Finding My Voice over Zoom: An Autoethnography of Videoconferencing Experience for a Person Who Stutters

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ABSTRACT

Existing videoconferencing (VC) technologies are often optimized for productivity and efficiency, with little support for the "soft side" of VC meetings such as empathy, authenticity, belonging, and emotional connections. This paper presents findings from a 15-month long autoethnographic study of VC experiences by the first author, a person who stutters (PWS). Our research shed light on the hidden costs of VC for PWS, uncovering the substantial emotional and cognitive efforts that other meeting attendants are often unaware of. Recognizing the disproportionate burden on PWS to be heard in VC, we propose a set of design implications for a more inclusive communication environment, advocating for shared responsibility among all, including communication technologies, to ensure the inclusion and respect of every voice.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in accessibility**; **Computer supported cooperative work**; *Interaction design theory, concepts and paradigms.*

KEYWORDS

stuttering, videoconferencing, autoethnography, computer-mediated communication, accessibility, Zoom, mindfulness

1 INTRODUCTION

Stuttering affects one percent of the population worldwide [12]. Typically characterized by speech repetitions, prolongations, and blocks, stuttering also triggers adverse emotional and cognitive reactions in everyday communication, significantly impacting the quality of life for people who stutter (PWS) [95]. The communication challenges faced by people who stutter often stem from

listeners' negative responses rather than speech disfluencies themselves [19]. Extensive research shows that people who stutter frequently encounter social rejection [23, 28], stigma [14], and discrimination [16], which limit all aspects of life, including social interactions [13], educational achievements [41], and employment opportunities [45].

In an age of remote work and telecommunication, communication challenges for people who stutter are often exacerbated by the use of telecommunication technologies that are *not* designed to accommodate speech diversity. Recent benchmarking of automatic speech recognition (ASR) systems revealed significant performances disparity between fluent and stuttered speech [62], rendering speech interfaces inaccessible for people who stutter [10]. Previous research on stuttering and videoconferencing (VC) identified both the benefits and challenges of videoconferencing for people who stutter, highlighting the extra - yet invisible - emotional and cognitive efforts required for their participation in VC meetings [99]. This study expands on prior research to delve deeper into the *hidden* cost of videoconferencing for people who stutter, through an autoethnographic exploration of VC experiences by the first author, a person who stutters. Spanning over 15 months across various VC scenarios, the autoethnographic data provides insights into the intricate cognitive and emotional complexities people who stutter navigate during VC calls, offering unique PWS-centered perspectives on their videoconferencing experiences.

Our contribution to HCI, CSCW, and accessibility research is twofold.

First, we bring a methodological contribution by utilizing autoethnography to gather in-depth, longitudinal data from a population often overlooked but profoundly affected by telecommunication technologies. Our autoethnographic approach was meticulously structured to encompass diverse VC contexts and situations, capturing the variability of stuttering and the interplay between the speaker, audience, and technology. Qualitative and quantitative data were collected over 43 VC sessions regarding the behaviors, feelings, and thoughts of the first author before, during, and after these meetings, providing a rich corpus for analysis and reflections.

Second, our examination of this rich autoethnographic data contributes to a first-person, nuanced understanding of the inner workings and complexities of thoughts and emotions underlying the meeting behaviors of people who stutter. Our findings indicate that despite socio-technical limitations and speech difficulties, people who stutter **can** attain satisfying VC experiences through mindfulness, self-compassion, and support from their audience.

As videoconferencing becomes the dominant medium for professional communications, it introduces a myriad of new challenges, including physical and mental fatigue [8, 38], distractions [63], and a

diminished sense of connectedness [92]. Although these challenges are widespread, they may disproportionately impact marginalized social groups, such as women [32, 87] and people with disabilities [74, 91, 99, 105], making workplace less equitable and inclusive. By extrapolating the experiences of people who stutter, our research offers important design implications for VC technologies that could benefit all users. We argue that, instead of efficiency and productivity, future VC technologies should prioritize enhancing the emotional experience of videoconferencing, addressing socially challenging moments, and facilitating emotional exchanges among participants. Researchers and designers of VC technology should also explore the value of vulnerability in video conferences, establishing mechanisms and opportunities for participants to share vulnerable moments and identities, fostering deeper, trusting relationships with each other. Lastly, our autoethnography of VC experiences reveals the potential for VC as an effective and convenient medium for self-therapy. Future VC technologies should explore opportunities to support users during challenging moments and promote long-term personal growth.

2 RELATED WORK

In this section, we first review foundational research on stuttering as a background for our work. We also discuss research on videoconferencing technologies and their impact to people with disabilities. Lastly, we review the method of autoethnography, especially its application in accessibility research to contextualize our work.

2.1 Stuttering

Stuttering is a neurodevelopmental condition that is often associated with "atypical" speech behaviors such as repetitions ("li-li-like this"), prolongations ("lllllike this") and blocks ("l—ike this") [11]. However, stuttering also affects people on emotional and and cognitive aspects [12], creating internal struggles in PWS that are not easily observed by the listeners ("iceberg theory") [82]. PWS often suffer from negative thoughts and feelings, poor self-image, and avoidance behaviors due to stigma towards stuttering [12], as a result, experience a reduced quality of life in many aspects including mental health, relationship, education, and employment [24].

Beyond measuring observable "speech disfluencies", stuttering is increasingly understood through the subjective experience of the speaker, such as the feeling of a loss of control on one's speech [95]. This epistemic shift in stuttering research and therapy led to a breakthrough on our understanding of stuttering [93], and has spurred the development of support strategies that focus on fostering a positive identity and experience with stuttering, rather than solely enhancing speech fluency [20, 83]. In contrast to fluency shaping therapy for stuttering, research indicates that self-help groups and stuttering affirmative therapy incorporating mental health techniques - such as Cognitive Behavioral Therapy (CBT) [58] and Mindfulness-based therapy [9] - are more effective in promoting the long term well-being of PWS [93].

As a communication "disorder", stuttering is highly variable [96] and inherently social [52]. The severity and individual experiences of stuttering can vary considerably across individuals, situations, and conversation partners. Capturing this variability has been challenging in clinical settings, limiting research on stuttering and the generalizability of techniques and strategies acquired during therapy sessions to real life situations. While the underlying causes for the variability in stuttering are not well understood, research has found its links to situations, tasks, audiences, and the speaker's emotional state [93].

Prior research and clinical work on stuttering underscore the importance of better understanding the experience of PWS during and around moments of stuttering, encompasing their affective, behavioral, and cognitive reactions, as well as environmental factors [93]. Building upon these insights, we conducted the autoethnographic study based on the first author's subjective experience of videoconferencing over a variety of situations as a person who stutters. By foregrounding the first author's personal experiences as the source of knowledge and expertise [17, 29, 35], our approach not only reinforces the epistemic authority of PWS in defining and improving the stuttering experience, but also yields comprehensive qualitative and quantitative data regarding stuttering within an evolving communication medium - videoconferencing - a domain not fully explored by researchers and clinicians previously.

Despite the prevalence of stuttering, HCI research has notably underrepresented the needs of the stuttering community, with few exceptions such as [10, 30, 36, 42, 72]. Existing technical research and products for PWS primarily concentrate on enhancing speech fluency, and could be categorized into two approaches according to [99]. One approach aims to manipulate PWS and make them speak more fluently [30, 36, 42, 89]. For example, delayed auditory feedback (DAF) [89] lets the speaker hear their voice with a timed delay to create a "choral effect" that could induce temporarily fluency for some. Another approach manipulates the speech without necessarily altering the speaker's behavior. For instance, Google's Project Relate provides a Repeat feature that repeats what the user said in a "*clear*" and "*synthesized voice*" for better automatic speech recognition results [2]. However, by focusing on fixing and hiding speech disfluencies, these technologies reinforce ableist norms on fluency, inhibiting PWS from developing a positive identity and experience with stuttering [83].

Recognizing the value of self-acceptance, resilience, and a stuttering-affirming environment in achieving positive long-term outcomes for PWS [79, 93], our study emphasizes the socioemotional aspects of stuttering within VC, particularly in high stressed situations. Our findings highlight the added socio-technical tension imposed by VC technologies on PWS, offering ideas for a more stuttering friendly VC environment.

2.2 Videoconferencing

Driven by the global shift to remote and hybrid work, Videoconferencing (VC) has become an integral part of professional and social interactions. VC offers real-time, multi-modal communication across distances when face-to-face meetings are impractical [37]. Despite its benefits, videoconferencing presents challenges such as reduced non-verbal cues, turn-taking confusions, constant distractions, reduced physical movement, heightened self-consciousness from self-view, and connection issues, contributing to the common experience of "Zoom fatigue" [8, 63]. The shift to VC also comes with implications for our social connections. While VC keeps people

connected over distances, it does not necessarily facilitate spontaneous interactions and deep connections as in face-to-face settings, potentially leading to feelings of loneliness [71].

Recent accessibility research shows that VC brings unique benefits as well as new challenges to people with disabilities. Tang *et al.* [91] interviewed 25 individuals with various disabilities about their telework experience, finding that while telework provides people with disabilities more flexibility and control to work in preferred environments, it also introduces challenges, particularly with the video channel. It requires significant effort for users with disabilities to manage the video channel, and sometimes creates accessibility conflicts: e.g., blind VC participants prefer to turn off their videos as they can not see or do not want to show themselves, making lip and expression reading more difficult for Deaf and Hard-of-Hearing (DHH) participants. Similarly, neurodiverse people often need to put in more effort to manage their video and audio over VC. Zolyomi *et al.* [105] studied VC use for autistic adults and found that sensory sensitivities, cognitive challenges, and anxiety made VC interactions difficult for them [105]. Our work is directly informed by recent interview study on the VC experience of people who stutter [99]. While the study found several benefits of VC for PWS such as reduced mental barrier to show up and more options to mask stuttering, it also highlighted distinct hurdles for PWS to engage in VC calls: the self-view feature introduced additional stress and distractions, voice-dictated turn taking mechanism puts PWS at a disadvantage, and the reduction of non-verbal communication channels undermines the effectiveness of PWS's current communication strategies [99]. This study aims to complement existing work [99] by providing a longitudinal, personal, reflective, and emotional perspective of the VC experience for PWS that are hard to capture via interviews. We review the method of autoethnography and justify our adoption of this approach in the next section.

2.3 Autoethnography

Autoethnography, a subset of first-person research methods, refers to an approach in that researchers become participants in an ethnographic study to get a first-hand understanding of users' everyday lived experiences [4]. Autoethnography method has gained popularity in HCI over the past decade [40, 49, 53, 54, 64, 67, 69, 75, 88]. It provides a unique perspective that embraces the subjectivity in the research, *"Autoethnography is one of the approaches that acknowledges and accommodates subjectivity, emotionality, and the researcher's influence on research, rather than hiding from these matters or assuming they don't exist"* [34].

Autoethnography also has the unique benefit of obtaining an intimate and longitudinal understanding of nuanced experiences when the user population is marginalized or hard to reach [31]. For example, Jain collected a 2.5-year autoethnographic travel journal of himself as a hard-of-hearing traveler, offering valuable insights into accessible travel technologies for DHH users [53]. Homewood [49] employed an 18-month autoethnography on her use of self-tracking technology to mitigate long COVID, providing rich design implications of pacing technologies.

In accessibility research, researchers with disabilities often adopt autoethnography to offer rich and firsthand insights into their experiences, informing the design of more accessible technologies

[53, 54, 69, 88]. For example, a research team in Microsoft reflects on their experiences as a mixed-ability, virtual team through autoethnography, discussing the evolving accessibility barriers and offering guidelines to support accessible virtual collaboration [69]. While VC is a routine activity for many, for those with communication challenges like PWS, it is layered with the emotional and cognitive effort required to manage one's speech and identity [99]. Previous research on stuttering and VC use relied on a single interview with 13 PWS, offering a detailed view of their VC experiences but not fully capturing the varied, context-dependent challenges they face. This work distinguishes itself by conducting a more longitudinal deep dive with the VC experience of one person who stutters (the first author).

By drawing from the deep and personal experiences of the first author, both as someone who stutters and an HCI researcher, we aim to provide a unique and complementary perspective beyond the insights gained from traditional user-centered design and research methodologies. It's worth noting despite the unique benefits, autoethnography also presents challenges such as the inherent subjectivity and bias, balancing the personal and the analytical voice, emotional intensity, and vulnerability of the researcher [7, 55, 61]. Considering those challenges and benefits, we carefully adopted the autoethnographic method by (1) having structured detailed documentation for the first author's VC experience through a structured questionnaire (2) having other authors supporting the first author practicing reflexivity in data analysis and the writing process.

3 BIOGRAPHY

This paper is based on the autoethnographic account of the first author's experience with videoconferencing over a 15-month period from May 2022 to July 2023. To contextualize the autoethnography, we first share the background information about the first author, in particular, her history with stuttering, her use of videoconferencing, as well as other aspects of her identity that could impact her stuttering and videoconferencing experiences.

The first author is a person who stutters and has been stuttering since childhood. Consistent with recent findings [68], the first author has experienced strong negative reactions and social stigma to her stutter as she grew up in China, and received no professional or peer support before adulthood. As a result, she has developed strong emotional reactions and self stigma of stuttering, and acquired many avoidance strategies [84] to conceal her stutter. The top strategies include word substitution, use of filler words, circumlocution, and avoidance of high-stress speaking situations such as self introduction and public speaking. Many of these avoidance strategies have become an integral part of the first author's speech behavior over time, in place of typical stuttering behaviors such as sound repetitions and prolongation. The first author's stutter can be described as covert stuttering, "*a type of stuttering experience that occurs when a person who stutters conceals his or her stutter from others, attempting to be perceived as a nonstuttering individual*" [33].

The first author sought out speech therapy services in the US in her late twenties, starting with fluency shaping techniques [44] that focused on altering her speech behaviors (e.g. speech rate, breathing pattern) to produce more fluent speech. Like many others who underwent fluency shaping therapy [101], the first author

did not find those techniques effective in real life situations and withdrew from the therapy after 1.5 years of weekly individual sessions. The first author was later introduced by a stuttering co-worker to an acceptance-based speech therapy program for covert stutterers [15] that met weekly for two hours over Zoom from October 2021 to April 2022. With a focus on changing personal attitudes and feelings associated with stuttering [101], the first author found this therapy approach tremendously helpful in coping with the mental stress caused by stuttering. The first author then participated in several other acceptance-based programs that featured different practices including Acceptance and Commitment Therapy (ACT) [9], Avoidance Reduction Therapy for Stuttering (ARTS) [84], and Trauma-Informed Therapy [85]. The positive experience with acceptance-based speech therapy helped the first author establish and accept her identity as a person who stutters and contributed to the shift in her perspective to value open and comfortable stuttering over fluency.

Despite the documented benefits of self-help groups and community support for PWS [50], the first author did not participate in any stuttering-related self-help group or community until recent years, as she had been actively concealing her stuttering behavior and her identity as a person who stutters. She first encountered the stuttering community in 2019, when referred by a co-worker to the employee resource group (ERG) for employees who stutter at her workplace. Reluctant at first, the first author became an active member of the ERG after experiencing the support and empathy from the group. Motivated by this experience, the first author started to engage with other self-help groups for PWS in the US and internationally, building a diverse network within the stuttering community, and participating in stuttering-related social events, conferences, and workshops. The extensive interactions with the stuttering community exposed the first author to the prevalence of socio-technical barriers faced by PWS, while allowing her access to diverse experiences and perspectives within stuttering.

Aside from stuttering, the first author works in technology research and development, with experiences and expertise on data science, accessibility, HCI, and AI. The first author had worked as a software engineer and research scientist in a large US technology company, and is now working for a nonprofit organization with a role that requires frequent public speaking. Throughout her professional career, the first author has used videoconferencing extensively for distributed collaboration. However, as she became a permanent remote worker and work from home full time since the COVID-19 pandemic, videoconferencing becomes the dominant medium for her professional communications, and she on average spends one to two hours each day on work-related video calls. She also spends on average two to three hours per week participating in stuttering-related events such as speech therapy and self-help groups over videoconferencing (i.e. Zoom). Overall, videoconferencing is currently the most prominent channel for the first author to connect and communicate with the external world outside her immediate family. Understanding and improving her videoconferencing experience is thus particularly meaningful for the first author, both professionally and socially.

Intersectionality plays a role in the first author's videoconferencing experiences as well. As a woman, an immigrant, a non-native English speaker, and a tech worker in the male-dominated field,

the first author has experienced constant pressure to "lean in" and to pass as fluent. The first author adopted certain VC strategies to manage the intersectional tension, such as always disclosing her stutter upfront to prevent confusion between stuttering and a lack of English proficiency for the listener. At the same time, the first author recognizes her privileges as cis-gendered, upper-middle class Asian woman due to her socio-economic status and educational attainment. The first author acknowledges that her experiences might not be shared by other people who stutter, as stuttering community is not monolithic but immensely diverse over personal and sociocultural dimensions.

The other authors, who do not self-identify as people who stutter, joined the first author later in the research in supporting her in the analysis and presentation of the autoethnographic data, particularly connecting her personal narratives with broader social, political, and cultural meanings [4]. Their positionality introduces a more balanced perspective on data analysis while preserving the authenticity of the first author's personal account.

4 METHODOLOGY

4.1 Motivation for autoethnography

The first author began documenting her videoconferencing experiences in early 2022, as a coping mechanism for stuttering and stuttering-related struggles.

Similar to many others who stutter, the first author found videoconferencing with unique, new challenges for her communications, especially since she started remote work in early 2020 [99]. When discussing these challenges in self help groups in 2022, writing therapy [77] was recommended by several group members as beneficial for reflecting and healing from difficult speaking experiences. This led the first author to start journaling her most challenging speaking experiences to unpack the situation and her feelings.

Around the same time, the first author started participating in an Acceptance and Commitment Therapy (ACT) program for people who stutter [9], which emphasized recognizing and accepting emotions and thoughts associated with stuttering rather than letting them dictate one's actions. To apply ACT principles outside the therapy sessions, the first author wanted to be more mindful about her emotions and thoughts in daily conversations, especially when physically struggling with her speech. The first author was concurrently participating in the Avoidance Reduction Therapy for Stuttering (ARTS) [84], which encouraged people who stutter to identify and challenge their avoidance behaviors such as avoiding certain words or avoiding to speak at all. The ARTS therapy approach inspired the first author to start tracking her avoidance behaviors in everyday communications.

As the first author noticed that she stuttered more in professional and public communications, which almost always took place over videoconferencing given her remote work situation, she decided to focus on her VC experiences, and structured her free-form journaling into a questionnaire with sections covering goals and summary of speaking situations, emotional, cognitive, and speech experiences, as well as avoidance behaviors. Next, we provide more details about the questionnaire.

4.2 Autoethnographic data collection

To document her videoconferencing experiences systematically and consistently, the first author designed a Google Form questionnaire, which she filled in before and after 43 VC meeting over a 15-month period from May 2022 to July 2023. These recorded responses to the questionnaire form the basis of the autoethnographic data used for our research.

4.2.1 VC experience questionnaire. Informed by the first author's speech goals and challenges, as well as previous research on measuring the experience and impact of stuttering [21, 102], the questionnaire was structured into six primary sections, with some questions to fill out before, and some after the VC meeting:

(1) Speaking goals: This section captured the utility, behavioral, emotional, and cognitive goals for the meeting, along with 5-item self-ratings on how successfully these goals were met.
(2) Speaking partner: Multiple choice questions about the conversation partner(s) such as their gender, social status, whether they knew about the first author's stutter, whether they stutter, and their levels of interest and appreciation of what the first author said in the meeting. Previous research found individual's stuttering behaviors could vary greatly depending on the speaking partners [96], we thus recorded meta-data about speaking partners as identified in [21] to understand their impact on the first author's VC experience.
(3) Fluency: Questions included 5-item Likert scale self-ratings on the frequency of speech disfluencies, such as blocks, usage of filler words, word/sentence restarts, and pauses. The Likert levels were customized to the first author's stuttering patterns, from low "*Not at all (over the entire meeting)*" to high "*Several times per sentence*".
(4) Spontaneity: Spontaneity for PWS refers to the state when speech is effortlessly produced with little premeditation or hesitation [21]. We captured speech spontaneity in the questionnaire as it was shown to have a bigger effect on PWS's speaking experience than fluency [21]. Questions in this section were adopted from previous research on stuttering and spontaneity (see [21]), including 18 5-item Likert scale self-ratings on the degree to which the first author spoke spontaneously in the meeting, and the physical and mental tension associated with speaking. For example, "*How much did the possibility of disfluency affect what I said?*" ("*Not at all*" to "*Always*"), and "*How much physical tension I felt while speaking?*" ("*Low*" to "*High*").
(5) Avoidance: 7-item Likert scaled (from *"Not at all"* to *"All the time"*) questions on self observed frequencies of different avoidance behaviors, such as avoiding difficult words, feared sentences, eye contacts, specific people, or situations like introduction and disagreement.
(6) General assessment: Questions on overall satisfaction and top emotions post meeting.

Unlike previous research designed to collect survey responses from participants who stutter [21], the autoethnography questionnaire also included one open-ended question in each section for general reflections and detailed notes about the corresponding aspect of the meeting (i.e. "*Other notes about ...*"). These open-ended questions enabled us to collect detailed introspective data while also serving the original journaling purpose for the first author.

4.2.2 Data collection. To collect the autoethnographic data, the first author completed the questionnaire for 43 VC meeting over 15 months.

The frequency of data collection fluctuated over time. While the first author documented her meetings regularly at the beginning (18 meetings in May 2022), it was challenging to maintain the momentum and temporal consistency: there were periods during which no meeting was documented due to travel and vacation (Jun 2022 - Jul 2022, Sep 2022 - Oct 2022), and only 4 meetings were collected when her workload got heavy (Nov 2022 - Mar 2023). This temporal pattern points to a prominent barrier for autoethnography of marginalized experiences: it is both laborious and emotionally taxing. Completing the questionnaire for a single VC meeting took an average of 20 minutes, demanding considerable time and mental commitment from the first author, particularly when already fatigued from extensive videoconferencing [8, 99].

Given that stuttering is highly variable and influenced heavily by the speaking situations [21, 52, 93, 96], the first author deliberately included a variety of VC meeting *contexts* and *audience types* in the autoethnographic data. Over the 43 documented VC meetings, 21 (49%) were in professional contexts (e.g. team meetings, partnership calls, interviews), 12 (30%) were for learning and education (e.g. speech therapy, self help groups, parenting workshops), 8 (19%) were community events (e.g. the World Stuttering Network's annual virtual conference, interview by podcasts hosted by people who stutter), and 2 social meetings (e.g. chatting with friends and acquaintances). The first author also documented VC meetings with different audience sizes and levels of familiarity, including: 13 (30%) one-on-one meetings (8 with a familiar partner, 5 with a stranger), 24 (56%) small group meetings (14 with familiar partners, 10 with at least one strangers), and 6 (14%) large meetings (one with about 20 strangers, 5 public speaking).

To better understand the tension between stuttering and videoconferencing, the first author emphasized her data collection on meetings where she expected the tension to be high for her, such as public speaking or meeting with strangers, rather than low-friction ones, such as one-on-one's or small group meetings with friends and colleagues. As a result, the autoethnographic data were not a random sample of the first author's VC meetings, but oversampled high stressed, challenging situations. The emphasis on challenging speaking situations also served as a form of writing therapy that provided mental health benefits to the first author [77].

4.3 Data analysis

The richness of the autoethnographic data allowed us to deploy a mixed-method approach, combining quantitative and qualitative analysis methods to build a more comprehensive and robust understanding of the experience of PWS with videoconferencing.

While our primary findings are based on open and axial coding of the first author's open-ended reflections [81], our qualitative analysis were deeply integrated and informed by the quantitative analysis of meeting meta-data and the first author's self-ratings on different aspects of her meeting experiences. Our data analysis consisted of the following steps:

(1) To start, the first author and the second author went through the data separately and conducted open coding, creating open codes and memos that summarized the first author's VC experiences as a person who stutters, as well as the technical and situational factors that impacted her communications on VC. We also leveraged the quantitative dimensions of the data to facilitate the coding and interpretation of the qualitative data. For instance, sorting the meeting entries by satisfaction ratings or the level of tension experienced helped us identify top challenges and effective strategies from the qualitative data; grouping the entries by the meeting context or audience size made it easier to code the situational effect on the first author's VC experience.

(2) In parallel with the open coding, the first author performed correlation and regression analyses of the quantitative data to understand the relationships between situational factors (e.g. meeting context, audience) and stuttering experiences (e.g. fluency, spontaneity, avoidance), and how they predicted the first author's overall satisfaction with her VC meetings.

(3) Next, the first two co-authors met to discuss, refine, and categorize their codes into themes and categories (axial-coding). Our axial coding process was informed by the quantitative analysis, with new insights and high-level themes often emerging from the convergence of the preliminary qualitative and quantitative results. For example, the statistically significant correlation between self-ratings of avoidance and overall satisfaction, as observed in the quantitative data, prompted us to dive deeper in our qualitative analysis of the first author's reflection on avoidance, coding the challenges, strategies, and gains specific to open stutter. Similarly, the observation of increased tension as well as reduced fluency in public speaking led us to group our initial codes and notes on this situation together to understand the mechanism of the struggle, uncovering the common technical and non-technical factors that had exacerbated or alleviated the tension experienced by the first author.

(4) We iteratively performed the aforementioned steps of open- and axial-coding of the qualitative data, aided by insights from the quantitative analysis, for several rounds before converging on the key findings of this study.

In addition to discussing the qualitative coding and reviewing the quantitative results together, the first two co-authors also engaged in three 75- to 120-minute conversations, in which the second author asked constructive questions based on the first author's journal entries. The second author's position as a non-stutterer, an experienced UX researcher, and a trusted colleague allowed her to ask questions that clarified details in the reflection notes and helped the first author develop a personal narratives (e.g., How has this challenge changed over time? Why was stuttering openly important to you?). These conversations were instrumental to uncover deeper insights from the personal data and to practice reflexivity.

The active involvement of the first author in the data analysis was pivotal in our autoethnographic HCI study, aligning with established practices in this field [40, 49, 53, 75]. This approach crucially engaged the firsthand experience of stuttering and preserved the author's testimonial authority, a hallmark of first-person research [31, 35]. Autoethnography demands more than mere data recording and analysis — it integrates the ethnographer's personal experience and perspectives into data interpretation [34]. In our study, the analysis enriched by the first author's lived intersectional experiences provided nuanced insights that might have been overlooked if solely conducted by others. This active involvement empowered the first author to challenge the prevalent listener-centered conceptualization of stuttering in research and public discourse, asserting her epistemic agency [95].

5 FINDINGS

We now present the findings on the social, technical, and situational factors that impacted the first author's videoconferencing experiences as a person who stutters. This section is structured to start with an overview of the key insights from our qualitative and quantitative data analysis, followed by vignettes of three representative videoconferencing situations to provide rich and personal description and interpretations of the first author's VC experience as a person who stutters, uncovering the emotional and cognitive efforts for her to participate, and how the current VC affordance supported or marginalized her in remote meetings.

For the remainder of this section, we shift to a first-person singular narrative to bring out the first author's personal and inner voices. We also hope that a closer and more intimate voice will enable the reader to better empathize with the lived experiences of a person who stutters. Quotes are taken from the first author's autoethnographic data entries and are lightly edited for readability. Sensitive information, such as names of people and organizations, are redacted to protect the privacy of other parties.

5.1 Overview

The data show that many of the VC meetings were challenging: in close to half of the VC meetings (20 out of 43, 46.5%), I rated my physical tension as "*high*" or "*somewhat high*" (see Figure 1a), and in almost half of the meetings (21, 49%) I rated my speaking as "*effortful*" or "*somewhat effortful*" (see Figure 1b). Although high stressed situations such as public speaking were deliberately oversampled in the autoethnography, a fair amount of meetings I expected to have lower stress also turned out to be challenging: I rated 6 out of 14 one-on-one meetings and 11 out of 24 small group meetings with "*high*" or "*somewhat high*" physical tension. As a traumatic reaction towards stuttering [46], the physical tension could be overwhelming and disabling. As I recalled in my notes about one meeting, "*I experienced lots of physical tension and the speech was very effortful. I was soaked in sweat afterwards. I was very much consumed by the tension and did not feel much control over my body and my thoughts.*"

As a result, **my speech fluency varied greatly** (see Figure 1c), ranging from my baseline level of "*one or two disfluencies in total*" (13 meetings, 30%), to a severe stutter with "*several disfluencies per sentences*" in 3 VC meetings. For the majority of the meetings, I had either "*several disfluencies in total*" (15 meetings, 35%) or "*one or two disfluencies per sentences*" (12 meetings, 28%). Speech variability is both common and frustrating for people who stutter [96], making

(a) "The amount of physical tension I felt while speaking was..."

(b) "Talking was ..."

(c) "How fluent was my speech overall?"

(d) "How much did the possibility of disfluency affect what I said?"

(e) "How satisfied was I after the speaking situation?"

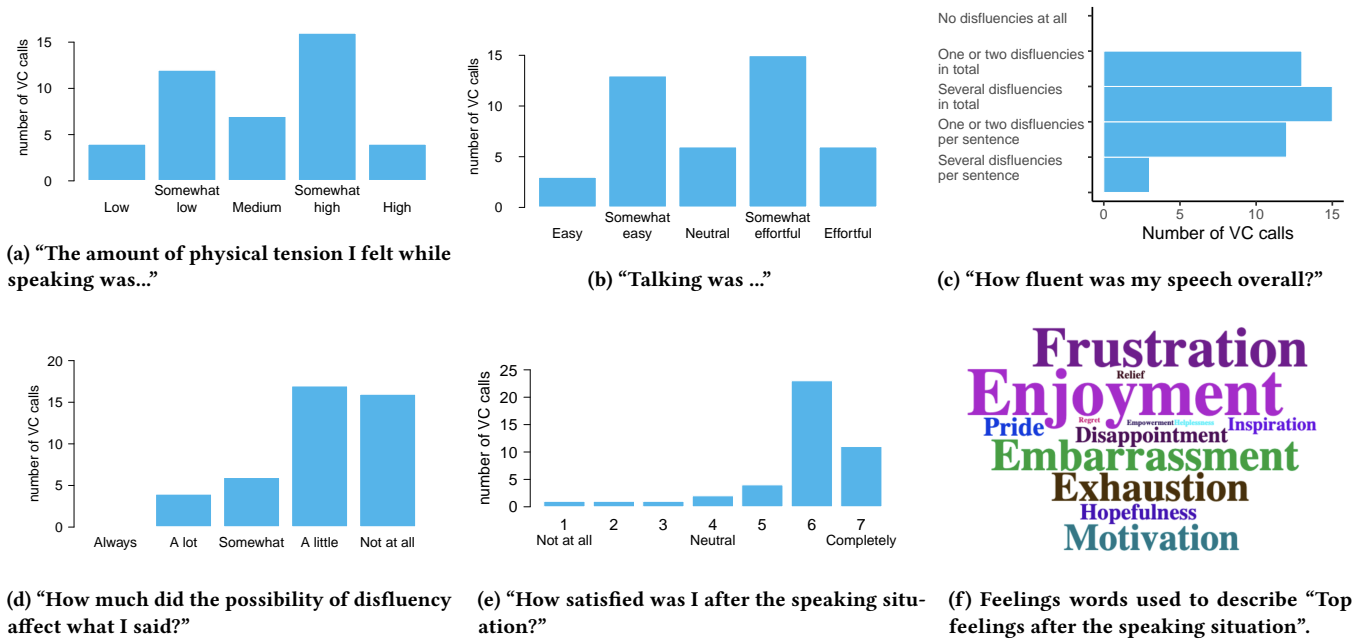(f) Feelings words used to describe "Top feelings after the speaking situation".

Figure 1: Distribution autoethnographic data over: (a) the level of physical tension experienced, (b) the level of effort required for speaking, (c) self-rated speech fluency, (d) the impact of stuttering on speech content (spontaneity), (e) overall satisfaction, and (f) experienced emotions (word cloud with font sizes corresponding to the term frequency in data).

it difficult for me to predict how often I will stutter in a meeting and how long it would take me to say what I want to say.

Despite challenges with physical tension and fluency, I tried minimizing the impact of disfluencies on what I said (Figure 1d), and **felt overall satisfied after the majority of the VC meetings**. As depicted in Figure 1e, I rated 38 out 43 meetings (88%) with positive satisfaction. While my satisfaction did drop with increasing levels of physical tension (Pearson's $p < 0.01$) and speech disfluencies (Pearson's $p < 0.05$), it also positively correlated with increased speech spontaneity (Pearson's $p < 0.01$), heightened interests demonstrated by my speaking partners (Pearson's $p < 0.05$), and reduced avoidance of speaking situations (Pearson's $p < 0.05$). Figure 2 illustrates how my satisfaction decreases as I experienced more physical tension (Fig. 2a) and increases as I spoke more freely and spontaneously (Fig. 2b).

However, **the affordance of current VC technology has limited my access to factors contributing positively to my meeting experiences**: the increased complexity in turn taking made it harder for me to speak spontaneously and easier to avoid speaking, and the limited view of other meeting participants made it challenging to gauge the interests of my audience. At the same time, **certain designs of VC technology could exacerbate stuttering-related challenges**. In line with previous research findings [99], the self-view feature in VC meetings was noted multiple times in my journals: seeing myself in video made me feel more self-conscious and pay more attention to myself when I speak, which was shown to lead to increased stuttering struggles [43].

To sum, videoconferencing is an emotionally- and physically-taxing experience for me as a person who stutters, often eliciting

a wide range of concurrent feelings from exhaustion, frustration, embarrassment to satisfaction, enjoyment, and accomplishment (see Figure 1f). To cope with the physical tension and emotional complexity involved in VC meetings, I relied on strategies from stuttering affirming therapy (e.g. accept the struggle, reduce avoidance), as well as the support of my speaking partners. The following three vignettes offer a closer look on my VC experiences across varied contexts and stress levels, revealing the inner workings and complexities of the thoughts and feelings underlying a PSW's meeting behaviors that are often imperceptible to other participants.

5.2 Public speaking in a panel: stress, struggle, and accomplishment

Public speaking is often my most feared situation, causing the worst physiological struggles and the highest level of stress before, during, and even after the speaking situation.

In April 2023, I was invited to speak at a research panel over Zoom. The panel gathered academic and industry researchers focusing on speech AI technologies, with about 50 people in the audience, including stuttering researchers, therapists, and PWS.

Given a set of pre-selected questions for the panelists, I decided to outline my answers rather than scripting them, aiming for greater spontaneity [21]. My primary goal was to contribute to the panel by sharing my insights and engaging with other panelists and the audience. Anticipating the physical and mental struggle when speaking in this type of situations, I felt nervous days leading up to the event. Despite expected speech struggles, I set behavioral goals on reducing filler words and using words I typically struggle with.
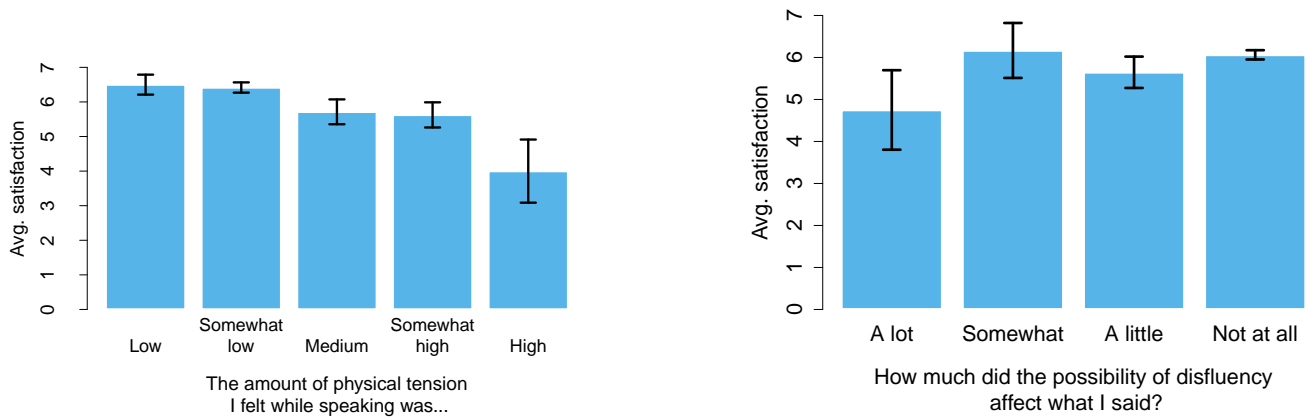
(a) Average meeting satisfaction at different tension levels. The higher the physical tension, the less satisfying the VC meeting was.

(b) Average meeting satisfaction, grouped by the impact of stuttering on speech content. The difference between "*A lot*" and "*Not all all*" is statistically significant (Mann-Whitney p<0.05).

Figure 2: How meeting satisfaction changes with (a) experienced tension, and (b) speech spontaneity.

Upon joining the Zoom call, I immediately experienced a rush of physical tension, and had several severe blocks when introducing myself. Realizing I was the only panelist who stutters also made me feel more self conscious, as noted in my reflection:

> *None of the other panelists stutter. I was the only speaker who stutters, it definitely made me stand out and feel alone. But I made a point at the beginning that I will stutter more openly to give others an exposure to stuttered speech.*

In my introduction, I not only self disclosed as a PWS but also informed the audience about the characteristics of my stutter – more filler words and pauses rather than the more typical sound repetitions or prolongations. While my self-disclosure did not reduce the tension I felt while speaking, it helped clarify potential misinterpretations of my use of filler words as being unprepared or forgetting what I was about to say, and served as self-advocacy.

Another stressor in this situation was the technical setup of the panel, which spotlighted the speaker, forcing me to see myself speaking throughout the session. Reflecting upon this, I noted that *"it was distracting and not empowering."* My experience echos previous findings that the self-view in VC is *not* stuttering friendly [99]. As social psychology research has shown, seeing oneself in the mirror would make people more self conscious [97], increased self-consciousness often leads to more stuttering struggles [43].

Overall, several factors contributed to a particularly challenging speaking situation for me: a large, unfamiliar audience that I cannot see or directly engage with, the pressure to perform as an expert, being the only speaker who stutters, and the technical setup of the virtual panel. Like other PWS in similar conditions [96, 99], I struggled with my speech throughout the session. I felt intense physical tension while speaking, and noted that *"I used a lot of filler words... several times a sentence. And I also did some retries when I blocked".* As a result, I was uncomfortable with the situation, feeling worried and insecure before I spoke, and found myself embarrassed by my speech behaviors. I noticed the automatic negative thoughts

such as *"I am the worst speaker"*, *"People will not be able to understand me"*, and *"People will not value my opinion since I stutter so much".*

However, I managed to consciously acknowledge and accept these emotions and thoughts without letting them deter my participation in the panel. I raised my hand whenever I had a point to make, made conscious efforts to not switch my words, and engaged actively by referencing others' points and debating opinions, tasks that typically induce speech struggles for me. Despite the technical constraints for PWS to speak over VC [99], I ended up speaking more than I planned to and eagerly jumped into the conversation. As the only speaker who stutters, I felt compelled to share my lived experiences and advocate for the stuttering community, and found my perspectives valuable for the panel that I was willing to take the risk to speak up. As I reported for this speaking experience:

> *I had lots of blocks but did not change what I wanted to say. I did feel embarrassed and had lots of physiological reactions before I started speaking, but I was glad that I did it!*

> *I made an effort to reference other panelists and participants by names and credit their points. The self intro was hard but I self-disclosed at the beginning and made a point about why I did that.*

In the end, this speaking experience was satisfying. The top feelings recorded in my autoethnographic journal were "*satisfaction*", "*pride*", "*accomplishment*", "*frustration*", and "*exhaustion*". Feeling frustrated and exhausted from my speech struggles did not negate my speaking experience, but contributed to my sense of accomplishment and pride that elevated the whole experience. The satisfaction stemmed from my commitment to challenging myself to speak authentically, as well as the audience's acknowledgment and appreciation of my contribution in this panel:

> *I was able to say everything I prepared to say, as well as raising my hand every time when I felt I had new things to add. I was quite spontaneous and definitely*

showed both the enthusiasm and the knowledge I have on the topic. One participant private messaged me to say that I was a good speaker, and thanked me for both the content and the passion.

Several audience members messaged me to thank me for saying what I said. And several other panelists added me on LinkedIn.

In this high stakes situation, I was able to come across as an expert in the field and felt that my contribution was valued, and at the same time my authenticity and vulnerability was respected and appreciated by my audience. I believe that these factors together helped build meaningful connections with the audience. The support from the audience and the recognition of my own efforts helped me get through the frustration and exhaustion caused by the physical and mental struggle with my speech, and reframed this challenging experience into a rewarding one. It proved that despite the high tension and low fluency, I can still feel satisfied and enjoy speaking, as I refocus my efforts away from my struggle and toward actions that align with my core values of authenticity, connection, and growth.

5.3 Public speaking with community: finding strength in shared struggle

I started participating in various stuttering community events and conferences since early 2022, when most of these activities were virtual or hybrid. Although speaking to a large audience remained a challenge, I found public speaking with and to other stutterers immensely valuable. Consistent with research findings [50], these interactions helped me desensitize myself to stuttering, fostering self-acceptance and efficacy in my identity as a person who stutters.

In April 2023, I was invited to give a 5-min speech at a stuttering community virtual conference organized by a U.S. university. There were about 30 speakers, all people who stutter, who had participated in the same speech therapy program at the host university. There were about 100 people in the audience, including people who stutter, their friends and families, and speech language pathologists (SLPs).

I prepared an outline, rather than a script, for my speech, as I wanted to speak to my audience in a direct and authentic way rather than reading from a script. In addition to setting a goal to myself to accept negative emotions and thoughts while speaking publicly, I wanted to challenge myself with behaviors I usually avoid when speaking to a large non-stuttering group. For example, I intended to stay in a block silently instead of trying to cover it up with filler words, and to stutter voluntarily at words that I do not normally stutter - both activities used in my past speech therapy to desensitize myself to stuttering.

Although public speaking at this scale is usually preceded with lots of anxiety, I was feeling relatively relaxed before this event, as I noted: *"it helped that it was a stuttering community event, since stuttering was understood and expected. I definitely felt more calm with a group at this scale than in a non-stuttering event."* During the event I was more relaxed right before I spoke, noting that *"When I waited for my turn, I didn't get the strong heart bumping sensation that I normally have, but felt relatively calm."* Knowing that other speakers and people in the audience also stutter made me feel safe

and understood ahead of and during this situation, since we all shared the same struggle.

Consistent with findings from stuttering research [94], shifting my communication goal from fluency to authenticity and connection did help reduce my speech struggles. During my presentation, I was, in turn, more fluent than usual with this size of audience, but nevertheless still had one or two blocks per sentence. Although my speech was not as struggled as it sometimes is, I did find myself frustrated and disappointed each time I habitually engaged in avoidance behaviors - such as using filler words to cover up speech blocks and looking away from the camera to avoid eye contact.

Like many people who stutter, stuttering invoked strong social anxiety in me, making me very sensitive to the evaluation of my audience [51]. While the negative reaction of the audience could amplify my negative reactivity of stuttering [94], in this case, the support and engagement from other community members helped me overcome my anxiety and find joy in a challenging situation:

I was spotlighted on Zoom but I immediately switched to gallery view that allowed me to see more of the audience's reaction. That was quite helpful. I especially appreciated a few audience members whose facial expressions changed along with my speech (smiling when I was saying something lighthearted or sarcastic, and intensified when I was saying something emotional and raw). I felt supported and felt the connection with my audience. I really enjoyed this connection, although my frustration with my speech kept on distracting me.

I noticed that, in contrast to virtual conferences with non-stuttering audience, most audience members turned on their camera and showed vivid facial expressions throughout the two-hour Zoom session, making it much easier for speakers like me to see and connect with the audience through the gallery view.

Hearing other speakers stutter also had a tremendous impact on me. First, it helped to normalize disfluencies, enabling me to notice and challenge my own self-stigma towards stuttering. As I noted:

I did notice that I maybe subconsciously paid attention to other speakers and compared myself with them. I even felt a bit more nervous when several speakers in a row who sounded very confident and fluent, and felt a bit of a relief when a speaker had more severe stuttering. I was able to notice this thought pattern and caught my desire to fluency...

Second, I also learned from, and was inspired by other speakers communicating effectively while stuttering. I noticed, for example, a couple of speakers positioned their cameras to show more of their body language and gestures, and several people held their eye contact the whole time while having intense speech struggles, and wanted to model myself on their VC communication strategies and their ability to keep the audience engaged over long, silent blocks. Besides the speech behavior, I was also empowered by the self-compassionate and unapologetic attitudes demonstrated by several of the speakers, for example, I recorded, *"(I) really liked the message from one college student who advised everyone to 'give yourself permission to talk the way you wanted, and live the way you wanted.' Very inspiring!"*

Despite frequent speech disfluencies in the virtual conference, I found the speakers engaging, their messages resonating, and my own speaking experience highly enjoyable. Even though I did not know most of the audience or speakers beforehand, I felt connected and energized afterwards, making the VC experience satisfying. This experience highlighted that emotional connections can be built over videoconferencing with mindfulness and intentions, and it requires real effort to *be present* rather than merely having a presence. As a community particularly invested in successful communications, the participants of the stuttering conference demonstrated best practices on VC – such as showing-up on camera, attentive listening, and unmasking vulnerable moments – that contributed to my positive experience of a large virtual conference that could easily be lost to anonymity, fatigue, and disengagement [8, 92]. As shown in previous research [94], engaging with the stuttering community enabled me to learn and grow with other people who stutter, and build strength and efficacy to communicate authentically.

5.4 Struggle and frustration over a one-on-one meeting

In contrast to the satisfying experiences of speaking to large audiences in the previous vignettes, I will now share a VC conversation that began with low tension but turned out highly intense and unsatisfying. This experience involved a one-on-one meeting with Kelly (pseudonym) over Zoom, whom I met for the first time as a potential consultant for my organization. I anticipated the meeting with excitement, as I typically enjoy introducing our work to individuals interested in collaborating. Moreover, I usually find one-on-one meetings with peers to be relatively stress-free.

I often have more speech struggles at the start of conversation, especially when meeting new people, before I build connection and trust to feel safe to stutter in front of them. Establish this initial rapport and trust via videoconferencing proves even more challenging. My strategy is typically to start with small talk, comment on something interesting in the other person's Zoom background, and gradually ease into self-introduction.

Following this strategy, I began by commenting on Kelly's Zoom background and inquiring about her location. However, Kelly responded briefly, not engaging in small talk or expressing reciprocal interest. Recognizing her disinterest, I moved on to introduce myself, including an informational disclosure about my stutter. Her response to my self-disclosure was simply: "*It's okay*", which I found disempowering, as I was not seeking permission to stutter.

Despite the initial hiccups, I proceeded to share personal stories related to the background and motivation behind my ongoing project. I have taken this approach in introductory calls previously, often achieving a positive, as personal stories help foster the interpersonal connection that is crucial for long-term collaborations.

While I spoke, Kelly muted herself and remained mostly impassive, occasionally jotting down notes. Over a distance, her lack of verbal or non-verbal cues made it particularly challenging to gauge her interest or engagement in our conversation. This absence of feedback triggered familiar but uncomfortable feelings of insecurity, with thoughts like, "*I am losing her and making a fool of myself because of my stutter*", surfacing in my mind.

Such emotional and cognitive reactivity to stuttering was stressful, triggering a "*fight-or-flight*" responses in my body, leading to noticeable physical tension in my chest and speech musculature, exacerbating my speech struggles. Recognizing this cycle of struggle, I made an effort to calm myself by reminding myself that her note taking indicated a certain interest and value in what I said. This positive thought encouraged me to overcome avoidance tendencies and continue speaking.

A few minutes later, as I was talking, Kelly raised her physical hand. I immediately paused, expecting her to contribute. However, she commented that my introduction was too lengthy and ineffective, and she did not know where it was going. Getting this response from her caught me off guard, as I reflected later:

> *I was mainly trying to tell my personal stories to connect, but she was here for business. (...) I was actually feeling okay before that, especially when I saw her taking notes, I thought she was getting insights that were useful and already had ideas for me and [Organization name redacted]. But at that moment I realized that she was not getting anything, and that was both a surprise and a disappointment.*

Although I did not mind her interruption and understood her good intentions, the sudden realization of the misalignment between her and my goal half way through the meeting was demoralizing. Her comment about my introduction made me feel judged and incompetent. I wished I had picked up on this misalignment earlier in this call, but with much fewer communication cues than what is typical in in-person meetings, it was nearly impossible until she verbalized her feedback. I wrote later that *"I was extremely embarrassed by that comment, almost to the point that I wanted to hang off the call and hide."*

The overwhelming feeling of embarrassment and inadequacy *"lingered and impacted my willingness to speak for the rest of the meeting"*. As a result, I spoke less, had more struggles, and frequently looked away to conceal my discomfort:

> *My fluency was not great at the beginning, but it really suffered after she interrupted me and started giving me feedback about the elevator pitch. However, the bigger problem after that moment was that I did not want to speak any more. (...) I was not able to maintain eye contact when I spoke, especially in the later part of the meeting when the embarrassment loomed over my head.*

This experience was also traumatizing as it evoked painful memories of being asked to speak faster, interrupted, and questioned about my competence and intelligence due to my speech disfluencies. As I reflected:

> *I felt unheard and inadequate again. I felt reminded that I should not take up space, even if I was trying to believe otherwise. (...) This meeting left me with both a big disappointment and emotional trauma.*

This experience demonstrates that while my stutter itself does not prevent me from engaging and connecting with others, it is the reactions of others - overlaying with my traumatic past experiences with stuttering - that create the disabling barrier for me to fully participate in and enjoy the conversation. Microaggressions towards

stuttering, even unintentional ones, can lead to self-censorship, disengagement, avoidance of eye contact, and decreased self-esteem in people who stutter. This experience starkly contrasts with my previous vignettes, where feeling valued and appreciated by conversation partners broke down these barriers and led to a sense of achievement despite speech struggles.

Lastly, despite the intense emotional and cognitive reactions during this call, reflecting on this experience afterward by journaling helped me externalize and distance myself from negative thoughts and feelings. By writing about my experience I was able to examine my struggle with self-compassion instead of blaming myself.

6 DISCUSSION

We summarize our findings and discuss their implications to VC technology and virtual meeting practices.

6.1 Support emotional experiences of videoconferencing

Videoconferencing can be exhausting [8]. The limited nonverbal channels to connect with people [73], the mental stress from the "Zoom gaze" [8, 38], and the constant distractions from one's environment [63], all contribute to the heightened cognitive load of video conferences for all participants [92]. For people with disabilities, such extra cognitive cost, combined with the accessibility and technical barriers created by videoconferencing technologies, could make videoconferencing even more emotionally draining and unsatisfying [27, 91, 99, 105]. The lack of physical co-presence in VC often makes these cognitive and emotional challenges less visible to other audience, leading to further marginalization and disengagement of people with disabilities.

However, existing technical investigations on videoconferencing technologies have been largely concentrated on efficiency and productivity in the context of collaborative work [57, 76, 100], with a recent trend on AI-facilitated note-taking and seamless transitions between auditory-visual-textual content to facilitate information delivery and exchange [1, 59, 60, 86]. Yet the emotional experience of videoconferencing remains overlooked and under-supported. Our study offers a first-person account of VC experiences, across a wide range of situations, revealing unique insights into the significant emotional and cognitive efforts involved to participate in VC meetings as a person who stutters. Similar to what has been reported in previous interview research with people who stutter [99], the first author often found videoconferencing physically exhausting and emotionally draining. However, our autoethnographic study provides a lens to better understand the complexities of the thoughts and feelings underlying the meeting behaviors. We see that, the most difficult moments of the meeting, were not when the first author stuttered, but when she felt out of control and unheard. To cope with those moments, the first author relied on mindfulness, authentic self expression, and the connection with the audience. For example, although it would be easier to read a scripted presentation over VC, the first author chose to prioritize spontaneous, authentic connections with the audience over smoother speech. And when experiencing frustration and exhaustion from speech struggle, the first author sought acknowledgement and support from the audience to speak openly. On the other hand, the lack of nonverbal

channels makes it harder to "read" people. Assessing the reaction of the audience during a VC presentation is nearly impossible, and ableist microaggressions - such as telling the first author "it's okay" when she self-disclosed - become harder to ignore or push back on in the virtual environment [47].

We thus urge videoconferencing researchers and developers to design for the "soft" side of VC experiences such as authenticity, empathy, a sense of belonging, and emotional connections. Highlighted by the perspectives of PWS, those elements are universally appreciated in human communications and very often, what make the communication experience meaningful and satisfying. As pointed out by Christopher Constantino (CCC-SLP and a person who stutters), "Our pauses, hesitations, and silences carry semantic weight; they are meaningful and purposeful" [18]. Therefore, instead of focusing on the words spoken, VC technology can help us respect and pick up the meaning of the silence between words, and empower its users during those challenging moments of embarrassment, hesitancy, and isolation, with compassion and solidarity. For example, when detecting an extended moment of discontinued speech in the middle of a sentence, the VC platform can support the speaker emotionally by showing an affirmative and compassionate message. The platform can also provide relational support by informing other participants that the current speaker is still connected and needs their patience, and amplifying supportive facial expression or comments of the other participants to make them more salient to the speaker.

6.2 Design for vulnerability

Vulnerability – "*the quality or state of being exposed to the possibility of being attacked or harmed, either physically or emotionally*" (Oxford Dictionary) – is a common aspect of human experience, particularly for people with disabilities. However, as highlighted by Dagan *et al* [26], existing HCI research and design rarely consider vulnerability as a design value, but instead focus on protecting and alleviating people from their vulnerabilities. This tendency to "resolve vulnerability" is also prevalent in the field of accessibility, with numerous efforts on *masking* or *fixing* disabilities [98] to enhance "productivity, efficiency, normalcy, and speed" [56].

Our autoethnographic data highlight the personal and social value of vulnerability in VC-based communications in three aspects. Firstly, *vulnerability leads to authenticity and openness*. By self-identifying as a person who stutters at the beginning of the research panel (see section 5.2), the first author claimed the agency and privilege to speak openly about her lived experience with speech technologies as a member of a user group directly affected and often challenged by such technologies, contributing valuable insights that were often missed in the conversation. Secondly, *vulnerability draws attention and engagement*. As documented in the second vignette (see Section 5.3), while a large online conference is typically wearying for its anonymity and lack of interactivity, the occurrences of intense disfluencies in the presentations by PWS infused the situation with a kind of unpredictability and excitement that made the presentations more memorable and interesting - a phenomenon described as "*stuttering gain*" by Christopher Constantino [18]. Finally, *vulnerability builds trust and intimacy*.

As beautifully described by Constantino, "*Every moment of stuttering is an exercise in trust, a verbal trust fall. We are asking the person we are speaking with to catch us*" [18]. In this metaphor, a "*fall*" for PWS signifies the humiliation and the loss of control they often experience when they stutter; and to "*catch*" usually requires the listener to show genuine interest and patience towards what a person who stutters wants to say. For example, when the first author showed her speech struggles in professional and public settings (see Section 5.2 and Section 5.3), the support and the acknowledgment from the audience successfully "*caught*" her in her "*trust fall*", allowing her to form an intimate, trusting relationship with her audience that led to mutually rewarding, satisfying communication experiences in an otherwise stressful setting. In a nutshell, while the socio-technical constraints of videoconerencing make it harder to focus, connect, and be authentic in VC meetings than in person [92], vulnerability offers unique opportunities for engaging, trusting, and open communications over videoconferencing, enabling us to build deeper, intimate connections with friends, colleagues, and strangers in the telecommunication environment.

However, vulnerability does come with risk. As documented in Section 5.4, when the first author's self-disclosure of her stutter was treated as seeking permission, the act of openness became disempowering. Moreover, her conversation partner's lack of interest or patience for her personal stories inevitably failed the first author in her "*trust fall*", triggering emotional trauma that led to self censorship and social withdrawal.

We thus argue for the potential and the need to design for vulnerability, and invite VC technology researchers and developers to explore the benefits of vulnerability, along with mechanisms for compassion and risk management. We see two promising directions in this domain: supporting self-disclosure and fostering self-acceptance. Self-disclosure of vulnerable and stigmatized aspects about oneself is a sensitive and complex process [5, 39, 104], yet has proved to be beneficial for PWS [103] as well as other marginalized communities [6, 80]. While PWS often struggle with the discomfort with verbal self-disclosure, as well as the uncertainty with the reactions they might receive, VC technologies can provide a mechanism for natural and effective disclosure with helpful information and instructions for others to react appropriately. For example, drawing inspiration from the increasingly common practice of appending pronouns after one's name in VC meetings, VC platforms can provide a customizable "name tag" for each participant that displays one's name, pronouns, as well as a "FYI" field for lightweight disclosure. For the audience, the technology can also proactively solicit special needs and accommodation requests from meeting participants to generate a set of behavior guidelines for all. On the other hand, self acceptance serves to reduce tension and build resilience for PWS in vulnerable moments [79]. Rather than helping PWS speak fluently [3, 36, 59] to "fit in" in virtual meetings [98], VC technologies could instead embrace and normalize stuttering by prompting users who stutter to practice voluntary stuttering [78] in meetings and transcribing stuttered speech verbatim in auto caption, as increased exposure to stuttering behaviors and and stuttered speech has shown to foster self acceptance as PWS as well as reducing social stigma towards stuttering [93].

6.3 Reappropriate VC for self-therapy

Our autoethnography study also points to the potential for people who stutter to reappropriate their videoconferencing experience as a form of self-therapy, a use case echoed by other PWS in previous research [99]. Reappropriation of everyday technology has mainly been studied in HCI, particularly in the Maker context, as a means of technological resistance and self expression [90]. Recent research in accessibility explored reappropriating digital fabrication technologies for rapid prototyping of assistive technology, revealing both the opportunity to create personalized, intimate assistive devices and the technical and clinical challenges with this practice [48, 70].

The first author's autoethnographic experiences with VC show that VC can be an effective and convenient medium for PWS to practice and track their communication skills and strategies outside speech therapy sessions, into everyday situations with a variety of audiences, tasks, and stress levels - which is recommended but hard to achieve in traditional speech therapy programs [22, 96].

Videoconferencing comes with unique affordance for self therapy. As reported in previous studies [91, 99], videoconferencing offers greater control and flexibility over the environment where the conversation takes place. While the speaking situation varies, the familiarity and the ability to customize their physical and virtual environment could be useful for people to better manage both the risk of the situation they are exposed to and the corresponding tension they experience. As the "loss of control" was reported as the core and most frustrating part of stuttering experience [93], additional control for the speaking situation is naturally therapeutic and empowering. By taking control of the speaking environment and having easy access to tension-diffusing tools and systems, people who stutter can prepare themselves to systematically approach feared situations with a safety net - a key component of Avoidance Reductions Therapy for Stuttering (ARTS) [84]. In practice, the first author would choose different types of avoidance behaviors that are appropriate for different types of VC meetings. For example, in a low stress situation, she would work on reducing word switching and filler words, while in high stress situation, she would let herself switch words and use filler words when she struggles, but aim for showing up and self disclosing.

Both Acceptance and Commitment Therapy and ARTS encourage people who stutter to actively desensitize themselves to negative feelings and thoughts associated with stuttering, approaching them with curiosity and acceptance. However, it is often challenging to disengage with these feelings and thoughts, which then lead to struggles and self-reinforcement. Similar to what was reported for many people who stutter [99], the first author took advantage of the out-of-the-camera-view calming objects (e.g. artwork) and actions (e.g. breathing exercise) to go through stuttering moments and develop her mindfulness skills in coping with the stress and panic caused by stuttering. In this context, there is an opportunity for VC technologies to incorporate features that support these mindfulness practices. For instance, VC platforms could detect the moments of block for PWS and deliever subtle auditory or visual cues (e.g., the sound of deep breathing or calming animated visuals), acting as prompts for PWS to engage in mindfulness breathing exercises. We call designers to welcome such appropriations and incorporate such mindfulness practice in VC to support PWS in

dealing with difficult moments and develop resilience over time, turning VC experience into *everyday mindfulness* practice [65, 66].

The practice of autoethnography for VC experiences provided therapeutic value as well. As described in Section 4.1, the first author's autoethnography involved her self identifying utility, behavioral, emotional, and cognitive goals for the virtual meeting before it started. Deliberating and writing down these goals enabled the first author to realign her communication around core values, incentivizing value-driven actions despite socio-emotional challenges. Additionally, the free-form reflective exercises, as demonstrated in the vignettes, were beneficial. They allowed the first author to reframe automatic negative thoughts and cultivate self compassion – a quality known to reduce negative reactions to stuttering and improve the overall quality of life for people who stutter [25].

As such, we find videoconferencing a meaningful channel for self therapy, and implore marginalized users to reappropriate videoconferencing as an opportunity to practice and develop mindfulness and communication skills, in additional to being a collaboration and information tool. Keeping the therapeutic use case of videoconferencing in mind, VC technologies can incorporate practices and interventions developed in speech and mental therapy to support users' growth and development in mindfulness, self-compassion, and emotional resilience. For example, similar to having a sticky note with positive messages at the edge of the computer monitor, VC platforms can have built-in, customizable affirmative messages as seen in stutter-affirming therapy [20, 83]; VC platforms could also suggest users have quick breathing exercise before the meeting starts, during the stuttering moments to reduce stress, and body scan meditation after the meeting to wind down. This incorporation could make mindfulness more contextual and pertinent to users beyond a separate daily practice [66].

6.4 Limitation and future work

We acknowledge the inherent limitations of using autoethnography, as it may not fully capture the breadth of experiences and challenges faced by other PWS. To address this limitation, future research should consider employing a mix of qualitative methods to involve more PWS such as conducting participatory design with PWS [59, 63, 72], which has the potential to offer a more diverse understanding of the experience of PWS and empower them to lead the design of more inclusive VC. Additionally, future work could expand the scope of this autoethnography beyond a single-person narrative. For example, future exploration might benefit from incorporating multi-perspective approaches such as group autoethnography [61, 69], which leverages the unique insights of individual experiences while providing a more varied view from different researchers involved. Lastly, future work could compare our findings with an autoethnographic study of someone else who has benefited from or actively participates in traditional, fluency-focused speech therapies, to further unpack relationship between speech fluency and participation in VC meetings.

Despite its limitations, our study shows the value and richness of the first-person accounts of video-mediated communications as a PWS, offering novel insights for designing more inclusive VC environments. We hope our work inspires researchers with disabilities to engage more actively in autoethnographic studies, uncovering diverse and nuanced aspects of disability experiences and asserting epistemic authority for marginalized communities.

7 CONCLUSION

This paper presents findings from a 15-month autoethnography of videoconferencing experiences of a person who stutters. Drawing from the intimate, longitudinal data over a variety of VC situations, our study sheds light on the hidden cost of videoconferencing for people who stutter, uncovering the significant emotional and cognitive efforts that are often invisible to other meeting attendants. Our findings highlight the disproportional burden carried by people who stutter to participate and engage in video conferences, calling for a more accommodating communication environment in which everyone, including technologies used for communication, shares the responsibility and efforts to include and respect all voices.

While current videoconferencing technologies tend to be optimized for productivity and efficiency, our findings also draw attention to the "soft" side of VC experiences such as authenticity, empathy, a sense of belonging, and emotional connections. We thus urge VC researchers and designers to prioritize these values in videoconferencing, as they are the vital elements of human communications and very often, what makes the communication experience meaningful and satisfying for all participants.

ACKNOWLEDGMENTS

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