participants were compensated with a $75 Visa gift card.

We began by asking general questions about their dyslexia, such as their age at diagnosis and its effects. We then asked about their experience using Facebook, with an emphasis on their experience as a person with dyslexia. Based on their responses, we followed up on specific aspects of their experience (e.g., "what about writing status updates is challenging?"). We asked about challenges in both reading and writing content on Facebook, how they deal with those challenges, and their use of assistive technology.

We analyzed the transcribed interviews using inductive qualitative methods drawn from grounded theory (Burnard 1991). Interviews were reviewed and notes were taken about these key ideas. The authors reviewed the notes together and discussed key ideas, one author then coded all transcripts, then reconvened to review and discuss the coded material. We used affinity diagrams to organize these ideas into the themes we discuss below.

### Findings

Here we describe participants' use of SNSs such as Facebook, the specific challenges they face on social media, and strategies to alleviate these challenges.

**Facebook use**   Participants used Facebook for a variety of reasons: self-expression, entertainment, connecting with people, and organizing group events. However, at times their dyslexia affected their use of Facebook.

P03 and P08 found Facebook's visual content especially appealing. P08 enjoys viewing cooking videos on Facebook because the video format is more accessible than written recipes. Facebook was also a key way to connect with LD advocacy groups. P03 has no friends with dyslexia, so she appreciates having a space to share her experiences. P02 even used Facebook to launch a LD awareness campaign.

Social media is a significant part of several participants' lives, in that they are almost "addicted to it" (P02). P10's desire to express herself on Facebook instilled in her a life-long interest in writing, despite her dyslexia: *"In a weird way, Facebook was one of the huge reasons that I ended up becoming a writing major."*

**Challenges with reading on social media**   Overall, participants didn't find reading on Facebook to be especially challenging; only one of 11 participants found reading to be the bigger challenge when using Facebook.

One reason is that written content on Facebook is often brief compared to other content online (e.g., email, news), and there is a high proportion of visual content (Wu et al. 2017). P02 explained, *"a lot of the writing and stuff is pretty short...it's generally pretty easy to read,"* which was echoed by several participants. When encountering long posts, their strategy was to skip over them: *"I don't end up reading all of [long posts], because, let's be honest, it's gonna take me too much time to read that"* (P11). Similarly, P01 scanned longer posts for key words or phrases to understand the gist of them, rather than reading each individual word.

Formatting elements improved Facebook's readability. For example, the font is clear and easy to read: *"it's the perfect font for people with issues with reading"* (P03). Although some prefer larger fonts (P02, P05, P11), most found the current size appropriate: as P07 explained, *"it's not small, so that's great."* Furthermore, P07 noted that font colors help with text parsing: *"Names are always in blue...non-content that's just information is in gray and then the text is in black. Segmenting things in colors is really helpful."*

However, the high-contrast color scheme of black text on a white background hindered readability, and participants would prefer to have a different color scheme. Suggested background colors included cream, red, and yellow.

In general, participants didn't use assistive technology to help read content on Facebook. For example, P04 described not needing text-to-speech voiceover software when using Facebook because *"there aren't often large blocks of text."*

**Challenges with writing on social media**   In contrast, 10 of 11 participants found writing on Facebook to be a bigger challenge than reading. In fact, writing on Facebook was often so aversive that some avoided it entirely. For example, P03 said writing statuses was her least favorite thing to do on Facebook and that *"I've gone like three months without posting anything actually."* P05 stated that she is not comfortable

writing on Facebook, and P02 noted *"I very rarely comment [on Facebook]...maybe it has to do with finding writing too laborious."* The only exception was P10: *"I enjoy Facebook enough and I enjoy writing enough that I'm totally willing [to write despite the challenges]."*

In addition to challenges with writing correctly, participants also described difficulties in beginning writing. For example, P09 explained that *"it's just a struggle for me to get started...I can think of the ideas. It's just a struggle for me to put it down into words."* In these situations, they often refrain from writing anything. This is a challenge shared by the general population, similar to "writer's block". However, it is harder to address using technology, because of the complexity of providing authentic and appropriate inspirational support before writing starts, as opposed to correcting spelling and grammar in existing text. P06 wanted support: *"I don't really like writing from scratch. I like to have a skeleton I could work with and adjust to fit my style,"* but does not know of any technology that supports scaffolding.

**Anxiety about writing/self-presentation concerns** Participants not only reported avoiding writing content on Facebook, their feelings about writing were often emotionally charged. Most described having some anxiety about writing content on Facebook, driven by *"the fear of making a mistake that you're publicly showing"* (P04). This is a key reason why writing is more challenging than reading on social media: while reading is often an internal process in which errors occur privately, writing – as an "exhibition" and "performance" (Hogan 2010; Zhao et al. 2013) – displays writing struggles to their entire social network.

Our participants were acutely aware of how spelling errors are perceived on Facebook. At best, they are concerned that they will be ineffective at expressing themselves: *"I worry that I'm going to spell it wrong or I'm not going to be clear and people aren't going to understand me"* (P05). In this case, dyslexia interferes with their ability to use Facebook to achieve the self-expression and relationship building goals of self-disclosure (Choi and Bazarova 2015). At worst, they worry that their dyslexia undermines their ability to present themselves as capable, intelligent people. *"I don't want to write publicly...that's my biggest fear, I think, of not sounding as intelligent,"* P04 explained, concerned that manifestations of her learning disability will cause others to draw incorrect conclusions about her intelligence.

These concerns aren't simply that writing errors occurring in a public space will draw attention to an often otherwise invisible disability, as most of our participants were open about having dyslexia: *"I'm very open about my LD, but I still feel the need to come across as polished"* (P07). They still expect that writing errors will reflect badly on them, despite having dyslexia. These concerns are exacerbated by the perception that errors are archived. *"It's in the public sphere and I'd really rather [writing] not be incorrect for however long the internet lasts"* P07 continued.

Furthermore, concerns about writing content on Facebook specifically center around avoiding drawing negative attention to spelling errors in this public and archived domain. Several participants noted how others are critical of writing

errors. P10, the most enthusiastic about writing on Facebook, remarked *"it's true how harshly people judge people who spell words incorrectly, you know?"* This sentiment was echoed by several others as well; P11 believes *"when you post something public there's always scrutiny about grammar that's in the post"* and P07 said *"what's really annoying are the people on FB who correct people's spelling once they've posted something."* These judgments and corrections makes them wary to write publicly on Facebook.

Not only had participants observed others' spelling or grammar corrected on Facebook, in many instances their own writing errors had drawn negative attention from friends and family. P02 described how his sisters encourage him avoid writing on Facebook or delete already posted content: *"my sisters say, 'don't post [written content]. You need to delete it because people won't take you seriously with what you're saying,"* and that this makes him feel *"kind of like a bozo."* P03 has several family members who are writers, and *"they'll instantly want to autocorrect and don't understand it's rude...I hate it."* She responds by privately messaging them to ask to remove comments correcting her. Her mom now only corrects her privately, which alleviates some embarrassment. Her experience is consistent with the literature regarding the relative severity of public versus private face threats (Cupach and Carson 2002). For P01, who enjoys debating with others about science on Facebook, he feels that writing corrections are sometimes used by others to invalidate his points or derail the debate, which frustrates him.

The anxiety stemming from criticisms undermined participants' willingness to write on Facebook. P03 stated that anxiety about posting *"definitely"* means she posts less often and that it's *"one -liners at most...something silly that I know if I made a mistake in that no one's going to point it out,"* and P11 noted *"I don't want to be embarrassed by not having the right grammatical symbol or punctuation...that's a big obstacle [to writing]."* For P04, *"I'm not about to produce anything on social media, because who knows how that's going to make people view me."* Considering the social and psychological benefits of self-expression on social media (Ellison, Steinfield, and Lampe 2007; Burke, Marlow, and Lento 2010; Gonzales and Hancock 2010), and participants' desire to write on Facebook (e.g., P11: *"I wish that I did [post on Facebook]"*), this is an opportunity to better support people with dyslexia to feel more comfortable and empowered to write in these spaces.

Facebook also allows for private, direct messaging using Messenger. Participants described messaging friends as distinctly different from communicating with friends on Facebook through wall posts or comments, because writing on Messenger is not displayed publicly. For example, P04 explained that Messenger is less stressful because *"I don't care if I make spelling mistakes with my friends."* P03 elaborated further, explaining that *"my friends know that with me, they might get two messages after my original one, because I'm editing what I wrote, and that's okay with me."* For her, Messenger evokes less anxiety because it's meant to be an instant communication medium, and she doesn't need to come across as polished. This further reinforces that the social context of writing on social media creates more challenges and anxiety

than simply the difficulty of the task itself.

**Strategies for writing on social media**  Participants employed various strategies to cope with writing challenges.

*1. Editing/deleting posts*

When they do write content on Facebook, most participants are extra vigilant to ensure that their writing is clear. Before she posts, P03 explained that *"I kind of sit and I have to think through my status. Is it making sense?"* They described double-checking content in order to make sure it was written correctly before posting. However, when writing errors did occur, one way that they managed their public writing on Facebook was by editing and deleting content.

P08 described the feeling of making a writing error on Facebook: *"it's stressful, like 'oh my gosh I gotta get this off.'"* P03 likes that she can edit writing on Facebook, because she can adjust it after she or others notice. They edited and deleted a range of content, including posts, comments, and photo captions. P01 said that when he caught an error that *"I have to go back to it and re-edit it back to the way it was supposed to be."*

Overall, participants did not like that Facebook has visible edit histories. Because so much of the anxiety around writing on Facebook involves others' reactions, a visible edit history limits the effectiveness of this strategy. P07 and P10 didn't like that posts are shown as "edited". P03 recounted situations in which her friends joked about mistakes in her edit history (e.g., "ass" instead of "as"). She would instead prefer a *"grace period"* where edits would not be recorded.

*2. Asking for help from others*

Another strategy our participants employed was asking for help from others without dyslexia, specifically to proofread more significant content they wrote on Facebook. P05 often asked friends to proofread "*important*" things she wrote about on Facebook (e.g., getting a new job) to ensure that content was polished, and P06 relied on her son to proofread almost everything she wrote on Facebook. P08 described the emotional value of proofreading: *"sometimes I'll have someone read over my stuff and I'm like 'Oh my gosh, I'm glad I didn't hit enter.'"* In the absence of technological ways of ensuring error-free writing, friends and family serve as a trustworthy way of maintaining a positive self-impression on social media. The drawback of this strategy is that others are not always available and that editing can be time consuming for both the writer and the proofreader.

*3. Use of assistive technology while writing on Facebook*

Participants used several assistive technologies to effectively write content on Facebook. Facebook has no dedicated spellcheck tool, so they write and spell check using services like Microsoft Word, and then cut and paste checked content into Facebook. As a result, P06 *"hate[s] to write on my phone"* because she is used to using spellchecker software on her computer. P10 uses Google as a spell check tool: *"I have to Google the word and I copy and paste my status sometimes."* An advantage of using Google is that the search results provide more context than a traditional spell check tool, by showing how the word is used in a sentence (Fourney, Morris, and White 2017).

**Writing support requests**  While the strategies described above helped participants with writing on Facebook, there were still areas where more support is needed. Not surprisingly, a native spell and grammar check was desired by most. Moreover, several also suggested supports beyond a traditional spell/grammar check, specifically harnessing the power of machine learning algorithms to autocorrect and suggest what to write. P01 described *"an autocorrect feature specifically for a dyslexic person...as you type something in, it automatically changes to what it thinks you're putting in."* P08 wants a tool that generates text: *"it might say 'here are some suggestions of what you might be trying to say.'"*

## Survey study

### Method

To further explore the themes surfaced in the interviews, and to determine the extent to which these issues are unique to the dyslexia community, we designed an online survey targeted at a larger audience. It contained 13 questions, though some of these were shown only conditionally depending on previous answers. All questions were optional.

To ensure enough respondents with dyslexia, participants were recruited from the members of groups or fans of pages regarding learning disabilities on Facebook, who self-reported as English-speaking and living in the US. To control for participants' Facebook proficiency, we ensured that they had been on Facebook for at least one year, had at least 10 friends, had logged onto Facebook at least once per week for 4 weeks, and had written content on Facebook at least once in the month preceding the survey. We informed participants that their responses would be anonymized and potentially published for academic research. The survey took about 15 minutes to complete, and asked about challenges regarding reading and writing on social media, strategies to mitigate writing challenges, and social reactions to writing errors. Response options were randomized and scales were randomly flipped when appropriate. 492 participants (90.2% female, average age = 45.27) completed our survey[2]. We asked participants whether and when they were diagnosed with the following conditions: dyslexia; dyscalculia; dysgraphia; dyspraxia; ADD/ADHD; and ASD; 21 reported not having dyslexia but having at least one other condition. We omitted these 21 people who only have conditions other than dyslexia, and compared those who reported having none of the listed conditions (*non-dyslexia*, n=404) with those who reported having dyslexia (*dyslexia*, n=67). All survey data was anonymized after collection.

### Findings

**Challenges: reading vs. writing**  When asked *Which activity on Facebook is more challenging to you?*, with options (a) *Reading*, (b) *Writing*, (c) *Both are equally challenging*, more than half of both groups answered that writing is harder than reading on social media (50.7% for dyslexia, 51.2%

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[2]The gender distribution may be linked to the fact that women are more likely to seek health-related information and support online (Atkinson, Saperstein, and Pleis 2009; Duggan et al. 2015).
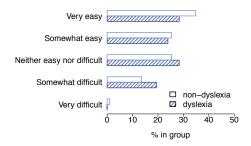
Figure 1: Self-rated level of difficulties with writing



Figure 2: Top writing challenges experienced

for non-dyslexia). Pearson chi-square test showed **no significant difference** between two groups: $\chi^2$(2, N=439)=0.3392, $p$=.844. This indicates that tools to better support writing on social media for people with dyslexia may also be useful for a broad audience.

Although writing is more challenging than reading for both groups, such challenges could be more detrimental to the overall experience of people with dyslexia, as suggested in previous research on the usability challenges for people with or without disabilities (Bigham, Lin, and Savage 2017). To quantify perceived writing difficulty, we asked all participants:*"How easy or difficult is it for you to write content on Facebook?"*, with response options on a five-point scale between *"Very easy"* (1) to *"Very difficult"* (5).

67 participants with dyslexia and 399 participants without answered this question, and the distribution of their answers is shown in Figure 1. The difference in the average score between the dyslexia (2.39) and non-dyslexia groups (2.21) is not statistically significant (Mann-Whitney U test: $p$= .19), indicating that two groups have broadly similar perceptions of the levels of writing challenge they face.

For respondents who indicated that writing is more challenging than reading, we also asked them to select the top writing challenge they experienced on Facebook (single choice question). The options were: (a) *Coming up with ideas and/or meaningful content*, (b) *Spelling*; (c) *Grammar*; (d) *Punctuation*; (e) *Structuring and organizing my thoughts*; (f) *Other (please describe)*. We chose the single choice format to understand the most pressing writing issue faced by people with and without dyslexia and the extent to which their primary concern differed. Furthermore, we considered a rank order format, but chose against it as they are more cognitively demanding, in order to keep the survey as straightforward as possible for people with dyslexia.

37 participants with dyslexia and 263 without answered this question, and their responses are shown in Figure 2. For those with dyslexia, their top challenge is spelling (**dyslexia = 35%**, non-dyslexia = 16%), whereas the top challenge for those without is coming up with ideas and meaningful content (dyslexia = 19%, **non-dyslexia =** 41%). This indicates that while writing is considered to be a greater challenge than reading for both groups, the biggest barrier to writing varies, and thus the most effective types of writing supports for these groups may be different. Since we were asking for the **top** challenge in this single choice question, the results

here do not prove that coming up with meaningful content is not a challenge for people with dyslexia. Nevertheless, we argue that people with dyslexia are much more aware of and concerned about spelling challenges when writing on Facebook. Figure 2 also shows much smaller differences across groups in other categories such as grammar, sentence structure, and punctuation. This could be explained by the prominence of spelling difficulties for people with dyslexia and the resulting data sparsity in other categories.

There were a few common themes among the *other* writing challenges described by survey participants. The top one is *"auto correct"*, which 11 noted as their top challenge. Interestingly, no one with dyslexia brought up auto correct, which indicates that people without dyslexia may be more likely to view it as a hindrance since it provides less value to them overall. *"Typing on mobile phone"* is another common issue surfaced in the write-in responses, also referred by our participants as the *"fat finger typing"* problem. This challenge occurs for people with and without dyslexia: among the nine who mentioned this, two self-reported as dyslexic.

**Reactions to corrections** Consistent with the findings from the interview study, people with dyslexia were more likely to receive negative feedback on Facebook due to writing issues. 468 participants (67 with dyslexia) responded to our question *"Has anyone ever corrected or commented negatively on the spelling or grammar of content you've written on Facebook?"* with the options (a) *Yes*; (b) *No*; (c) *I'm not sure*. Among them, 47.8% **of participants with dyslexia** answered "Yes", compared to only 22.1% without. The difference is statistically significant across groups: Pearson chi-square test $\chi^2$(2, N=468)=19.9, $p$< .001. This highlights the tension between self-expression and public face threats for people with dyslexia on social media.

And when negative feedback occurred, people with dyslexia had stronger reactions to it than those without. For the 32 people with dyslexia and 89 without who answered "yes" to the previous question, we asked *"How have you responded to those comments or corrections? (Select all that apply)"*, with the following options: (a) *I deleted the content*; (b) *I explained that I have a learning disability*; (c) *I didn't change anything*; (d) *I posted less in the future*; (e) *I edited the content*, (f) *Other (Please describe)*.

The responses are shown in Figure 3. Although the top reaction for both groups is to edit the content after negative comments or corrections, people with dyslexia were also more likely to self-censor by deleting the content (**dyslexia =** 25%,
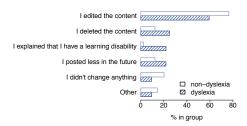
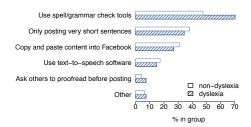Figure 3: Reactions following negative feedback about their writing on Facebook. Note: multiple choice question.



Figure 4: Common strategies for writing on Facebook. Note: multiple choice question.

non-dyslexia = 12%) or posting less in the future (**dyslexia = 22%**, non-dyslexia = 12%), whereas those without were more likely to keep the content with edits (dyslexia=59%, **non-dyslexia =** 76%) or no change at all (dyslexia = 9%, **non-dyslexia =** 20%).

**Strategies** To understand how people overcome writing challenges, we asked all participants *"Which strategies do you use when writing content on Facebook? (Select all that apply)"*, with the following options: (a) *Copy and paste content into Facebook*; (b) *Use text-to-speech software*; (c) *Ask others to proofread before posting*; (d) *Only posting very short sentences*; (e) *Use spell/grammar check tools (e.g., Grammar.ly, Microsoft Word)*; (f) *Other (please describe)*.

Figure 4 illustrates that the writing strategies employed by people with and without dyslexia are often similar, but people with dyslexia rely on spell/grammar check tools much more heavily. Among the 67 dyslexia participants and 404 non-dyslexia participants who answered this question, over 70% of the dyslexia group report using third-party tools for spell/grammar checking during writing, whereas only 48% of the non-dyslexia do so. This is consistent with the finding that spelling is the top writing challenge for people with dyslexia, and supports the interview insights about the importance of spell/grammar checkers.

We also asked all participants how often they edit or delete content on Facebook because of errors, with options being (a) *Never*, (b) *Rarely*, (c) *Sometimes*, (d) *Frequently*. A Pearson chi-square test[3] showed that the responses to this question differed significantly across two groups: $\chi^2(2,N=468)=27.12$, $p < .001$. In particular, people without dyslexia are more likely to have *never* or *rarely* edited

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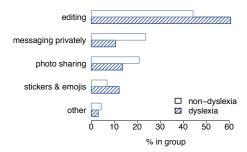[3]We combined "Never" and "Rarely" categories for chi-sq test.



Figure 5: Responses about most useful existing features for communicating on Facebook

or deleted content (dyslexia=13%, **non-dyslexia=**33%) and people with dyslexia are more likely to have *frequently* done so (**dyslexia=**48%, non-dyslexia=20%). This validates the findings from the interviews, demonstrates how people with dyslexia strive to control their self-presentation on SNSs.

**Facebook support** We asked all participants *"Which of the following features are most useful for you when communicating with others on Facebook?"*, with the following options (single choice): (a) *Being able to edit content*; (b) *Messaging someone privately*; (c) *Posting with stickers & emojis*; (d) *Photo sharing*; (e) *Other (please describe)*.

66 participants with dyslexia and 393 without answered this question and the responses from two groups differed significantly: Pearson chi-square test[4] $\chi^2(3, N=440)=11.07$, p=.011. While both groups considered *"being able to edit"* the most useful feature overall (Figure 5), participants with dyslexia were disproportionately more likely to select this than those without (**dyslexia =** 61%, non-dyslexia = 44%). The difference is also very pronounced for *"messaging privately"*, with more people without dyslexia (24%) finding this useful than people with dyslexia (11%). This may be due to the differences in writing challenges faced by people with and without dyslexia; for those with dyslexia, spelling is the perceived top challenge (see Figure 2), which does not change by switching to private communication channels. This finding calls out *editing* as so essential for writing for people with dyslexia that when choosing the *most* useful feature, they picked *editing* other than the other options. This can also explain why we do not see a higher percentage of the dyslexia group choosing photo sharing or stickers & emojis, even though interview participants appreciated visual-based communication. While this a single choice question, 9 participants utilized the write-in option to note that every listed option helped them.

## Discussion

Both interview and survey participants with dyslexia often reported writing as more challenging than reading when using social media. Our survey also confirms that the top difficulty for people with dyslexia is spelling, and they use technical

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[4]We dropped the "other" category because the number of people with dyslexia in this category is too small for chi-square test.

and social strategies to mitigate these difficulties and write more effectively on social media. Survey respondents with dyslexia also echoed interview participants on the negative consequences of writing errors, reporting higher frequencies of being called out on their errors and reacting more strongly to those incidents. The survey also complemented the interview study by comparing the writing experience between Facebook users with and without dyslexia.

While the increasing amount of visual content provides a fun and expressive way for people to communicate online (Wu et al. 2017), language is still important in constructing self-identity and building communities on SNSs (Danescu-Niculescu-Mizil et al. 2013; Seargeant and Tagg 2014). However, the survey results showed that writing was a bigger challenge for both groups, although the biggest barriers to writing are different for people with and without dyslexia. These findings are significant for two reasons. First, with most of the previous research regarding online accessibility for people with dyslexia has focused on understanding or supporting reading, our findings suggest that a deeper exploration into the writing experience as well as better dyslexia-specific writing supports is warranted, to facilitate access to the benefits of engaging on social media. Second, our results indicate that a well-designed writing tool created for the dyslexia community could also benefit a broader audience.

We also found that when people with dyslexia write on Facebook, they are more likely to receive negative attention because of writing errors. When compared to those without, they also report taking more extreme measures in response to these public face threats. Furthermore, they are more likely to edit or delete posts because of writing errors than their non-dyslexic counterparts. Taken together, these findings further support that people with "hidden" disabilities such as dyslexia are often especially careful in how their conditions are presented to others (Morris, Begel, and Wiedermann 2015), and that even if they are open about having dyslexia, they are still concerned with writing errors undermining their ability to self-present as capable, intelligent people (Brady et al. 2013).

As a result, we found that writing on social media is a challenge for people with dyslexia not only because of the difficulty of the task, but also because it is an emotionally charged activity. The anxiety stemming from writing errors undermines their control of self-presentation in these spaces; and they also experience potential or actual face threats when writing errors are highlighted by others (Cupach and Carson 2002). On social media, writing is an activity that takes place in front of a wide audience and where errors are open to scrutiny (Hogan 2010; Zhao et al. 2013; Bazarova and Choi 2014; Haimson et al. 2015; Dimicco and Millen 2007; Vitak 2012), whereas reading is mostly an internalized process where errors can be discreetly remedied. In many ways, writing on social media is a minefield, and makes people with dyslexia concerned about a misstep.

**Design implications**  These findings have implications for designing tools to improve writing on social media for people with dyslexia. First, although both people with and without dyslexia reported that writing on social media was harder than reading, the nature of what was most difficult varied, and this should be considered in support tools. For example, spelling is a major challenge, yet mass market tools like spell check and autocorrect are abundantly available. However, they are less reliable at identifying and remedying the types of errors that people with dyslexia are especially prone to making. Additionally, the suggestions or corrections are made without context, making it difficult for them to evaluate and pick the right suggestion/correction. Tools that better account for the specific challenges of people with dyslexia would help reduce the difficulty of the task, and promote confidence in writing on social media.

However, an effective writing support tool for people with dyslexia must take into account not only task difficulties, but also its role in self-presentation and self-disclosure on social media. This approach should be delicate and adaptive to the social and emotional context around writing. For example, a tool could provide extra confirmation or edit suggestions before posting to their wider social network, where the risk of face threats is higher and comes with greater consequences (Litt et al. 2014), but not in private communication. Features that do not directly involve text but change posting dynamics can also benefit this community. For example, mechanisms like "scheduled posting" could allow for a grace period to craft and review text, reducing the likelihood of mistakes.

While our intention was to understand how to better support writing for people with dyslexia, we found that people without dyslexia find writing on social media challenging as well, suggesting that writing supports developed for the dyslexia community could also benefit a broader population. As such, we encourage researchers and designers to explore writing assistance tools for social media that are tailored for the needs of people with dyslexia while still appealing to a broader audience. For example, as our study shows that a lack of ways to kick-start writing is challenging for both groups, a tool that offers drafted text could be beneficial as scaffolding for people with dyslexia and inspiration for those without. In fact, a general writing support tool may also be less stigmatizing to adopt (as much of the preferred "assistive technology" described by participants are mass market tools like spell check and Google search).

**Limitations and future work**  There are a few limitations in our work. First, all survey questions and nearly all interview questions asked specifically about experiences with reading and writing on one specific SNSs - Facebook. Future work should explore these themes with other SNSs and other forms of written communication.

Participants were exclusively US-based, thus may not be representative to people from other cultures, especially to those with different languages (e.g., non-latin characters) or social structures (e.g., where self-presentation is more or less important). Comparing the social media experiences of people with dyslexia across cultures is a topic for future research. Furthermore, participants in both the interview and survey were overwhelmingly women; future work should ensure that these findings hold true among men.

These challenges regarding writing on social media present clear opportunities for future work, particularly the design

and development of tools to support effective writing.

## Conclusion

Although categorized as a learning disability, dyslexia impacts the ability to process and generate written information, and can have lasting effects on how we communicate and express ourselves on social media. In this paper, we present one of the first studies that examines the challenges and coping strategies of people with dyslexia on SNSs, based on interviews of 11 participants with dyslexia and a survey of 492 Facebook users with or without dyslexia.

Our findings reveal that, when compared to reading, writing is a bigger challenge for social media users with dyslexia. Although writing is also challenging for people without dyslexia, the biggest barrier to writing differs across the two groups. Confronted with the social stigma associated with "poor" writing, people with dyslexia spend more time and effort improving the quality of their writing, and have been relying heavily on digital assistance such as spell and grammar checkers and search engines (although many of these technologies were not designed or targeted at their use case). Besides being technically challenging, writing is also a very emotionally charged experience for them. Even though most interview participants are comfortable identifying as people with dyslexia, writing on social media is a struggle because it often lessens their sense of control on whether and how to share this part of their identity with their social network. They are also more likely to receive negative feedback about their writing that exacerbates their stress and anxiety. As a result, they are more likely to have stronger reactions to feedback, such as self-censoring.

We hope these findings demonstrate the gap between current social media technology and the needs of people with dyslexia, and inspire both the research community and industry to design and develop better writing supports.

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