Meeting (the) Pandemic: Videoconferencing Fatigue and Evolving Tensions of Sociality in Enterprise Video Meetings During COVID-19

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Abstract

When COVID-19 led to mandatory working from home, significant blind spots in supporting the sociality of working life—in the moment and over time—were revealed in enterprise video meetings, and these were a key factor in reports about videoconferencing fatigue. Drawing on a large study (N=849) of one global technology company's employees 'experiences of all-remote video meetings during the COVID-19 pandemic, we use a dialectic method to explore the tensions expressed by employees around effectiveness and sociality, as well as their strategies to cope with these tensions. We argue that videoconferencing fatigue arose partly due to work practices and technologies designed with assumptions of steady states and taken-for-granted balances between task and social dimensions of work relationships. Our analysis offers a social lens on videoconferencing fatigue and suggests the need to reconceptualize ideas around designing technologies and practices to enable both effectiveness and sociality in the context of video meetings.

Keywords

COVID-19, dialectics, efficiency, productivity, small talk, sociality, telework, video meeting fatigue, videoconferencing

1 Introduction

The fabric of collegiality may unravel when one thread is asked to do the job of many. During the COVID-19 pandemic, increases in the number and cadence of video meetings for knowledge workers led to a meeting pandemic with its own disease: videoconferencing fatigue (Riedl, 2022). Drawing on a large diary and poll study (N=849) of one global technology company's employees 'experiences during COVID-19, this paper examines videoconferencing fatigue in the context of employees 'reported experiences of tensions between work effectiveness and sociality. We frame these tensions in terms of dialectics (Baxter and Montgomery, 1996), the inevitable dilemmas inherent in relating. As video meetings expanded to serve both the formal work-oriented functions they had always served and the informal social functions displaced by remoteness, employees found themselves in ironic struggles with sociality in the very medium assumed to best afford it. While employees developed a range of strategies for coping with these tensions, we find that videoconferencing fatigue arose due to work practices and technologies designed with assumptions of steady states and taken-for-granted balances between task and social dimensions of work relationships.

Although COVID-19 is no longer the urgent crisis in the same way that it was in 2020–2022, videoconferencing fatigue has not simply gone away. All-remote and hybrid work are now significantly more common and expected to become even more so (Barrero, 2021). While there are now more resources around ways to reduce and improve remote and hybrid meetings (Reed and Allen, 2022), and increased patents for working-from-home technologies (Bloom et al., 2021), we believe that many researchers are still working with a restricted conceptualization of video meetings. Videoconferencing fatigue, then, could easily continue to be a problem for individuals, teams, and organizations. The overall contribution of this paper, then, is to show how a dialectical approach to thinking about video meetings—in this case, involving an inherent

tension between task-orientation and sociality—should lead us to rethinking conceptualizations of video meeting technologies and practices.

We begin by outlining prior research on the importance of sociality for work and how assumptions around videoconferencing show fundamental tensions between its intuitive social value and its actual ability to provide this value, especially in the context of a disrupted equilibrium of collegiality. After reporting our data collection and methods, we report the results of an iterative qualitative analysis of diary entries in a combined findings and discussion section. Finally, we discuss implications for how practice and technology should be designing for dialectics in the context of videoconferencing fatigue, considering major conceptual blocks and how to move beyond them. We focus on two sociotechnical considerations: moving beyond the concept of 'meetings 'to new dynamic collaboration concepts and technologies, and moving beyond the simple provision of best practice 'guidelines 'towards technologies that build in the premise of enabling teams to actively negotiate and experiment with their own needs and methods for balance. Following the dialectical perspective, we argue that videoconferencing design should move away from designing for steady states and towards designing to embrace change and helping teams to motivate accountable choices about working together in ways that embrace both effectiveness and sociality.

2 Prior Work

2.1 Videoconferencing and Assumptions of Sociality

No other phrase more succinctly captures the central allure of videoconferencing better than Julius P. Molnar's grand proclamation about the AT&T Mod II Picturephone that 'clearly, "the next best thing to being there" is going to be a Picturephone call '(Molnar, 1969). At the heart of Molnar's prediction lies the myth of video-as-co-presence: that videoconferencing simulates in-person communication (Dourish and Bellotti, 1992). The myth is predicated on reasonable logic: the two primary modalities of in-person talk are verbal and visual, and these are the aspects that videoconferencing transmits. Indeed, in simplistic readings of social presence theory (Short et al., 1976) and media richness theory (Daft and Lengel, 1986), videoconferencing has the fewest social cues filtered out compared to other electronic media, so these theories would predict that it could substitute for in-person interaction when necessary.

Videoconferencing research, however, has a history of decidedly mixed results in terms of videoconferencing being as good as we imagine (Chapanis, 1972; Pye and Williams, 1977; Whittaker and O'Conaill, 1997; Ferran and Watts 2008; Kuzminykh and Rintel 2020). Standaert et al. (2021), drawing on data from the organizers of 612 business meetings at a large global technology company, found that the ability to hear voice and share screens—but not see video of participants—was identified as critical to all business meeting objectives. The top five business objectives (routine exchange of information; non-routine exchange of information; clarifying a concept issue, or idea; exchanging/sharing different opinions or views of a topic or issue, and finding a solution to a problem that has arisen) do not require video of other participants as an important capability. Video of other participants is an important capability for more affective issues (e.g., showing personal concern or interest, maintaining relationships and staying in touch,

and building trust and relationships). The relative importance of video may change when participants have different abilities (e.g., blind or low vision, deaf or hard of hearing, or neurodiversity) (Tang, 2021), but it is generally less important than most people assume, and almost always secondary to audio (Isaacs and Tang, 1993; Monk and Watts, 1995; Rintel, 2010).

That being said, pre-pandemic, there were certainly many examples of pro-social videoconferencing for work and personal life, including over very extended sessions in personal life (Miller and Sinahan, 2014; Brubaker et al., 2012; Neustadter et al., 2012). This pro-social behavior was possible *despite* the apparent unnaturalness that underlies the theoretical reasoning for videoconferencing fatigue. Videoconferencing, like all technology, is used in the context of a mutually shaped relationship between technology and social behavior. People can adapt to its constraints and adapt it to their needs. Users have been found to disregard and accommodate odd views of people, video freezes, and distorted audio (Rintel, 2010, 2015); overcome eye contact problems (Dourish et al., 1996; Grayson and Monk 2003); and develop new ways to show one another their environments (Liccoppe and Morel, 2014). Additionally, work on enabling informal, distributed workplace video-based communication, either through periodic engagements (Fish et al., 1990; Roussel, 2002) or persistent connections (Harrison, 2009), has extended ideas around how videoconferencing may enable pro-social engagement—albeit, again, with mixed success in research and limited transfer to commercial systems. In sum, neither the value nor problems of videoconferencing are inherent: rather, they are what we make of them.

2.2 The interwoven nature of work effectiveness and sociality

Work effectiveness and sociality do not exist in opposition to one another; rather, they are tightly interwoven (Abarca et al., 2020; Gabarro, 1990). 'Small talk 'develops common ground and social bonds (Holmes, 2000; Tracy and Naughton, 2000). It is integral to interpersonal trust in teams— confidence in people and a willingness to be vulnerable to one another (Ma et al., 2019; Alves et al., 2022). Emphasis on well-being and member support improve outcomes for both current projects and the likely success of future projects (McGrath, 2014). Much of the social capital on which effective organizations and individuals rely is established in both formal scheduled meetings (Rogelberg et al., 2010; Yoerger et al., 2015) and informally throughout the day in spontaneous and serendipitous encounters (Kraut et al., 1993; Whittaker, 1995; Shah et al., 2017; Sias et al., 2020).

Before the COVID-19 pandemic, the balance between task and social encounters appeared to be at equilibrium for many. It was easy to overlook the value of the fabric of collegiality that we were weaving in physical workspaces, despite the red flag thrown up repeatedly by remote work research: namely, that without significant effort from leaders to promote alternatives to traditional in-person socialization opportunities, remote working radically alters socialization, usually negatively (Lippe and Lippényi 2020; Allen et al., 2015; Hill and Bartol 2015; Charalampous et al., 2018; Arnison and Miller, 2002).

When knowledge workers suddenly found themselves required to work from home during the COVID-19 pandemic, for significantly longer than most anticipated, this taken-for-granted balance fell apart. The lack of social connection became a pressing concern (Lal et al., 2021;

Miller et al., 2021; Bleakley et al., 2021). Since many meetings were already video meetings, it was logical enough to move all existing meetings online, and then add more meetings to make up for real and perceived deficits in human encounters caused by not being in offices. Given videoconferencing's sensorial richness, it was expected that it could adequately substitute for in-person interaction, or at least adequately enough using existing strategies for managing its constraints. However, this substitution appears to have quickly broken down just a couple of months into the pandemic. Although sometimes it was more the appearance than the reality that there were more meetings (Yang et al., 2021), the overwhelming sentiment from many knowledge workers was that they ended up having too many video meetings, held too close together, for goals not suited to the medium, and that the medium was harder to use all day, every day, than anyone had imagined (Teevan et al., 2021).

2.3 Videoconferencing Fatigue

Riedl's (2022) synthetic definition of videoconferencing fatigue is: 'somatic and cognitive exhaustion that is caused by the intensive and/or inappropriate use of videoconferencing tools, frequently accompanied by related symptoms such as tiredness, worry, anxiety, burnout, discomfort, and stress, as well as other bodily symptoms such as headaches.' In hindsight, videoconferencing fatigue should not have been a surprise. However, 'fatigue,' 'tiredness, 'and 'exhaustion 'in relation to video meeting overuse do not appear in major pre-pandemic collections of videoconferencing research (Finn et al., 1997; Harrison 2009); teamwork (Galegher, 2014); or meeting science (Allen et al., 2015). This is likely because the overuse of video meetings—let alone a rapid global switch to mandatory working-from-home with video meetings as its core—seemed highly unlikely at the time. Videoconferencing had taken most of the 20th century to achieve even mainstream usage (Edigo, 1988; Noll, 1992; Isaacs and Tang, 1994). While ubiquitous by the second decade of the 21st century, it had not disrupted working in offices or in-person socialization (Bailenson, 2021) in ways that science fiction had predicted.

The first part of Reidl's (2022) definition, 'somatic and cognitive exhaustion,' is theorized as stemming from incongruencies between the verbal/non-verbal mechanics of human communication and the technological transmission-reception affordances of videoconferencing technology. These incongruencies largely lie in issues around how video is added to audio to enable an analogue of in-person conversation. Videoconferencing is inherently asymmetrical: it is a fractured ecosystem of fragmented interactions (Luff et al., 2003, Heath and Luff, 1992, Hindmarsh 1998). Person space, task space, and reference space (Buxton, 2009) are disconnected so that participants cannot see a holistic and accurate view of interlocutors 'gaze, bodies, environments, and resources. This makes it harder to use eye-contact or gestural onset to make turn-taking decisions (Luff et al., 2016), which may have ripple effects for issues like establishing trust (Bos et al., 2001; Teoh et al., 2010). The long-standing grid view of multiple participants that most current commercial systems use is highly artificial, breaking natural spatial understandings of reading the periphery, positional orientation, and micro-mobility (Buxton et al., 1997; Marquardt et al., 2012). These issues were well-known, acute problems pre-pandemic, and frameworks for videoconferencing design (e.g., Buxton, 2009; Rae et al., 2015) had noted that, in aggregate, these issues were disruptive to the comfort and effectiveness of

videoconferencing. However, they had not been thought of as an aggregate chronic employee wellbeing problem until the nickname 'Zoom fatigue' arose in social media as a side-effect of the spectacular 2020 take-up of Zoom in response to the COVID-19 pandemic.

Bailenson (2021) was the first to offer a theoretical explanation of videoconferencing fatigue based on nonverbal overload: a combination of the artificiality of non-verbal factors (eye-gaze at a close distance, missing body language, artificially-sized faces, and constant self-view) alongside repeated exposure without variation due to immobility within and between video meetings. The non-verbal factors introduce two extremes of unnaturalness compared to being in person: lack of information from body language and eye contact, and too much information from the constant self-view and artificial grouping of faces (Riedl, 2022). It is theorized that significant cognitive effort is needed to reconcile these extremes with communicative expectations. Bailenson (2021) theorizes that this cognitive effort is intensified through immobility, consisting of repeated exposure without variety of view and place. This immobility has three aspects. First, the field-of view of most videoconferencing cameras introduces a constraint on people's ability to move around and still be seen in the frame of a videoconference (Gaver et al., 1993; Licoppe and Morel, 2014). Second, immobility was exacerbated during COVID-19 when national restrictions on public movement led to knowledge workers rarely moving away from their computers during work hours (and, indeed, sometimes for online social encounters too) and spending almost all their time in one dwelling. Third, the user interface of meetings was highly invariant, mostly consisting of grids of largely non-moving people against monotonously unchanging backgrounds (which was partially alleviated by background replacement features, but this did bring much change to the overall meeting UI).
However, as Reidl (2022) notes, non-verbal factors and immobility are just two aspects of a even wider range of factors that can feed into videoconferencing fatigue. The second major aspect of Reidl's definition is that cognitive exhaustion stems from 'intensive and/or inappropriate use.' Döring et al. (2022) unpack the inputs that could lead to intensive and/or inappropriate use in their significantly more holistic model of videoconferencing fatigue, based on the Differential Susceptibility to Media Effects Model (Valkenburg and Peter, 2013) and synthesized from a systematic review of the extant research (including Bailenson, 2021 and Reidl, 2022). They propose that videoconferencing fatigue has four major inputs (each of which has many sub-inputs): personal factors (individual and social factors); organizational factors (temporal and context- or content-related factors); technological Factors (presentation-related, communication-related, self-related and usability-related); and environmental factors (micro- and macro-environmental). Döring et al. (2022) note that the extant research has limited empirical proof of many of these factors, let alone their relative causal importance. Their extensive review emphasizes that 'intensive and/or inappropriate use' is where the affordances of videoconferencing meet uneasily with beliefs in what it affords us as people, employees, teams, and organizations.

2.4 Research Questions

The sudden massive use of video meetings provided an unparalleled, if tragic, opportunity to understand why 'the next best thing to being there 'is apparently fraught with contradictions

when it comes to the social aspects of working together. As such, we pose four research questions in this study, two about the situated facts, and two about their implications:

- RQ1: What tensions regarding social connection in work relationships did employees describe as resulting from using video meetings during the COVID-19 pandemic?
- RQ2: To the extent that employees described tensions, what strategies did they describe using to manage them?
- RQ3: What do these tensions and strategies reveal about videoconferencing fatigue?
- RQ4: What does videoconferencing fatigue reveal about the need for either/both practice-based or technological changes in work, workplaces, and videoconferencing technologies?

3 Method

3.1 Data collection

We were able to access employees at a single large global technology company and recruited them on a rolling basis via internal mailing lists between mid-April and mid-August 2020. 849 participants completed the onboarding (including consent). In this study, we drew upon the diary data and poll verbatims from the following subset of 372 participants who mentioned at least one issue relevant to our research questions.

- 47.9% identified as women, 50.5% as men, and 1.6% did not state their gender identity.
- The age distribution was 18-24: 4.8%, 25-34: 26.3%, 35-44: 28%, 45-54: 31.5%, 55-64: 8.1%, prefer not to say: 1.3%.
- Participants were recruited from almost all regions in which the company operates, primarily North America (58%), Europe (incl UK) (22.3%), and India (7.3%). Fewer participants were in China (incl Hong Kong and Taiwan) (1.1%), Central and South America (3.2%), South East Asia (excl China) (2.7%), Middle East and Africa (3.8%), and Australia and New Zealand (1.6%).
- Participants were recruited from almost all operational groups and roles, primarily Business and Sales (43.6%) and Development (32.3%). Fewer participants were from Technical Operations (8.1%), Creative, Design, UX Research (10.2%), Research (4.6%), and Administration (1.3%).
- Participants were asked to provide details on their normal (pre-pandemic) work location to indicate experience working from home. The largest group were used to working ‘In Facility ’100% of the time (55.9%), and a small number of those had returned to their facility (0.5%). Remote workers were distributed across full time and part time remote: Remote 100% (9.7%), Remote 80% (7.5%), Remote 60% (9.4%), Remote 40% (6.2%), Remote 20% (10.8%).

After the consent process, all participants were deidentified and a code was used to link demographic and diary and poll data. Verbatims were scrubbed for all identifying referents. An IRB reviewed the ethical procedures of the study.

3.2 Diaries and polls

In HCI/CSCW, diaries are used to capture changing reflections on experiences or similar experiences at different times (Reiman, 1993), and have been found to be very effective in information work contexts (Sellen and Harper, 1997; Czerwinksi et al., 2004). Our diaries were implemented as online forms that enabled participants to create open responses in written form and upload other media. We anticipated that social connection was going to be a relevant issue, and thus we included prompts about it through the diaries. We augmented the diary entries with 10 short polls of Likert scale questions plus an open entry field for specific topics (Blandford et al., 2016). Of these, the polls on spontaneous interaction and networks of contacts provided verbatim responses related to social connection, and these and two other polls ('Strength of direct and indirect connections to people' and 'Effectiveness of different remote meeting types') provided some quantification of the tensions at issue. See the Appendix for details.

3.3 Analysis

We draw on a dialectical approach to identify and explain tensions and strategies used to manage tensions invoked in the diaries. Originally developed by Bakhtin (1984) in his analyses of novels, the dialectical perspective was later applied to the dynamics of communication in interpersonal relationships by scholars such as Rawlins (1992) and Baxter and Montgomery (1996), and since expanded to analyze broader relationships in technological communicative contexts such as those between musical artists and their audiences (Baym, 2018). Baym (2018) argues that changes in historical and technological contexts can put pressure on different sides of dialectic tensions. Baxter and Montgomery (1996: 179) speculate that some periods may be 'marked by more shifts [in strategies] of shorter duration but greater intensity.' The pandemic, nearly as intense as any historical change could be, put new pressures on social connection as many around the world were told or forced to stay home.

An analysis drawing on relational dialectics puts the focus on 'dilemmas and tensions that inhere in relating' (Baxter and Montgomery, 1996: 15). These tensions are seen as defining one another: for example, autonomy becomes meaningful in its complementary opposition to interdependence, formality in contrast with informality, planning in contrast to spontaneity. Crucially, instead of assuming steady states, the assumption is that these dynamic competing tensions inevitably underly all communicative events. Countless, even infinite, opposing pulls and pushes may be at play in any moment of a social encounter (Baxter and Montgomery, 1996). Participants may or may not notice or attend to these tensions, yet their actions inevitably favor some sides of tensions over others or seek to find balances amongst them. Given different communicative contexts, a salient strategy in one social encounter may recede in another.

To our knowledge, the dialectic approach has not been brought to bear on video meetings. Dialectics more generally have a small presence in reflections on their meaning (Tomes and Armstrong, 2010) and accounting for antagonistic points of view in participatory design

(Frauenberger et al., 2018). Yet, as we noted above, the history of videoconferencing research is essentially a history of exploring competing tensions and strategies. The recent work on videoconferencing fatigue could be framed, too, as based on cognitive effort stemming from the dialectic tension of lack of information—too much information (Reidl, 2022), or more broadly on the relative strength of causal influences which are themselves often in tension (e.g., Döring et al., 2022). In all three of these cases, however, dialectics have not been used as an analytic lens or method.

Although we expect that there will be resonances between what happens in video meetings and what is described in other work on the dialectics of personal relationships, in keeping with the proposition that the pool of tensions may well be infinite, we do not start with a taxonomy of previously-identified tensions or strategies, such as Baxter and Braithwaite's (2006) detailed overview of the contradictions of relating, or Sahlstein's (2006) collection of dialectics in long-distance relationships. Instead, we look to the diaries, using iterative qualitative coding methods (Corbin and Strauss, 2015) to pull out the contrasts diarists make as they describe meetings. Once we were able to highlight the key tensions that employees grappled with, in their own words, we looked for descriptions of managing those tensions. Dialectic research does not argue that there are 1:1 relationships between tensions and management strategies, nor even that individuals are consistent in which strategies they use. Instead, people experience different dynamics of tensions in different ways at different times, and use the strategies that feel right in the moment and over time to address them. After presenting the tensions and strategies at play, we draw on Baxter and Montgomery (1986) to consider why these choices may have contributed to fatigue.

4 Findings

4.1 Less Social Connection

We begin with the overall point that the diaries made clear: the implicit balances that enabled people to maintain social as well as task-oriented bonds with their colleagues at work were profoundly disrupted. Many of the employees in our sample reported a loss of social connection. Three months into the pandemic, one diarist wrote an entry which reflected the sentiments of many, writing that being 'socially connected is definitely the hardest thing for me to date' [P221, 10 Jun]. Another described 'team camaraderie' as decreasing 'even though we sync daily' [P253, 7 May]. Social connection was described as particularly challenging with new employees. 'We had a new team member join us completely remotely,' wrote one respondent, explaining that 'it seems like it is taking longer to get to know them because we only meet during scheduled meetings' [P003, 21 Apr]. Indeed, the difficulties for remote new hires have been found in both pandemic and pre-pandemic scholarship (Rodeghero et al., 2021; Arnison and Miller, 2002).

It's important to recognize that while descriptions of diminished social connection were recurrent, the sense that this was a loss was not universal: not all experienced this as a problem to solve. One respondent, for instance, discovered both that getting out of social interaction improved their work experience and that this made them different from many of their colleagues. They described how they could 'focus and work more efficiently when there isn't "water cooler"

chats and dedicated lunch hours,' and it was surprising that so many people wanted that type of interaction during the day [P350, 8 Jun].

Descriptive statistics from three polls bear out the diary reports of differing experiences. In our one-off poll (n=198) on spontaneous interactions, most respondents (79%) agreed that spontaneous interaction mattered to them, but for the majority (59%) the degree to which it mattered did not change because of mandatory working from home. Some (37%) felt that their needs for spontaneous interaction were not being met, but on the other hand, 53% responded positively that their needs were being met.

In a separate poll (n=123) on the strength of connections to their immediate collaborators (direct connections) and broader organization (indirect connections), the strength of indirect connections was perceived by most (76%) to be the same or weaker during mandatory working from home than before. People reported having variable success in maintaining direct connections (41% felt these connections had gotten stronger, while 36% felt they had gotten weaker). We observed a similar divide between participants who formed and did not form new working relationships, with contacts old and new. People with some prior work from home experience tended to report faring better in maintaining connections and making new ones than those who used to work at the office 100% of the time.

In another separate poll (n=116) on the effectiveness of 16 different remote meeting types, remote one-on-one socializing and group socializing were rated as less effective than in-person socializing by most participants (60% and 62% respectively – thus, note, this still leaves a sizeable proportion of around 40% that felt it was as or more effective to socialize remotely).

4.2 The core tension

The brief findings above indicate how participants described tensions while the multiplex blend of social and professional dimensions of their relationships became strained. Our first research question asked what tensions regarding social connection employees described as resulting from using video meetings during COVID-19. Together, the diaries describe one nuanced but overarching tension between two poles of *social* encounters, marked by *spontaneity and informality* and *task-oriented* encounters, characterized as *agenda-bound and formal*. Within short diary excerpts, for instance, 'focus,' 'efficiency,' and daily syncs with the team were contrasted with 'water cooler chats,' 'lunch hours' and 'camaraderie.' 'Intentionality' was contrasted with 'spontaneity,' 'agendas' with 'checking in,' 'meeting business' with 'chat,' and, tellingly, 'work' and 'impersonal' with 'personal.' While it is both theoretically and empirically simplistic to contrast maintaining connection with getting work done, that is nonetheless how diarists described the basic tension at stake. This key tension was exacerbated by three factors – the technology, the meeting frame, and the lack of models. Technical issues, such as bandwidth and the availability and use of video enhanced the challenges of social connection. For instance, one person in a team and organization which leaves cameras off as their norm described 'a sense of disconnect' as resulting from difficulty sensing others ''mood/attentiveness/body language' [P253, 7 May]. Another noted that the difficulty of sensing mood '…results in a decreased amount of personal connection that everyone feels,' a problem enhanced by the cognitive contrast

between the remembered ease of face-to-face meetings and the 'effort and concentration [it took to] ‘focus ’[in online meetings]' [P437, 6 May].

Tensions were also exacerbated by the frame of ‘meeting ’itself. The concept of a meeting was ill-suited to the lived experience of collegiality. For this company, as with many others, meetings were operationalized as planned and goal-oriented, which was reflected in scheduling and videoconferencing systems that encode such organizational cultures. Strict planning and goal orientation works against many of the key characteristics of sociality; despite this, meetings were treated as containers for any and most social action, likely as a symptom of the rush to do something, anything, without good means for thinking through what might work best.

As an era of ‘meetings for everything ’emerged, newly remote teams had few models for what remote social meetings–or meetings that included sociality–with colleagues should be like. As one diarist described, meetings and social spaces 'have always been separate endeavors. A social meeting (like coffee, virtual or otherwise) obviously has different expectations than a feature design meeting. Keeping this clear and distinct is less of a drag on my energy and focus' [P031, 4 May]. Figuring out how to break meetings out of this frame required new explorations of how videoconferencing software could 'be used to simulate what an in-person meeting/interaction would have looked like in a normal day' [P386, 7 May], said one diarist, ironically expressing both the view that video meetings *were not* simulating in-person interaction while expecting that it *could* somehow simulate it.

4.3 Tension Management Strategies

Tensions are inevitable. What affects outcomes is thus not how many or which tensions there are, but how adequately people frame and manage those tensions. For example, Tracy (2005) explored how engaging in the emotional labor of managing others ’feelings can lead to stress and burnout, yet can also be enjoyable, healthy, and fun. In her work, different approaches to managing these tensions led to different outcomes. Individuals will vary in which tensions they experience, which are important to them, what balances between tensions they prefer, and which situations may invoke tensions. Within social encounters, they nonetheless manage them—if only by acting in ways that tacitly affirm the balances or preferences already established. These interactive strategies may vary or evolve over time.

Our second research question asked which strategies participants describe using to manage the tensions they described. Pushed to rely so heavily on videoconferencing, the strategies people had used to manage tensions between getting work done and maintaining personal ties in the office did not work as well as before. One diarist succinctly described managing the tensions between '…work problems [and] personal problems' as '…a skill we are trying to do a better job at building' as a team [P447, 5 May]. As people explored and tried new strategies, they were met with mixed success, depending not only on the strategy but also with whom it was used. One, for instance, tried hard to '…do hallway meetings like I used to in the office' but found they were '…much more comfortable messaging fellow junior colleagues for spontaneous one-on-one check-ins,' and could not '…figure out a way to have 'hallway' meetings with my more senior colleagues like I used to' [P014, 8 May].

In the remainder of this section, we describe three categories of strategies employees articulated to manage the dialectic tensions that arose. As remoteness increased, so did pressure to move sociality into meetings. Most common were descriptions of switching between the 'poles' of sociality (maintaining personal connection) and effectiveness (getting tasks accomplished), trying to attend to both by alternating social and task-focused interactions or by using different media for different poles. Other times, they chose one pole at the expense of the other, sometimes becoming resigned to a balance which they described as serving them poorly. Finally, a few described efforts to attend to both poles simultaneously. These three categories of strategy were often individualized rather than emerging from entire teams. Far from finding ways to make it work well, by the time our diary period ended, it remained difficult and often dispiriting to try to find a good balance of social and work needs through videoconferencing.

4.3.1 Pole Switching

Diarists described three different ways of moving between poles throughout their days. The most common sort of strategy described was switching between emphasizing social connection and task orientation either within meetings, in different meetings, or in different relationships. People frequently described *using the start of the meeting for sociality and then switching to business*.

> Interaction has become more personal. People start calls by asking how you are, how your office situation is, etc. […] I like the personal questions in the beginning of some meetings. They add another layer of interaction to the calls and remote meetings [P159, 24 Apr].

> [This small talk is] rich and, strangely, more personal even in absence of video chat […] For example rather than saying a very quick and curt 'hi 'and jumping straight into business, we have 'small talk. 'Asking each other how we're holding up, whether our families are safe and with us, talking about how this situation feels, etc. [P471, 6 May]

That being said, the nature of most video meeting systems is that upon joining a meeting, one can be seen and heard by others equally, but only one person can effectively talk at a time. The side-conversations with one's neighbour as people filter in to a physical meeting room are not possible. Diarists described the awkwardness of doing small talk in public:

> '[One] thing I've noticed and sort of missed that somehow feels less appropriate in online meetings is the social aspect of it, especially as people are rolling in. I like to get to know my teammates and so I like to ask things about people's weekends or whatnot. But in an online meeting you can't just have a quiet side-conversation with anyone else, and also even if in person you'd be speaking loudly enough for the whole room, somehow it just feels way more awkward when someone joining a call will suddenly be plunged full-volume into you talking about going for a bike ride or whatever. :). '[P367, 20 May]

That being said, participants also reported getting used to conducting small talk in public over time:

> 'I've noticed remote meetings now often start with the people who arrive first having a short chat as other people join, which is more reminiscent of how it would be in an in person meeting. This is in contrast to early in the lockdown where people generally joined

> remote meetings and waited in semi-silence (with the occasionally "hello") before the meeting started. ’[P202, 01 May]

Checking in on one another about the pandemic felt especially important. Participants wrote that it often lasted quite a while, though, which made it difficult to get to important items in a meeting’s agenda. This was particularly challenging across time zones:

> It’s especially important to support the mental health of our colleagues during this time, but the check-in can take up 1/3 to 1/2 of the meeting. […] The first few minutes invariably are used to check in with each other on their wellbeing. Sometimes the participants end up spending more than the usual time you would set for greetings. […] The run over varies from a few minutes to sometimes half an hour. I have had to remind the participants a couple of times that it was almost or beyond midnight in my time zone to bring the meeting to a close. [P442, 4 May]

Participants were especially likely to complain about getting the balance wrong when meetings had no 'clear agenda, [as] it’s easy to get caught up in small-talk about the current situation and how everybody is doing because we have not seen each other for a while.' [P019, 12 Jun]. But even agendas couldn’t guarantee the right balance:

> The challenging meetings are those that have a long-standing ‘agenda ’that is rarely, if ever, adhered to, and various people flow in/out of the meetings. And when the traditional ‘water cooler ’BS-ers show up, chatting about the latest sports victories, or their weekend activities, we often lose 10-15 minutes of a 30-60 minute meeting on mindless chatter. That in turn, often leads to multi-tasking by both Customers and Internal team members. [P612, 27 May]

Another frequently mentioned strategy was to *use some meetings for tasks and others for socializing*. Diarists described their teams creating weekly social get-togethers and planned morale events. Inventing new practices as they went along, they described many new kinds of meetings that emerged in the initial months of working from home. Some described their teams holding '…a social coffee-break meeting each morning, where anyone who wants to can drop in' [P304, 20 May] or a '…water cooler meeting daily along with a morning coffee meeting, which allows people to join at their convenience and 'run into' their coworkers, whom they wouldn’t normally interact with as often' [P386, 21 May]. 'I think people quickly realized that you also need social meetings, whether 1:1 or for groups to help stay motivated,' wrote an employee whose team had set up a daily call that '…quickly ballooned into competitions of backgrounds, themes, quizzes and whatnot in order to maintain social connections' [P293, 20 May].

These meetings worked for some, but in general, reading the diaries, one is left with the sense that those who consistently participated were a minority: 'There are one lot of people who join [virtual team coffee sessions] every time and the rest come and go – some join and keep coming back and others come once and are never seen again' [P120, 4 May]. As the number of meetings in these people’s lives increased (Kun et al., 2021), these social meetings could themselves overwhelm.

Some participants described pre-COVID, in-person events that were organized as one component all together followed by smaller social encounters. They wrote that the online versions lacked the same flow:

> ‘[Large] meetings are probably the least successful because in general [these] would have two components, one of which is a large broadcast-style -- that works fine -- followed by a social element which is very difficult because with 100 participants everybody can't really talk. And I know [there is] such a thing as breakout rooms but how do you decide who goes where? It's just not very free-flowing. ’[P464, 15 May]

Furthermore, just as sociality crept into work meetings, work crept into these social meetings.

> Also starting to get an overdose of digital meetings for everything (from very operational to virtual coffee breaks all day long even during lunch break). There is a sense to try to escape a bit from this situation and see *real* humans. [P625, 23 Jun]

> One challenge we have found is establishing a 'water cooler chat' meeting to talk about random topics. We’ve lost track of that original goal after a few weeks of it, and now it’s more like a general team meeting and less chit-chat. Socialization is a bit difficult when all over [Microsoft] Teams. [P346, 22 May]

In response to people not '…prioritizing [these] informal social meetings on the calendar to try to stay connected, ’[P735, 14 Aug] and as a response of its own, many described creating less-frequent and more-structured morale meetings. People described doing '…things on meetings … for team fun and bonding: we have now a gym class, a meditation class, virtual happy hour, and an icebreaker match maker' [P013, 22 Apr]. They described by playing online games together every week, '…interaction with coworkers has been quite fun and lighthearted' [P386, 7 May]. But different meetings for different purposes, too, had their limits.

> I’ve tried running party games and scavenger hunts as structured ways to create more interaction among more attendees (as opposed to just the ‘noisiest ’group). But despite their promise as a way for us to learn things about our colleagues that we would not have learned in physical social events, the issue is getting people to show up. [P053, 7 May]

Indeed, person after person in the diaries describes low or declining attendance at these events. As time wore on, many teams gave up on this tension management strategy which required extra meetings: 'The "quarantine happy hours" are a thing of the distant past (March)' [P383, 9 Jun].

People also *divided their socializing and task time between different relationships*. They described having social meetings online with '…good colleagues and we both kind of agree that casual conversation is also a part of the workday during a time of crisis' [P293, 11 May]. This worked well for preserving stronger ties, as people focused their efforts on preserving ties with those they worked with most closely, but for some this came at the cost of neglecting weaker relationships (Yang et al., 2020). One employee described scheduling recurring 15-20 minute meetings '…with key people I feel I need to connect with more often. Effectively improving my ability to action and execute… [and, the lack of set agenda for these meetings helped] …some of the "water cooler" conversations' [P096, 3 Aug]. As another surmised, ‘It seems most

relationships that were positive/strong before the stay-at-home mandate have stayed about the same or have improved. On the other hand, negative/weaker relationships seemed to all get worse ’[P154, 24 Jun].

One reason these pole-switching strategies were often described as imperfect at best and sometimes poor is that ultimately the activity was still a videoconference. Parsing out social activities from work ones conflated them when the format was identical to a work meeting. 'When people met in person it could often feel a little bit like a treat,' wrote one participant, 'but when it’s online, it feels more like a chore' [P086, 24 Jul]. One way people broke out of being stuck in the same medium while still switching between task and social orientations was to switch media depending on the primary purpose of the interaction at the time. In the diaries, this was far less commonly reported than the other pole-switching strategies described above. There are hints in the entries, though, that this kind of media splitting may have been more satisfying. Participants described segmenting their camera use, turning it on for the period of the meeting when people check in on one another and then transitioning out of videoconferencing when the meeting turned to the tasks at hand: 'I’ve seen a significant increase in video, at least to say hello at the beginning of meetings' [P074, 22 Apr].

More common were descriptions of adding asynchronous media. One person appreciatively described a team 'trying to prioritize social support in our video meetings and communicating work stuff over email as much as possible' [P014, 13 May]. Another described 'a very active chat group on Teams ’where ‘most spontaneous topics are discussed' [P304, 8 May]. For some, these chat channels met the same fate as social meetings. One team, for example created a Teams channel for TTWR (Trying To Work Remotely) where 'we shared a lot of the questions initially, pictures of our home set-ups, tips, etc. but after the first 2 months the activity died down.' [P735, 14 Aug]. Spontaneous personal chat seemed more likely to endure. One person who described missing spontaneous and hallways meetings, described having 'to work extra hard to get alignment' said there was 'lots of back channeling now on IM.' [P352, 22 Jun], or, as another person who missed 'spontaneous hallway meetings' put it, 'I do have a lot of spontaneous IMs' now [P494, 16 Jun].

4.3.2 Choosing One Pole Over the Other

In many cases, and especially over time, selection of the effectiveness pole over the sociality pole became the norm. For some, this took the form of *focusing only on work*. Some reported that they preferred this new work environment which did not call for fostering and maintaining social relationships.

> Most people I’ve talked to lately are just super focused on meetings and not really super chatty or fluffy in convo, so there’s no awkwardness with small chat or weird personalities. That makes meetings more enjoyable (to me, anyway). [P332, 4 Aug]

Several participants described yearning for social connection but giving up on it. Some acknowledged this loss and described, with disappointment, a *passive acceptance* of losing coworker relationships and becoming more isolated as a result. This person, for example,

expresses powerlessness at changing a dynamic where 'human touch 'is lost and new employees cannot be adequately included.

> On informal chatting side, gossips and coffee table chats increase personal bonding. With that becoming difficult in work from home situation, we are losing human touch in our dealings. For e.g., we have couple of members joining our team in last 3 months. The team inclusion we have with these members is remarkably low compared to what would have been the case in normal situation. The relationship is more businesslike nowadays. I have no suggestion on how to solve this. But this is one major drawback of working from home. [P628, 23 Jun]

For some, the combination of lost social time during meetings and loss of social meetings was particularly hard, with some simply disengaging.

> Meeting with my manager, in 1:1 setting, and with my team, quickly tailed off.… this does mean there is an increasing sense of isolation. There are no coffee machine conversations, only targeted meetings with defined project outcomes. [P058, 30 Apr]

> Work feels so deeply impersonal now and I feel it causing my work confidence to erode. Originally we had lots of social meetings to stay connected, and now it feels like it's ONLY about the work. People used to care about what was going on in other peoples ' lives, and now it's just an afterthought. After so many cycles of not getting any feedback from others, I don't even bother asking how people are doing. It's silent and I feel I've lost many good friends at [Company Name]. [P805, 15 Jun]

Diarists sometimes acknowledged that '…people are getting "better" at meetings [in the sense that they were] doing meetings in different ways,' but expressed concern whether it led to 'better outcomes' which 'seem to suit the style of some people,' but 'squashes spontaneous conversation' [P005, 1 Jul]. Sometimes they acknowledged increased productivity as a result of these newer, more intentional meeting strategies with less room for sociality: 'While I do feel more productive, I feel less and less connected to people in my team since we're removing casual chats from the meetings slowly' [P047, 13 May].

4.3.3 Bringing the Poles Together

The third category of strategy we saw in the diaries was to *attend simultaneously to both poles*, but this was very rare. One employee described a team that succeeded in having 'lighthearted, spontaneous interactions without compromising productivity' [P280, 7 May]. Another employee described each pole as equally valuable and the ongoing management of the tension as an inevitable dynamic that required constant skilled attention:

> We have accomplished all the tasks productively in meetings this week. However, it's important to maintain personal connections with people, and make sure there's enough time and energy to hear how everyone is doing on a personal level. I think it's nice to start off each meeting with a little personal banter, especially when you're waiting for everyone to log in. [P173, 30 Apr]

They then described a specific incident when the tension between sociality and productivity peaked:

> However, during one meeting recently one of the leads cut off the banter and said we need to get going bc we had a lot to cover in the time slot. I understand the need to be productive, but it's also important to make a little extra time to nurture our personal connections. But.... I also did recognize that this person was having a stressful day. So overall, Teams meetings require a big balance of being productive, staying personally connected, but also showing empathy for a variety of temperaments to emerge through a very difficult and stressful situation. [P173, 30 Apr]

What's significant here is that the person recognized both the need to be productive and the extra time to nurture personal connections. They were able to contextualize the relative importance of each in the moment and offer empathic understanding to the meeting lead who decided which way the meeting would go.

A few entries did not describe what was happening in meetings, but rather what they wished were happening. One diarist succinctly encapsulated how a shift to focusing only on the efficiency pole ironically exacerbated their video fatigue: 'My impression is many people have too many meetings, so facilitators want to keep meetings short as possible. But I think the efficiency-focused meetings, while maybe shorter, feel more impersonal and are thus more draining than a [more social] meeting' [P014, 10 Aug].

5 Discussion and Implications

There is no single, permanent solution for resolving the contradictions between sociality and efficient work in videoconferencing, let alone in remote work. Individuals and teams navigate these tensions in different ways, and what works for one person at one time may not work for others. We begin our discussion with a summary of the findings of our first two research questions. We then move to our third research question with an assessment of these strategies with respect to videoconferencing fatigue, drawing on Baxter and Montgomery's (1996) hierarchy of strategies. Finally, we move to our fourth research questions by discussing two sets of reconceptualizations around video meetings that we believe are fundamental to designing videoconferencing for the new future of work.

5.1 Summary of Tensions and Strategies

RQ1: What tensions regarding work relationships and social connection did employees describe as resulting from using video meetings during COVID-19?

- The core tension was that *social, spontaneous, informal encounters* were set against *task-oriented, agenda-bound, formal encounters*.
- The core tension was expressed as a range of polar opposites such as: *focus—camaraderie*; *daily syncs—water cooler chats/lunch hours*; *intentionality—spontaneity*; *agendas—checking in*; *chat—business*; *work—personal*; *impersonal—personal*.

- Further, these tensions were exacerbated by three factors: *Idiosyncratic technical issues and use*; *the framing of all encounters as meetings*; and a *lack of models for remote social encounters*.

RQ2: To the extent that employees described tensions, what strategies did they describe using to manage them?

- One common strategy was *pole-switching between social and task orientations*. This was expressed as: *using the start of the meeting for sociality and then switching to business*; *using some meetings for tasks and others for socializing*; *dividing socializing and task time between different relationships*; *switching media depending on the primary purpose*.
- The second common strategy was *choosing one pole at the expense of the other*, becoming resigned to a dispiritingly poor balance. This was expressed as: *focusing only on work*; and *passive acceptance of losing coworker relationships.*
- The rarest strategy was to *attend to both poles simultaneously*. This was expressed in ways such as: *managing the desire to have both lighthearted interactions without compromising productivity* and paying *constant skilled attention*. It was so unusual in the data, however, that when it did appear, it was sometimes in regard to what employees wished were happening rather than what was.
- Strategies were *most often described as individualized rather than emerging from entire teams*.

5.2 Assessing the Strategies with Respect to Videoconferencing Fatigue

While we did not measure the effectiveness of the strategies that we found, we are able to offer an assessment with respect to our third research question on videoconferencing fatigue:

RQ3: What do these tensions and strategies reveal about videoconferencing fatigue?

Baxter and Montgomery (1986) organize different types of strategies in a hierarchy, going from least to most functional, and we will follow their lead. With the possible exception of those who don't care for socializing at work, few would argue that the situation described thus far is desirable. Videoconferencing did not serve different needs equally well, yet remained people's go-to technology, with the consequence that some employees became increasingly disconnected and isolated over time. Understanding what we have described with reference to the contradictions of interpersonal relationships proposed by Baxter and Montgomery (1996) helps to explain why so many felt lost connection despite meeting regularly, as well as why their efforts at tension management may have increased their sense of videoconferencing fatigue.

The kind of strategy least likely to create lasting satisfactory relationships is one in which people only acknowledge one extreme side of the tension, which Baxter and Montgomery call *denial*. This does not mean people are themselves 'in denial 'in the popular psychology sense of the term, but that they favor only one pole of the tension, ignoring or perhaps not personally experiencing the other. This corresponds to the strategies in which people attended only to one polarity, ignoring the other. Baxter and Montgomery describe another ineffective kind of

strategy, *disorientation,* in which people become fatalistically resigned to a balance between the tensions that does not serve them. This aligns with the entries above that describe losing friends and social connection but not knowing what they could do to change that. Those who appreciated the shift away from water-cooler chat toward a heightened focus on doing the work may or may not have experienced any tension between sociality and tasks; for others, though, work relationships were harmed.

The strategies of pole-switching in an effort to attend to both poles resonates with several strategies Baxter and Montgomery (1996) put in the middle of their hierarchy. Practices like starting meetings with time for small talk, or in different meetings, or with different people, can be seen as examples of *spiraling inversion*, in which people alternate time periods for each side of the tension within the same activity. When people use *segmentation*, people engage in different activities to attend to different sides of the tension. Efforts to switch media for different kinds of encounters can be seen as novel segmentation strategies.

At the top of Baxter and Montgomery's hierarchy are dialectic management strategies which do not resolve the tensions entirely, but acknowledge, accept, or even celebrate the tension and its poles. While rare, a few respondents described strategies that align with these categories. One strategy, which Baxter and Montgomery call *recalibration*, sees the poles as complementary rather than oppositional. In the context of our study, this looked like people who described sociality as providing the energy, camaraderie, and motivation to fuel their productivity. As we said above, it is notable that these entries did not describe what happened in meetings, but rather what the diarists *wished* were happening. Finally, Baxter and Montgomery's *reaffirmation* 'celebrates the richness afforded by each polarity and tolerates the tension posed by their unity' (Baxter and Montgomery, 1996, p. 66). The example used earlier, in which the diarist recognized the dynamic need to both stay productive and be empathetic, was an unusual example of reaffirmation. It seemed to work for this individual for this specific meeting, but one can easily imagine the limitations of leaving strategies like reaffirmation and recalibration to individuals to navigate alone. An organization that values both the social and the productive at work will only be able to take reaffirmation so far without broader structures to support it. Teams and organizations must find ways to strategically navigate and reaffirm the value of both efficient work and sociality. This will inevitably be an ongoing process, requiring collaboration and contextual adaptation to manage the tensions over time.

This assessment does not seek to define and model videoconferencing fatigue through mapping of inputs and outputs, and proportional causality, except insofar as this assessment speaks to the second part of Reidl's (2022) definition, which refers to the 'intense and/or inappropriate' use of videoconferencing, and as material relevant to both the Personal and Organizational factors of Döring et al.'s (2022) model. Instead, our assessment is intended to emphasize how responses to *the tensions between effectiveness and sociality reflect two assumptions that sit somewhere near the heart of videoconferencing fatigue*: *the assumption that videoconferencing simulates in-person communication*, and that, as a result, *the assumption that video meetings are static and knowable containers of any and all kinds of communication*. We do believe that these assumptions should be built into future models of videoconferencing fatigue, but that work lies

in the future. We will, however, deal with the implications of these assumptions below for designing videoconferencing.

In addition, even though our assessment is based on a hierarchy of least to most functional, we do not propose that there is an unambiguous guideline for videoconferencing strategies that should be avoided or followed by individuals or developed directly into features. This is because what we hope to convey through the dialectic method is that the tensions and strategies are inherent in all communication and relationships: they cannot be designed away. Even though these responses were learned over a very special and problematic period of history, they reveal longstanding assumptions in technology and the way we work. Perhaps even more importantly, they are raw accounts of struggles with ongoing, competing obligations which differ for people across meeting types, groups, and roles. Thus, building on what we have said about the revealed assumptions about videoconferencing and video meetings, we add that *the solution to videoconferencing fatigue lies in the realm of enabling people to better account for their desires and actions within their complex contexts*—personal, cultural, team, organization, and more—than in simple fixes to one-size-fits-all videoconferencing technologies or best practice guidelines.

5.3 Implications for videoconferencing design and practices

This brings us to our fourth and final research question.

RQ4: What does videoconferencing fatigue reveal about the need for either/both practice-based or technological changes in work, workplaces, and videoconferencing technologies?

The issues discussed above should not be read as finding fault in our participants or their company. They were taken by surprise by a global lack of contingency planning for something as radical as a pandemic. Even in a historical context where disruptive technology platforms cause upheavals to specific industries, the *entire* world of work is still fairly slow-moving. The research community was also caught by surprise. Investigation of fatigue factors in videoconferencing, especially prolonged participation, are a glaring omission, but decades of slow videoconferencing take-up had inured even the most ardent videoconferencing researchers against belief in pandemic-level usage levels that might lead to fatigue. More broadly, the research community could have conducted more longitudinal and field research on current videoconferencing usage, its place in the ordinary world of work, and its possible role in business continuity in times of emergency, but the need for such work is apparent mainly in hindsight.

Perhaps the greatest weakness of prior research was in not understanding the breadth of vision of Hollan and Stornetta (1992), who urged us to think not just about ‘the next best thing to being there ’but to go ‘beyond being there’. While individual research projects took on that mission in terms of technological advances, the research community apparently did not do enough to consider the fundamental implications of what they must move beyond for designing and using video-mediated tools appropriately within holistic considerations of meeting, team, and organizational effectiveness.

The history of research on telework suggests that without more concerted interventions, the tensions discussed above will create stark divides when some are in the office and others are not, but also affect everyone's workplace engagement. Video meeting fatigue is undeniably real, and if the new future of work is hybrid, then collaborating with combinations of remote and on-site colleagues will likely be susceptible to fatigue issues if video meetings continue without change. Additionally, for many, having some form of the informal, spontaneous, and social conversations that used to happen in person is necessary for their productivity, focus, and workplace wellbeing. Both of these problems are sociotechnical, implicating both normative practices and technological design.

Navigating these issues begins with changes in mindsets that recognize the tensions that lie at the heart of many of the challenges we have described. Our implications, then, are two proposals of changes in mindset that speak to issues in dialectic design. These changes in mindsets are initially intended for researchers and developers—the likely readers of this work—but meant ultimately to propagate across to users and organizations too. The first is a change in mindset to think *beyond meetings* to consider new dynamic collaboration concepts and technologies. The second is a change in mindset to think *beyond guidelines* and instead consider building experimentation into video-mediated communication systems and work cultures.

5.3.1 Beyond Meetings: The Need for New Dynamic Collaboration Concepts and Technologies

Meetings are comprised of conversation, which we use every day in a multitude of situations, but this has led people, teams, and organizations to mistakenly assume that meetings can be used for any communicative purpose without associated thought, help, or training (Rogelberg, 2019). Pre-COVID, this assumption was already being recognized as leading to significant wasted cost in time in organizations. *The Doodle State of the Meeting 2019 report* (2019), based on responses from 6,500 professionals across the UK, Germany, and the USA in conjunction with data from 19 million meetings arranged through the Doodle platform in 2018, reported an average of 2 hours per week in poorly organized meetings, cumulatively costing 24 billion hours of time and $541 billion to organizations. So, using meetings as a 'container 'that could be conveniently scheduled anywhere across multiple employees 'calendars was already a known problem. It should not have been surprising that, as COVID-19 sent workers home, potential existed for overuse. This, combined with technological issues, lead to video meeting fatigue.

Second, there is the special problem of sociality in enterprise video meetings during COVID-19. The history of telecommuting research was originally preoccupied with categorizing meetings by function or purpose and scaling them from least to most reliance on being in-person to achieve their goals (Ochsman and Chapanis 1974; Pye, 1976). Neither early (e.g., Pye, 1978) nor recent (e.g., Allen et al., 2014) meeting classifications specifically call out an organizational meeting type or function that is primarily social in nature. Sociality is noted as a relevant enabler in pre-meeting small talk (Yoerger et al., 2015) and during meetings (Meinecke and Lehmann-Willenbrock, 2015; Geimer et al., 2015), but it has not been clear how it should be included as a general practice in video meetings beyond suggestions that remote teams be more deliberate about socializing to promote common ground and trust (Olson and Olsen, 2013).

The concept of a ‘meeting ’was ill-suited to the lived experience of workplace sociability. Workplace video meetings are (hopefully) planned, goal-oriented, and time limited, in contrast to social encounters in the workplace which are often unplanned and open-ended, following their own conversational topics, and taking as long as they take. The concept of a remote social encounter among colleagues is therefore one which employees who had never worked remotely had to invent during the pandemic. Not only is this kind of technologically mediated connection still in flux, but one that we have had neither a set of work practices to fall back on nor the appropriate technology to help in our efforts at re-conceptualization.

One starting point is to move beyond the concept of a meeting and work on diversifying our vocabulary and understanding of the range of our collaboration needs for remote and hybrid work. Interestingly, with few exceptions, meeting science itself lacks significant discussion or operationalization of different kinds of meeting motivations (Rogelberg et al., 2010; Geimer et al., 2015). Taking this one step further, we argue that the umbrella term 'meeting' is holding back both productivity and technology development because the term refers only to a combination of time and cohort, with little or no specialization with respect to the goal of the encounter. While a ‘meeting ’held via a videoconferencing system could be named ‘coffee hour, ’that label does nothing to shift us beyond the organizational norms ingrained in the features offered up by videoconferencing systems. Little wonder, then, that the tensions discussed here played out in ways that many found difficult to overcome. How do we understand what 'coffee hour' really means in remote work? How often should these happen? Who will turn up? Will it really last an hour? What will we talk about, and what should we talk about? And how will technology support us differently for this kind of collaborative encounter?

On this last point, we would advocate for the end of one-size-fits-all ‘meeting ’systems. This analysis has shown that technology should be designed in such a way that the goal of a remote or hybrid encounter provides people with an adaptable range of resources to help them find and connect with one another, set up the collaboration, manage the encounter, and provide support for anything that needs to persist in time afterwards. Variety is the spice of life, even organizational life. As the over-reliance and poor success of spiraling inversion in our data shows, a significant amount of the fatigue reported stemmed from using just one or two very similar systems for everything, with little variety of views or configurations. At the very least, within one system, different goals for encounters should look, sound, and feel different to one another and matched to goal needs There will always be some need for familiarity of baseline controls, but it is apparent now that in attempting to create the lowest bar to entry for the largest number of people with maximum flexibility of content, our existing scheduling and videoconferencing systems have forced unnatural homogeneity. It might be argued that enterprise-oriented systems ‘need ’bland homogeneity for practical organizational discipline. However, the reports above indicate a need to rethink representations of productivity in our technologies.

If productivity is recognized as a balance of efficiency and sociality, then the solution is not simply choosing one or the other, but dynamic technologies which provide recognizable spaces not just for ‘efficiency ’or ‘sociality, ’but also enabling employees to account for and negotiate

differential needs for efficiency or sociality. It might be that, as some employees reported, an ecosystem of technologies and modes of encounter are needed to support different recognizable activities. This should extend from social activities such as small talk, catching-up, and hanging-out through blended effective/social activities such as huddles before presenting and post-mortems afterwards, to specific organizational goals such as decision-making, brainstorming, or project reporting. These new collaborative activities will move between synchronous and asynchronous tools and the use of many different modalities of communication (video, audio, chat, sketching, and so on). They will draw on different notions of scheduling (formal, versus more open-ended) and encompass a wider range of collaborative ‘roles ’or ‘identities ’for people (such as organizer, newcomer, observer, gamesmaster, etc). If we designed technology as if the container-concept of ‘meeting ’(or similar) did not exist, we would design technology that inherently provides the motivation argued for by Rogelberg et al. (2010) because, as we emphasize, the encounter will be recognizable. Over time, with the right resources, we might expect these new ‘categories ’of collaboration to emerge.

There are certainly many models of technological solutions that we can look to for variety from meeting tools. In videoconferencing research, the need for sociality has primarily been operationalized through designs for systems that specifically promote spontaneous and serendipitous collegial social encounters. Informal mediated socialization space experiments include Fish et al.’s (1990) 'VideoWindow' and Roussel’s (2002) 'Well', both of which enabled walk-up informal encounters between workers in different workplaces (across floors or buildings). Related systems such as Handberg et al’s (2016) SharedSpaces provide spaces into which remote participants can enter and engage with one another in informal social ways, although with less support for spontaneity/serendipity of participants. The generic term Media Spaces (Harrison, 2009) refers to persistent personal/group office/domestic audio-video connections between two or more people with various collections of wide and focused video views, and sometimes with various scaled levels of view to balance privacy with access and access to one another from glancing to full engagement. Without the need to physically move between places, media spaces for working instead propose ongoing and ambient engagement with scaled levels of encounter, ranging from monitoring, checking in, through asking a quick question or piping-up to join in, to both spontaneous and scheduled meetings. Examples include Portholes (Dourish and Bly, 1992), RAVE (Gaver et al., 1992), and Montage (Tang and Rua, 1994), while others are detailed in collections by Harrison (2009), Finn et al. (1997), and more recent examples in the domestic domain (Neustaedter, 2015). Had commercial Media Space systems been in place during the pandemic, it is certainly possible that at least some videoconferencing fatigue may have been avoided at least in the sense that people would have had both a different 'there' space in which to relate and a different 'there' sense of time to relate outside of focused meetings. Immobility would still have been a problem, however.

There have been occasional reports of employees using existing videoconferencing systems to set up Media Space-like persistent shared connections between one another or offices (e.g., Karis et al., 2016), but these are the exception, and, together with some purpose-built commercial Media Space applications that cropped up during the pandemic (VideoWindow, 2022; Perch, 2022; and Tandem, 2022), they share display and audio properties with current video meetings.

As such, they are likely to have the same nonverbal overload factors proposed by Bailenson (2021). In addition, during the pandemic when governments restricted movement, such systems may have either tied people even more to their desks or, if they installed these in multiple rooms, perhaps created an inescapable sense of surveillance.

Game-like 2D spaces with the ability to transition to videoconference-like encounters—albeit with more graduated transitions into and out of talk than traditional videoconferencing—enable the visual depiction of virtual office and event spaces with the promise of a more naturalistic, all-day sense of working together in both planned and unplanned encounters. Virtual replication of a physical space is a simplistic solution to the issue of a missing physical workplace, and one that presents many accessibility challenges, but the recent proliferation of apps like Gather.Town (e.g., Knock, Remo Virtual Office, SpatialChat, Sococo, Topia, Virtual Office, Waimz, WorkAdventure) and apps with less direct physical metaphors (e.g. Discord, Ohyay, Pragli, Remotion, Sneek, Teemly), point to a strongly felt need for ongoing connection environments that allow users to blend work and sociality throughout the day. Such systems are very popular and show real promise for comfortable social engagement (Latulipe, 2021), but, like the Media Spaces above, such systems may lead people to a sense of obligation to be at their desks for long periods, and by including the need to navigate virtual avatars between places on a map as well as stay connected all day. It remains to be seen how they will operate day after day, week after week. Many of these companies claim to have customers who use them for fully remote virtual offices, but as yet there is no definitive research on how well they operate.

Virtual Reality and Augmented Reality might be a more significant path to difference. There are researchers considering how to move 'beyond being there' in VR (e.g., McVeigh-Schultz and Isbister, 2021) but such systems are not currently close to mainstream productisation due to numerous technical limitations in capabilities that prevent all day usage, not to mention conceptual issues in how to represent all the various facets of work in blended environments (Weinrich et al., 2021), and the issue of simulation sickness, especially for women (MacArthur et al., 2021). Even if those were to be overcome, it is currently still unclear how the inescapability of device usage constantly on one's head will significantly improve videoconferencing fatigue. We should not pre-judge VR and AR as technically incapable of doing so, but the evidence is not yet available. There is also the conundrum that if we do not sufficiently understand how to conduct both effective remote/hybrid meetings and how to blend in sociality throughout the day using existing technology, what evidence do we have that the VR/AR technology itself could fix these problems? The worst outcome would be to repeat the mistakes of the past.

We raise all the above criticisms not to undervalue the products or their developers, but rather to make the point that the solution to videoconferencing fatigue is not as simple as replacement with another videoconferencing system. We must consider the context of all-day use. This brings us to our last point: how will we know when we have succeeded?

5.3.2 Beyond Guidelines: Building Experimentation into Videoconferencing Systems and Work Cultures

Another implication of the overuse of 'meetings 'is that thoughtless meetings will be poor meetings, regardless of the technology. Many employees relied on what they thought could be

done with the existing technology and hoped for the best. They did this because there was nothing to fall back on—no guidelines for meetings relevant to business or social continuity in an extreme emergency, and limited guidelines and training for meetings at all. As mentioned, minimal training in how to organize and even attend meetings has long been a blind spot in many organizations (Rogelberg, 2020). The COVID-19 pandemic led to a plethora of guidelines for effective remote meetings and hybrid meetings (Baym et al., 2021). That there are generalized guidelines now available is a necessary correction. However, guidelines and trainings come with their own caveats about how they are rolled out and, critically, how much they end up directly changing or improving behavior. Our findings suggest the importance of ensuring that sociality is explicitly considered in these guidelines. However, such guidelines tend to focus on more productive and comfortable meetings. More productive meetings may help relieve some level of fatigue in terms of time in meetings, but that does not directly address the need for sociality which, unfulfilled, can generate its own exhaustion. There is mounting evidence for the benefit of meeting-free days (e.g., Laker et al., 2022), which show that having at least some meetings is essential for coordination and social ties, but two or even three meeting-free days per week improves overall work and satisfaction. It could also reduce fatigue, but only if the change to fewer meetings is accompanied by better meeting management—returning us to the problem of guidelines for meetings.

The technological design of videoconferencing systems also has a role to play. Most videoconferencing systems are designed to facilitate interaction, but few commercial systems provide direct feedback on the nature of that interaction. Concepts such as inclusion ‘meeting coaches ’that track a range of issues holding back productive meetings have made the jump from research (Samrose et al., 2020) to products (e.g., Read.AI and MeetingScience). Again, though, such dashboard systems are geared towards more effective meetings, not sociality. Still, they are a likely clear path to overall improvement.

Even when based on research, however, current dashboards cannot cover all groups, all activities, all global regions, and all cultures. They depend on encoding a limited number of cultural practices to be found, measured, and reported, but to fit the world in all its specificity is challenging, more so when needing to support cross-cultural needs, and even more so in terms of sociality. Furthermore: how will such dashboards be used? The concept of the dashboard assumes that as team behavior better fits the positive attributes of the dashboard’s assumptions, the better the meeting will be. But this removes some agency from teams to try out different courses of actions that work better for them. A team needs to be motivated not only to achieve the goals of the meeting but to meet the metric of the dashboard which may or may not match the often-competing goals of those in attendance.

Given that tensions between effectiveness and sociality will likely continue well into the future for remote and hybrid work, but also a sense that dashboard systems could help teams understand what is going on in meetings, we believe that the design implication here is not to start with the assumption that we know what should be done, but rather that the next generation of technology should be designed with the principle of enabling people and teams to experiment with their own encounters. We are not suggesting that dashboards be created to rank the sociality of meetings.

We mentioned above that assumptions about videoconferencing fatigue stemmed from misapprehensions about videoconferencing. These assumptions largely stem from a lack of data about what is going on in meetings, as well as a lack of accounts for one another's needs. A true leap in 'beyond being there' is not in the manner in which remote and hybrid video-mediated systems (or even combinations of asynchronous and synchronous systems) connect team members to one another, but in the way that they help teams learn about themselves. This could range from learning how to balance asynchronous and synchronous communication systems to provide variety of efficiency and sociality, through to how to balance time and nature of efficiency and sociality with different videoconferencing features or apps. The ability to conduct experiments—to achieve X, do it in manner Y for a month and in manner Z for a second month, then look back over results—will provide the much-needed motivation of agency.

The diaries show that even in large companies, social relations are a continuum that ranges from minimal human engagement to rich social support. Our technologies need to support that continuum, and, most importantly, help employees, teams, and organizations try different configurations and determine what is appropriate and works best to support this continuum in their context. The specific features to best enable efficiency when needed, social support when needed, and a blend when needed, will necessarily change over time. However, the great advantage of modern remote work technologies is that they are far more malleable than their videotelephony forbears. The potential for building in agency for users to test and decide upon their own configurations may provide one solution to videoconferencing fatigue.

6 Limitations

We acknowledge that the choice to limit data collection to one company does risk limiting generalizability, especially since company culture is likely to impact issues of social support, but we balanced treating this as a known limitation against issues of context and logistics. First, collecting data from one company enabled us to collect a large variety of experiences but also make sense of these against a consistent work context and a reasonably consistent technology baseline. Second, given that we wanted to spin up a large diary study during a pandemic, we needed a way to constrain logistics issues over such a long period of time so that sufficiently high-quality data could be collected. Given that we were able to recruit from almost all global regions, company groups, and roles, we believe that the trade-off is reasonable and that the resulting findings are likely common across technology and knowledge work companies.

7 Conclusion

Drawing from a large study of one global technology company's employees 'experiences of all-remote video meetings during the COVID-19 pandemic, we found tensions in strategies for social support, with practices and technology mutually shaping one another. There were problems managing the boundaries of what is social and what is work within the framework of 'a meeting. 'Some norms emerged to navigate these tensions, but they remained unsettled because boundary work is inherently composed of the pushes and pulls that compete and may even be contradictory. From a dialectical perspective, this boundary work is not something to fear, mourn, or avoid, but is to be 'embraced on its own terms' (Baxter and Montgomery, 1996, p. 60).

As productivity itself begins to be rethought as encompassing the dynamic tensions of efficiency and sociality, the technologies currently available for remote work—and the very concept of a ‘meeting ’to include all workplace social encounters—are inadequate to address the multiple, varied, changing needs people have at work. If COVID-19 has taught us anything, it is that work is people—not place, and not technology. People-centric principles need to be developed for the next generation of remote work technologies. We proposed two implications that are changes in mindsets. First, technology should help us break out of the constraints of ‘meetings ’and re-imagine a constellation of features and/or technologies that enable recognizably social, dynamic encounters. Second, technologies should provide teams with the agency to experiment and thus make choices about the constellation of features or technologies that best suit their work needs, including those of social support. Dialectic tensions call for a new mode of dialectic design.

8 Declarations

This research was not funded with any internal or external grant. There are no conflicts of interest or competing interests to declare.

9 Appendix

As well as written open entries, each diary included eight identical ‘pulse ’Likert scale questions, but these are not used in this study. Participants were asked to author up to 24 diary entries, organized in three cycles of eight guided topics. The topics were: physical workspace, interaction, productivity, tools, multitasking, types of meetings, time in meetings, and approaches to meetings. Each cycle contained slightly different additional questions about what had changed since the previous entry. For the diaries, each topic provided a range of prompts to help participants reflect on various aspects of the topic.

Diaries

In the diaries, social connection was directly prompted in just one of the eight topics, the ‘Approaches to meetings ’topic. For the Approaches topic asking 'What approaches have people been taking to recent online meetings?' we included a direct prompt about 'Staying socially connected.'

Across all the other topics we included more indirect references to social connection. Prompts about colleagues included asking about the 'Group cohesion,' 'Sensing the number and presence of others,' 'Sensing mood and engagement,' 'Familiarity with people and their geographical location,' 'Most successful and most challenging [meetings],' 'Topics that are easier or more difficult to discuss,' 'Group size, meeting length, meeting roles,' 'Balance of ad-hoc versus scheduled [meetings],' 'Handling difficult topics,' 'Contrasts with in-person meetings,' and 'How people share approaches.' We also included references to working from home in most topics, e.g., asking about 'Impact of other people in your vicinity' and 'Impact of home life.'

Polls

For the Spontaneous Interaction poll, we asked participants about their needs for spontaneous interaction during the mandatory period of working from home. We asked 5-point Likert scale

questions (Strongly Disagree to Strongly Agree) below, and also provided an open field for them to relate experiences that led to their answers:

- PRIOR to mandatory working from home, spontaneous interaction with people in my workplace mattered to me.
- DURING mandatory working from home, spontaneous interaction with people in my workplace matters/mattered to me.
- DURING mandatory working from home MY NEEDS ARE BEING/WERE MET for spontaneous interaction with people in my workplace.

For the network connections poll, we asked participants how they had kept up with their network of contacts in two questions. First, we asked them to tell us about how they had kept up with their network of contacts during the mandatory period of working from using 5-point Likert scale questions (Much Weaker to Much Stronger):

- Your DIRECT network is the people with whom you have daily or weekly working relationships (collaborating on shared projects or goals).
- Your INDIRECT network is the people that you are usually aware of but don't collaborate with on shared projects or goals daily or weekly.
- Has the strength of connection to your DIRECT network changed since mandatory working from home?
- Has the strength of connection to your INDIRECT network changed since mandatory working from home?

We then asked them to tell us about NEW and EXISTING working relationships during mandatory working from home using 5-point Likert scale questions (Strongly Disagree to Strongly Agree):

- I have MAINTAINED all of my valuable EXISTING working relationships during mandatory working from home.
- I have formed NEW valuable working relationships with NEW contacts during mandatory working from home.
- I have formed valuable NEW working relationships with EXISTING contacts during mandatory working from home.

Again, we asked them what experience/s led to their answers, adding the following example prompts: To what extent did/does technology support your needs? What role do meetings play? What role do other tools (chat, email, social media) play? Have you made new working relationships as a direct result of the COVID-19 situation?

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