



## Investigating the effects of online communication apprehension and digital technology anxiety on organizational dissent in virtual teams

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### ARTICLE INFO

Handling Editor: Jen-Her Wu

#### Keywords:

Online communication apprehension  
Computer anxiety  
Social compensation hypothesis  
Organizational dissent  
Structural equation modeling

### ABSTRACT

Working in virtual teams has become increasingly common in contemporary workplaces with technology that allows teams to collaborate online without being present in the same physical space. For some employees, communicating via virtual technologies such as email, phone, video conferences or applications to work in teams can cause anxiety, which in turn may influence their decision to engage in organizational dissent. This study examines the impact of two forms of online anxiety on employees' virtual organizational dissent: online communication apprehension and digital technology anxiety. The effects of age, technical skills, the portion of workload done virtually, and previous experience in virtual teamwork were included in the study as control variables. Using factorial analysis and structural equation modeling, the results from 321 volunteer employees of various US organizations (males = 135, females = 184, others = 2) were analyzed. The results show that the two forms of online anxiety and technical skills generally increase organizational dissent and aging significantly decreases virtual latent dissent. The study's findings support the social compensation hypothesis of online media use.

The development of Information and Communication Technology (ICT) in organizations has transformed the means of sharing and transferring information and reshaped intra/inter-organizational life and culture (Stephens & Kee, 2020). One area that is often challenging for organizations is the use of virtual teams. Virtual teams (VTs) are defined as "teams whose members use technology to varying degrees in working across locational, temporal, and relational boundaries to accomplish an interdependent task" (Martins et al., 2004, p. 808). VT use various communication technologies include email, audio and visual technologies such as Zoom or Skype, and apps like Microsoft Teams and Slack. Navigating dissent within VTs is an important skill for many workplaces, and one that has received little attention in previous academic work. Organizational dissent, or the expression of disagreement or contradictory opinions over organizational policies, operations, and practices (Kassing, 1997), has an important role within organizations in improving decision-making and productivity (Garner, 2014), and allowing employees the opportunities to meet their needs for autonomy, inclusion, and power (Gibbs, 2009). Due to dissent's confrontational nature in challenging the organizational status quo, dissent can be a

stressful process (Zeng et al., 2020). Despite the shift towards VTs as a key mode of employee organization, there is still little known about what factors feed into online dissent and how this can be managed. This research aims to address this gap, by examining how anxieties related to using technology and online communication might influence the expression of organizational dissent.

The shift to VTs creates both benefits and tensions for employees. Benefits include providing employees with new tools for connecting within and across organizations to share information, establish social networks, and negotiate their personal and organizational identities (Shumate & Contractor, 2014). This hyperconnectivity can be productive, but it can also create tensions by encouraging team members to stay in touch around the clock and disrupting the boundaries between public and private life (Fredette et al., 2012, pp. 113–119). Compared to offline (face-to-face) communication, VTs require a different set of cultural competencies to interpret conversations that may be lacking in the richness of non-verbal cues. Communicating on VTs can also require technical skills to utilize devices, which less technologically savvy employees may find stressful. These additional stresses in communication

*Abbreviations:* CA, Communication Apprehension; DTA, Digital Technology Anxiety; VOD, Virtual Organizational Dissent; VAD, Virtual Articulated Dissent; VLD, Virtual Latent Dissent; VT, Virtual Teams.

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<https://doi.org/10.1016/j.chb.2023.107719>

Received 26 July 2022; Received in revised form 14 January 2023; Accepted 24 February 2023

Available online 24 February 2023

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can make communicating disagreement difficult and lead to miscommunications between teams (Ishii et al., 2019).

Research to date has not yet revealed whether online environments are more conducive to dissent than in-person environments. However, it is clear that the dynamics of offline and online dissent are different and may have distinct ramifications for employees in creating a permanent digital record. For example, an intended articulated dissent to a manager in an email could end up being received laterally by coworker or displaced outside of the organization (Garner & Peterson, 2020). Online dissent can increase opportunities to coordinate and organize dissenters creating a sense of organizational unity (Garner & Peterson, 2020; Oltmann et al., 2020). Despite the prevalence of VTs and online communication tools in modern work environments, online organizational dissent has been understudied (Ravazzani & Mazzei, 2018). Given the potential high stakes and communication and technology application required in organizational dissent in VTs, it is likely that anxiety may play a role in shaping employee responses.

This research examines the impact of two distinct forms of anxiety on virtual organizational dissent (VOD) in VTs: Online Communication Apprehension (OCA) and Digital Technology Anxiety (DTA). OCA is an unease in relation to online communication interactions that reduces an individual's online participation and effectiveness (Fuller et al., 2016; Hunt et al., 2012). DTA is commonly known as computer anxiety, and is an avoidance emotion derived from expecting unsatisfactory outcomes of technology use (Burns et al., 2019). It is associated with a lower intention to use technology and a low perceived ease of technology use (Celik & Yesilyurt, 2013). DTA can lead to lower digital skills, and job and career satisfaction (Parayitam et al., 2010). In examining how these two forms of anxiety contribute to VOD, this work makes an important contribution to organizational communication studies, which has tended to approach anxiety through the broader sense of negative emotions such as anger and frustration (Barki & Hartwick, 2001). While the role of digital skills in various forms of online communication has been extensively investigated (see Livingstone et al., 2021, pp. 1–27; van Laar et al., 2017, 2020; Voogt & Roblin, 2012), the relationship between technical skills and the likelihood of organizational dissent is understudied. Through identifying the relationships between OCA and DTA on organizational dissent, this research furthers earlier work on how individual characteristics shape team dynamics and provides a novel contribution to the understudied field of VOD (Faraj & Azad, 2012; Norman, 2011).

The following sections lay out the theoretical approaches that have been used to explain the interaction between technology and people in the workplace in VTs, how this might impact on organizational dissent, and why anxiety might play an important role in this process. The study then elaborates on OCA and DTA in the VTs, providing hypotheses about how these might function to shape organizational dissent before turning to a discussion of method, where the study participants, terms of inclusion, data collection process, and data analysis and findings will be presented. Discussion of the main results, study limitations, conclusion, and managerial and theoretical implications will follow.

## 1. Technology, organizational dissent and anxiety

### 1.1. Organizational communication in virtual teams

According to Adaptive Structuration Theory (DeSanctis & Poole, 1994), the incorporation of new information communication technologies (ICTs) such as VTs into workplaces influences social structure and organizational relationships. The incorporation of technology into the workplace is not linear, and often produces unintentional results as users adapt to the technology according to their individual preferences. While some users may pick up the technology quickly, others may resist or struggle to learn it. Social and technological structures are intertwined, and these variations in ability and aptitude produce different outcomes for different users that affect the team as a whole (Evans et al., 2017). The quality and quantity of team communication is a significant variable

in determining procedures and outcomes of VTs such as performance, knowledge sharing, decision-making, trust, and commitment. (Abarca et al., 2020; Alsharo et al., 2017; Morrison-Smith & Ruiz, 2020). As communication in VTs is the result of an interaction between technological and non-technological variables, team members' emotions, characteristics, and personal needs are significant in shaping VT communication (Abarca et al., 2020).

#### 1.1.1. Outcomes of technology in VTs

The introduction of ICT such as VTs into the workplace can have positive or negative impact depending on how the organization adapts to this structuration. While technology facilitates teamwork and provides various capabilities to increase equality and participation, it includes dealing with diverse geographical, temporal, perceived distance, and team configuration and diversity challenges (Morrison-Smith & Ruiz, 2020). When implemented well, VT technologies can diversify the skills and knowledge sources of employees and increase organizational communication, which can democratize organizational culture (Cheney et al., 2011). Online technology in the workplace is closely related to the primary factors increasing organizational democracy, including the dynamic and competitive environment of the modern organization, the knowledge-based economy, and the increasingly networked nature of the world (Battilana et al., 2018). According to Battilana et al. (2018), ICTs reduce hierarchies and promote democratic organizational culture which is more transparent, inclusive, supportive, and open (Adobor, 2020) and can provide employees with more opportunities to express their opinions toward their managers and peers. Reviewing prior literature, Gilson et al. (2015) highlights increased information exchange, higher equality between employees, higher effectiveness of big teams, decreased social loafing, a more precise understanding of tasks and increased intragroup relationships as the benefits of VT introduction into the workplace. The introduction of VTs into workplaces can contribute to the democratization of the workplace (Fuller et al., 2016). On the other hand, when the structuration does not go as well, the implementation of ICTs in organizations can increase the risk of cyberbullying, security breaches, and the spread of mis/disinformation (Cheney et al., 2011). The introduction of VTs can also lead to misunderstandings, reduced information seeking, and incoherent messages (Gilson et al. (2015). The plausible relationship among dissent, democratic organizations and technology supports further investigation into the role it plays in shaping dissent processes, as democratic structures in organizations could increase the possibility of dissent (Croucher et al., 2021).

#### 1.1.2. Virtuality and media richness

The technological form which the VT chooses to communicate brings about various opportunities, barriers, and levels of virtuality. Hacker et al. (2019, p. 4) define virtuality as “a multi-faceted higher-order construct encompassing a team's independent identifying dimensions that signify degrees of dispersion or discontinuity.” The level of virtuality in a VT is related to how much the members use technology in teamwork procedures, how much the team's production using technology is of informational value, and to what level members are synchronous (Kirkman & Mathieu, 2005). For example, some technologies such as Slack or email may be lacking in non-verbal cues that shape the interpretation of communication, whereas others are media rich, such as audio and video meetings (Ishii et al., 2019). The level of virtuality and richness of communication medium in VTs influences the quantity and quality of organizational communication. A bibliometric analysis of the published works on VTs shows that communication technology and trust are among the primary constructs studied in this field (Abarca et al., 2020). This trend of research reflects the importance of communication in VTs because the specifications, content and medium of online communication (in comparison with face-to-face communication) influence how team members use technology or to what extent they trust each other (Hacker et al., 2019).

### 1.1.3. Social enhancement vs social compensation

Although ICTs are often readily available to all employees in organizations, the degree to which they use VTs for online communication varies. Two competing hypotheses have been suggested to explain how employees engage with VTs in the workplace online communication: social enhancement and the social compensation. The social enhancement hypothesis posits that those with higher offline communication competence will also use online communication technologies more extensively. Ruppel and Burke (2015) found that lower social anxiety and extroversion are related to increased online communication, which supports the enhancement approach. In contrast, the social compensation hypothesis asserts that those with inadequate offline communication competence or higher social anxiety will use online communication technologies to compensate for their communication deficits (Lee et al., 2020). Previous studies show that individuals with lower social competence (Ruppel & Burke, 2015), higher social anxiety (Weidman et al., 2012), lower self-esteem (Zywica & Danowski, 2008), and introversion (Van Zalk et al., 2011) used online communication more extensively. These contrasting views demonstrate the need for further research into how psychological elements such as anxiety shape online communications in VTs in the workplace.

### 1.2. Organizational dissent in virtual teams

Organizational dissent is the process of expressing contradictory views about organizational policies, operations and practices, which could be directed to the management (articulated dissent), shared with coworkers (latent dissent), or vented to the friends and family outside of the organization (displaced dissent) (Kassing, 1997). Despite employee dissatisfaction being commonplace in organizations, dissent may remain unexpressed because it is often met with negligence or even retaliation from coworkers or managers. Previous studies have investigated organizational dissent in terms of strategies of expression that are positive or negative for workplace dynamics, such as direct-factual appeals, repetition, solution presentations, circumventions, and threatening resignation (Kassing, 2002). Other studies have examined the type of message used, such as solution presentations, direct-factual appeals, coalitions, and inspiration (Garner, 2009).

The different forms of dissent have been characterized and defined from various viewpoints. Articulated dissent directly confronts the management and can be perceived as a form of employee disobedience, whereas latent and displaced dissent are more about seeking emotional confirmation and comfort (Kassing, 2002). As a result, previous studies have predominantly focused on articulated dissent, the type of employee voice that has the potential to bring out substantial organizational changes (Zeng et al., 2020). Although dissent is often viewed as positive or negative, dissent can mean different things to different people (Garner, 2013). For example, while managers might perceive dissent as negative, for employees' latent dissent might function as cathartic and a means for the employee to feel their voice is heard, enabling them to move forward. Dissent is therefore best understood as a complex process of co-construction that rather than involving discrete individuals and actions, is formed through the interaction of complex groups for both positive and negative outcomes (Garner, 2013). Dissent is not experienced as a singular moment for dissenters, but as the confluence of past histories and interactions. Dissent is influenced by efficient causes that promote instability and changes in conditions, and final causes that attempt to shape their outcome, such as the alignment to organizational goals (Garner, 2013). While the positive or negative outcomes of different types of dissent are out of the scope of this investigation, this research aims to better our understanding of technological factors as an efficient cause that give rise to dissent's expression. In doing so, it provides the foundations for further investigation into how organizational processes can shape the expression of dissent when using VTs in the workplace.

With the increased use of computer-mediated communication (CMC) and social media, individuals dissent online using the various capabilities

and affordances of the digital media for sense-making and power balance. Online dissent involves practices that leverage online communication affordances, such as the use of anonymity to disguise identity and asynchronicity in conversations. It also includes practices such as metavoicing, where participants engage in online reactions to other's activities to support each other's activities (Majchrzak et al., 2013). Outside of the workplace, or in situations within the workplace where people perceive their communications not to be monitored, the anonymity allows individuals to skirt potential retaliations when expressing their uncensored opinions (Kassing, 2011). Thus employees may feel more encouraged to "voice their concerns on their organizations with reduced fear of retribution" in the online environment (Gossett & Kilker, 2006, p. 63). On the other hand, the retrievability of online communication, manifested in the permanent retractability of communication logs, could produce anxiety and impact on dissenting strategies. Online dissent entails sharing personal information and views. This requires employees to navigate privacy boundaries, which according to Communication Privacy Management (CPM) theory (Petronio, 2002), can lead to boundary turbulence if the communication parties miscoordinate private information management. Previous research has implied an association between dissent and communication anxiety, particularly when expressed to managers (Bisel & Adame, 2018). On the other hand, the anonymity afforded by online communication could reasonably increase the likelihood of expressing one's opinions and overcoming the anxiety related to it (Ayyagari & Purvis, 2011).

While expressing online dissent has become common phenomenon in the contemporary digital environment, few studies have examined online dissent processes and audiences within the workplace (Ravazzani & Mazzei, 2018). Previous studies on online dissent have investigated how dissenting has been used to (re)produce counter-status-quo discourse in religious organizations against male dominance (Hinderaker, 2017), sexual exploitation of young adults (Hinderaker, 2020), power abuse (Garner & Peterson, 2020), and how online dissent is used by university students to challenge instructors' ideologies (Linville et al., 2018). An example of using media affordances in studying organizational dissent can be seen in the way organizational dissenters from United States administration used the referentiality and anonymity afforded by Twitter to resist misinformation from President Trump (Oltmann et al., 2020). The ability to engage in such practices within the workplace could also be impacted by employee's communication predispositions, such as anxiety.

### 1.3. Anxiety and organizational dissent

Due to its confrontational nature that challenges the organizational status quo, dissent is a stressful process (Zeng et al., 2020). Bisel and Adame (2018) show that when managers value employees' embodied expertise, organizational moralized articulated dissent increases, and employees' anxiety decreases. Prior studies have investigated the effect of stressful processes such as verbal aggressiveness and argumentativeness on dissent. Kassing and Avtgis (1999) showed that argumentativeness increases articulated dissent but has no significant effect on latent dissent, and verbal aggressiveness decreases latent dissent and increases articulated dissent. This finding shows that employees perceived articulated dissent as a constructive process that includes argument. Moreover, when employees found fewer opportunities to voice their opinion, they dissented latently, implying that a higher level of anxiety is more related to latent dissent.

The effect of different types of anxiety on dissent is understudied, such as communication apprehension (CA) and digital technology anxiety (DTA) (Kassing & Avtgis, 1999). Consequently, the impact of OCA on dissent has not been adequately addressed. The social enhancement and compensation approaches to online communication use (Lee et al., 2020) may deliver different understandings of the effect of anxiety on VOD in VTs. According to the social enhancement hypothesis, less anxious employees are more likely to use VTs to voice their organizational dissent. However, the social compensation approach reasons that

the more anxious employees will dissent more in online communication as they perceive the higher control and less non-verbal clues of VTs to be a more useful communication medium.

### 1.3.1. Online communication apprehension

OCA, also known as computer-mediated communication apprehension (CMCA), is the apprehension one endures during a real or anticipated online communication (Hunt et al., 2012). Previous studies of OCA in educational context showed it weakens students' learning ability (Vician & Brown, 2001), lessens their use of email technology (Fuller et al., 2006), and is negatively correlated with positive attitudes toward online communication and communication competence (Brown et al., 2004). In online organizational communication, employees with high OCA are perceived to have lower performances (Fuller et al., 2016), and they are less likely to use new technologies, especially ones that involve more complicated skills (Scott & Timmerman, 2005).

The relationship between OCA and VOD is understudied. Still, the previous research showed that organizational media afford socialization, information sharing, and power relationships (Treem & Leonardi, 2013). These qualities are necessary for dissent but may cause anxiety among the users. Managing power relations in dissent communication may be stressful; thus, those with higher apprehension are more likely to avoid dissent. On the other hand, organizational dissent may boost employee satisfaction (Lutgen-Sandvik et al., 2011), and their sense of emotional release and support (Sollitto & Myers, 2015). In this case, higher apprehension is likely to increase dissent to manage distress and anxiety. As the relationship between OCA and VOD has not been studied, and previous findings about the impact of anxiety on VOD have yielded mixed results, the following research questions are presented:

**RQ1a.** Does Online Communication Apprehension (OCA) impact Virtual Articulated Dissent (VAD)?

**RQ1b.** Does Online Communication Apprehension (OCA) impact Virtual Latent Dissent (VLD)?

### 1.3.2. Digital technology anxiety

Digital Technology Anxiety (DTA) is the anxiety of working with technology, affecting organizational behaviors, especially in online communication. Previous studies showed new technologies could create resistance in organizations (Lee et al., 2019). DTA and other types of anxieties lessen the chance of digital inclusion (Di Giacomo et al., 2019), can limit thought-action repertoire, and encourage avoidant or escapist behaviors (Burns et al., 2019) from the situations such as organizational dissent (Nemeth, 1995).

A relationship between ICTs-related skills and emotions (such as DTA) and the tendency to dissent in organizations seems plausible yet understudied. While DTA possibly prevents engagement with technology and limits online communication, including VOD, it is also possible that once employees are determined to voice their dissatisfaction, they overcome their DTA, especially considering the various affordances that different organizational media present (Rice et al., 2017). Also, employees with higher DTA send more social-oriented (versus task-oriented) messages in VTs to compensate for their higher CA (Fuller et al., 2016). As some types of dissent messages are social-oriented, such as exchange, inspiration, and humor (Garner, 2009), it is possible employees with higher DTA dissent more often using these message types. Repetition could also influence the relationship between DTA and VOD. Online communication increases the quantity and frequency of organizational communication (Fuller et al., 2016). With repeated online interaction, online communication effectiveness could improve, possibly leading to higher organizational dissent (Fuller & Dennis, 2009). Therefore, as the relationship between DTA and VOD was not studied before, and there are plausible arguments for both increasing and decreasing impacts, the following research questions are presented:

**RQ2a.** Does Digital Technology Anxiety (DTA) impact Virtual

Articulated Dissent (VAD)?

**RQ2b.** Does Digital Technology Anxiety (DTA) impact Virtual Latent Dissent (VLD)?

## 1.4. Control variables

This study also controls for the effect of the employees' technical skills, age, virtual experience, and the impact of the amount of job done virtually on VOD.

### 1.4.1. Technical skills

The level of skill and comfort with technology significantly affects performance on simple and complex tasks in a computer-mediated environment (Taha et al., 2014). Additionally, limited experience in online technology is a significant communication barrier (Lyles et al., 2020). Online communication entails sufficient technical competence, so higher technical skills can increase VOD. Therefore, the following are hypothesized:

H1a Higher technical skills increase Virtual Articulated Dissent (VAD).

H1b Higher technical skills increase Virtual Latent Dissent (VLD).

### 1.4.2. Age

Previous studies show that older employees are more likely to confront management or stand up in the organization, especially when they perceive a decision as unfair (Kang & Berger, 2010). Furthermore, age could also be linked with employees' tendency to use technology. However, older people tend to have more difficulty using technology to complete tasks (Yen et al., 2018) and usually perform worse when completing the same task with technology (Lyles et al., 2020). Hargittai et al. (2019) showed various elements such as socioeconomic status and autonomy of use could affect the tech skills among older users indicating a possible link between tech skills and age which, as mentioned before, could influence organizational dissent. Therefore, the following questions are presented:

**RQ3a.** Does age impact Virtual Articulated Dissent (VAD)?

**RQ3b.** Does age impact Virtual Latent Dissent (VLD)?

### 1.4.3. Online organizational experience

The online experience could increase communication competence, improve effectiveness and appropriateness in an online setting and decrease DTA (Fuller & Dennis, 2009). Perceived self-efficacy, which could be linked to a higher experience, is a key determinant of employee voice. Employees confident in their online communication skills are more likely to express their opinions (Hastings & Payne, 2013). Thus, the following hypotheses are presented:

H2a: Higher virtual experience increases Virtual Articulated Dissent (VAD).

H2b: Higher virtual experience increases Virtual Latent Dissent (VLD).

### 1.4.4. The portion of workload performed virtually

The portion of workload serves as an indication of physical work engagement. Those with heavier workloads are generally more involved in and committed to the work role. As past research has indicated that organizational engagement and commitment are significantly related to employee dissent behaviors in a face-to-face setting (Kassing et al., 2012), the following hypotheses are presented:

H3a: Higher virtual portion of workload increases Virtual Articulated Dissent (VAD).

H3b: Higher virtual portion of workload increases Virtual Latent Dissent (VLD).

Fig. 1 summarizes the study's theoretical model, Hypotheses, and RQs.



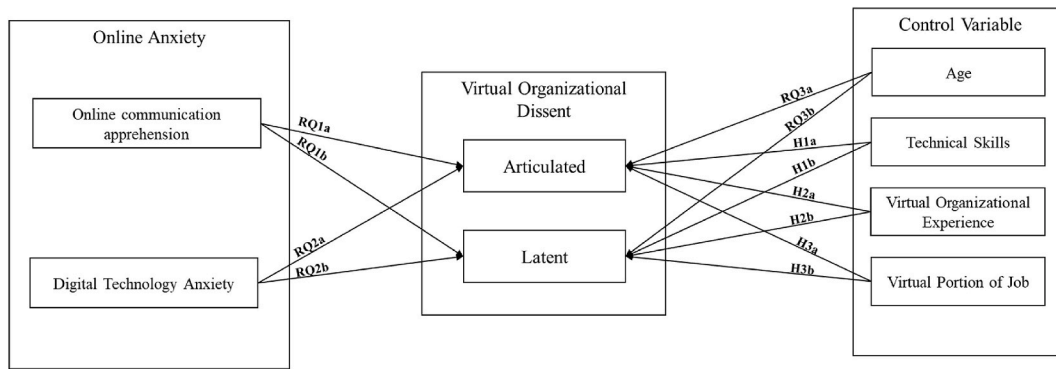


Fig. 1. Theoretical study model.

2. Method

2.1. Participants

After acquiring university human ethics approval, participants (N = 397), including volunteer employees of various US organizations (males = 165, females = 229, others = 3), were recruited via a reputable international panel data company (Qualtrics) to fill out online survey questionnaires. Participants received financial incentives upon completing the questionnaire. The experience of working in a VT was the inclusion criteria. Upon screening the data, the participants with missed information and those retired or unemployed at the time of data collection were removed. As a result, 321 participants were retained for final analysis. The included participants (males = 135, females = 184, others = 2) ranged from 19 to 77 years old (M = 39.07, SD = 12.19). The detail of demographics and organizational information, including education, organization size, work sector, the length of VT experience, and the virtual portion of the participants’ team workload, is presented in Table 1.

Table 1  
Demographic information of participants.

	N	%		N	%
<b>Gender</b>			<b>Virtual team experience (year)</b>		
Female	184	57.3	Less than 1	59	18.4
Male	135	42.1	1–2	84	26.2
Other	2	.6	3–5	86	26.8
<b>Education</b>			6–10	77	24
No high school diploma	4	1.2	More than 10	119	37.1
High school diploma	99	30.8	<b>Portion of virtual team workload</b>		
Bachelor	148	46.1	Small (0–19%)	67	20.9
Master	60	18.7	Notable (20–40%)	86	26.8
Doctorate	10	3.1	Medium (41–60%)	77	24
<b>Organization size</b>			Significant (61–80%)	57	17.8
Less than 10	30	9.3	Major (81–100%)	34	10.6
10–50	52	16.2	<b>Age (19–77 years old)</b>		
51–100	59	18.4	19–29	67	20.9
100–500	63	19.6	30–39	86	26.8
More than 500	117	36.4	40–49	77	24
<b>Work sector</b>			50–59	57	17.8
Finance and Management	34	10.6	60 and above	34	10.6
Social and public sectors	109	34	<b>Total</b>	321	100
Art and education	28	8.7			
Engineering and sciences	40	12.5			
Information technology	96	29.9			
Healthcare	14	4.4			

2.2. Measures

OCA was measured using eight items of the Measure of Online Communication Attitude (MOCA) developed by Ledbetter (2009), which is a Likert-type questionnaire ranging from (1) strongly disagree to (7) strongly agree.

DTA was measured using 8 items of a modified version of the Computer Anxiety Scale (CAS), which is a Likert-type scale originally developed by Cohen and Waugh (1989), ranging from (1) strongly disagree to (7) strongly agree. Following previous research which modified CAS to measure the anxiety of working with mobile phones in the scale (Demirbilek & Talan, 2017), the scale was modified by replacing “computer” with “smartphone”. Previous studies of mobile/smartphone technology anxiety modified the existing computer anxiety scales for their measurement. For example, Shen et al. (2010) used Computer Anxiety Rating Scale (Heinssen et al., 1987) to measure the technology anxiety related to mobile banking. Also, changes in the organizational media support this modification. With the development of organizational communication infrastructures, most communication applications, such as Microsoft Teams and Outlook, Skype for Business, Slack, Zoom, and so on, are already available on smartphones allowing for immediate and flexible communication that extends beyond office hours. Also, much of the informal online communication and grapevine in organizations, containing a considerable amount of organizational communication, is deliberately relocated to non-organizational platforms such as Messenger, WhatsApp, Telegram, etc., which are predominantly installed on personal smartphones.

Technical skill was measured using 6 items of the list of online skills recommended by Hargittai and Hsieh (2012), which measure the level of familiarity of the participants with the items such as “advance search”, based on a Likert-type questionnaire ranging from (1) “Not familiar at all” to (5) “Extremely familiar”.

VOD was measured using 18 items of the Organizational Dissent Scale (ODS) developed by Kassing (1998). ODS has 24 items measuring dissent across three contexts: articulated, latent, and displaced. Displaced dissent is not included in the current study because it is often considered a non-organizational communication behavior (Kassing & Armstrong, 2002). All items are measured on a 5-point Likert-type scale that ranges from (1) strongly disagree to (5) strongly agree. ODS was designed to measure face-to-face dissent, so items were modified to study VOD. For example, “I speak freely with my coworkers about troubling workplace issues” was changed to “I speak freely with my coworkers in my virtual team about troubling workplace issues”. The Pearson correlation, mean and standard deviation of the constructs are presented in Table 2. The description of included items in the questionnaire is presented in Table 3.

**Table 2**  
Means, standard deviations, and two-tailed pearson correlations.

Variables	N	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Online Communication Apprehension	321	2.60	1.45	1							
(2) Digital Technology Anxiety	321	1.97	1.14	.74**	1						
(3) Virtual Articulated Dissent	321	3.89	1.27	.57**	.60**	1					
(4) Virtual Latent Dissent	321	3.24	1.10	.37**	.43**	.46**	1				
(5) Tech Skills	321	2.79	0.77	-.12*	-.14**	0.03	.21**	1			
(6) Virtual Portion	321	2.7	1.27	-0.06	0.03	0.06	.14*	.23**	1		
(7) Virtual Experience	321	2.78	1.26	-0.06	0.03	0.02	0.04	.21**	.25**	1	
(8) Age	321	39.07	12.19	-.21**	-.24**	-.18**	-.27**	0.01	-0.11	.25**	1

Note. \*\*:  $p < .01$ , \*:  $p < .05$ .

**Table 3**  
EFA and CFA Structural factor loading matrix for study variable items.

Items	Factors					CFA	
	EFA						
	1	2	3	4	5		
OCA1	I feel awkward when communicating online.	<b>0.89</b>	-0.06	-0.01	-0.01	0.02	0.83
OCA2	I feel apprehensive about communicating online.	<b>0.7</b>	0.02	-0.01	0.09	-0.07	R
OCA3	I cannot think clearly when I communicate online.	<b>0.8</b>	0.14	0.05	0	-0.04	0.87
OCA4	The lack of nonverbal cues (such as eye contact, facial expressions, etc.) in e-mail makes me feel uncomfortable.	<b>0.82</b>	-0.11	0.03	-0.01	0.04	R
OCA5	I feel tense and nervous when communicating online.	<b>0.86</b>	0.07	0.03	-0.05	-0.01	0.89
OCA6	It bothers me that I cannot see people when communicating online.	<b>0.75</b>	-0.04	-0.03	0.02	0.03	0.73
OCA7	My words become confused and jumbled when I try to communicate online.	<b>0.8</b>	0.1	-0.07	0.05	-0.01	0.90
OCA8	I am afraid to voice my opinions when interacting with others on the computer.	<b>0.77</b>	0.09	-0.06	0	0.04	0.87
DTA1	I feel anxious whenever I am using smartphones.	0.12	<b>0.73</b>	0.12	0.04	0.02	R
DTA2	I wish that I could be as calm as others appear to be when they are using smartphones.	0.25	<b>0.54</b>	0.06	-0.11	-0.01	0.64
DTA4	I feel tense whenever working with a smartphone.	0.04	<b>0.88</b>	-0.03	-0.03	-0.05	0.88
DTA5	I worry about making mistakes on the smartphone.	0.03	<b>0.8</b>	0.03	0.01	-0.01	0.82
DTA6	I try to avoid using smartphones whenever possible.	-0.09	<b>0.88</b>	0	0.04	-0.02	0.82
DTA7	I experience anxiety whenever I work with a smartphone.	0	<b>0.9</b>	0.02	-0.02	-0.01	0.89
DTA11	I wish that smartphones were not as important as they are.	-0.01	<b>0.54</b>	-0.06	-0.09	0.09	0.57
DTA12	I am frightened by smartphones.	-0.01	<b>0.84</b>	-0.02	0.04	0.02	0.86
DTA14	I feel overwhelmed whenever I am working with a smartphone.	-0.04	<b>0.85</b>	-0.07	0.01	0.01	0.84
TechSkills1	How familiar are you with advance search	0.02	0.09	<b>0.73</b>	0.02	-0.09	0.70
TechSkills2	How familiar are you with PDF?	-0.22	0.05	<b>0.71</b>	-0.06	0.07	R
TechSkills3	How familiar are you with spyware?	0.07	-0.04	<b>0.85</b>	-0.03	0.05	0.83
TechSkills4	How familiar are you with wiki?	-0.09	-0.04	<b>0.78</b>	0.09	0	0.80
TechSkills5	How familiar are you with cache?	0.09	-0.1	<b>0.78</b>	0.03	0.02	0.80
TechSkills6	How familiar are you with phishing?	0.08	0	<b>0.8</b>	-0.03	-0.05	0.80
VLD2	I complain about things in my virtual team with other members.	0.04	0.01	0.03	<b>0.61</b>	0.17	0.71
VLD6	I join in when other virtual team members complain about organizational changes.	0.05	-0.06	-0.01	<b>0.71</b>	0.1	0.75
VLD7	I share my criticism of this organization openly.	0.01	0.05	0.01	<b>0.88</b>	-0.13	0.84
VLD8	I make certain virtual team member knows when I'm unhappy with work policies.	-0.03	-0.03	-0.04	<b>0.88</b>	-0.04	0.83
VLD11	I let other team members know how I feel about the way things are done around here.	-0.11	0.08	0.04	<b>0.71</b>	-0.02	0.69
VAD1	I am hesitant to raise questions or contradictory opinions in my virtual team.	0.05	0.16	0.04	0.05	<b>0.65</b>	0.80
VAD4	I do not question management in this virtual team.	-0.1	0.05	0.04	-0.13	<b>0.79</b>	0.67
VAD5	I'm hesitant to question workplace policies in this virtual team.	-0.01	-0.09	-0.06	0.04	<b>0.82</b>	0.76
VAD9	I don't tell my supervisor when I disagree with workplace decisions.	0.1	-0.05	-0.01	0.08	<b>0.59</b>	0.67
VAD15	I do not express my disagreement to team leaders.	0.12	0.01	-0.01	0.02	<b>0.53</b>	0.63
$\sum(\text{loadings})^2$							Total
% Variance							
							4.05
							11.3
							2.06
							1.73
							1.54
							20.68
							12.26
							34.23
							6.23
							5.23
							4.65
							62.6
KMO and Bartlett's Test							Adequacy
Goodness-of-fit Test							Chi-Square
							0.93
							7683.98***
							528
							701.86***
							373

Note. \*\*\*:  $p < .001$ ; (R): Item was later removed during CFA to establish the model fit.

### 2.3. Analysis

#### 2.3.1. Measurement validation

To test the validity of the measurements, initially, a test of normality via calculation of skewness and kurtosis was performed using IM SPSS statistics 27, which did not exceed the  $\pm 2.2$  threshold, demonstrating a normal distribution of data (Sposito et al., 1983). In the next step, Exploratory Factor Analysis (EFA) using IBM SPSS statistics 27 and Confirmatory Factor Analysis (CFA) using IBM SPSS AMOS 27 were conducted to check the validity and reliability of the measurement. EFA with maximum likelihood extraction and Promax rotation (good of

fitness:  $\chi^2(373) = 701.86, p < .001$ ; KMO and Bartlett: adequacy = 0.93,  $\chi^2(528) = 7683.98, p < .001$ ) yielded five factors with eigenvalues over 1 cumulatively extracting 62.6% of the of squared loading. The description of included items, EFA factors, and the sums of square loadings for each factor is presented in Table 3.

After removing 4 items from the EFA model (2 items from OCA and 1 item from DTA and Technical Skills each), a follow-up CFA on the included items, yielded an excellent model fit:  $\chi^2(367) = 684.198, p < .001$ , CFI = 0.95, SRMR = 0.05, RMSEA = 0.052, PClose = .29. The factor loading of the remaining items in the CFA are presented in Table 3. Also, the reliability and convergent and discriminant validities

of the adapted scale were measured. Cronbach  $\alpha$ , Composite reliability, and maximal reliability (MaxR(H)) were calculated for each factor, and they were all higher than 0.7, showing adequate reliability for the included constructs (Hair et al., 2014). Also, the Average Variance Extracted (AVE), Maximum Shared Variance (MSV), square root of AVE, maximum likelihood estimation of inter-construct correlations, and HeteroTrait-MonoTrait (HTMT) ratio of correlations were calculated for the model. AVE amounts were higher than 0.5, indicating acceptable convergent validity (Hair et al., 2014). To meet the criteria for discriminant validity, at least one of the following conditions must be met: 1) MSV for each construct should be less than its correspondent AVE, 2) the square root of AVE for the construct should be higher than the inter-construct correlations for the construct, 3) the HTMT must be less than 0.85 (Hair et al., 2014; Henseler et al., 2015). All conditions for each construct were met, indicating the model's discriminant validity. Furthermore, as the data was collected via only one method., the common method variance of data was investigated. First, Harman's single factor test was run by performing an EFA of the included items in which all items were loaded on a single unrotated factor (Podsakoff et al., 2003). The extracted factor explained 32.15% of the variance. Harman's test was repeated on the latent model used in CFA by linking a single latent variable to all included items. The resulted model showed a poor fit ( $\chi^2(378) = 3404.25, p < .001, CFI = 0.519, SRMR = 0.177, RMSEA = 0.158, PClose = .000$ ). Finally, the correlation of model variables, presented in Table 2, did not reveal any amount over 0.8. Correlations stronger than 0.9 could indicate common method bias (Pavlou et al., 2007). Thus common method variance is not a major issue in the data. A summary of the model reliability, validities, and invariance measurements is presented in Table 4.

### 2.3.2. Path model analysis

A path model was created based on the propositions of the study. DTA and OCA as exogenous predictors, technical skills, age, portion of job done online, virtual organizational experience as exogenous controls, and VAD and VLD as dependent variables were entered into the model. The model showed acceptable fitness,  $\chi^2(440) = 798.761, p < .001, CFI = 0.944, SRMR = 0.052, RMSEA = 0.05, PClose = .437$ . The standardized and unstandardized regressions weights, probability estimations, and effect sizes were measured using the Stats Tool Package (Gaskin, 2016) and are presented in Table 5.

### 3. Findings

Responding to the first four RQs of the study, the research shows that anxiety in online communication generally increased VOD. The result showed that OCA with a small effect increased VAD ( $\beta = 0.255, p < .001, f^2 = 0.05$ ), which responds to RQ1a. The effect of OCA on VLD was only significant at  $p < .10$ , however its effect size was considerable ( $\beta = 0.112, p = .081, f^2 = 0.14$ ). This test responds to RQ1b. DTA with a small

size effect increased VAD ( $\beta = 0.421, p < .001, f^2 = 0.08$ ) and VLD ( $\beta = 0.282, p = .001, f^2 = 0.05$ ). Thus, RQ2a and RQ2b are responded. The model explained 35% variance in VAD and 27% in VLD.

Technical skills increased VLD with a small effect ( $\beta = 0.234, p < .001, f^2 = 0.07$ ), but its small size effect on VAD was only significant at  $p < .10$  ( $\beta = 0.1, p = .087, f^2 = 0.02$ ). Thus, H1a is partially and H1b is fully supported. Responding to RQ3a and RQ3b, the study showed that aging significantly decreased VLD with a small size effect ( $\beta = -0.18, p = .002, f^2 = 0.11$ ). However, the impact of aging on VAD and the effects of other control variables on VAD and VLD were not significant. Thus, H2a and H2b, H3a, and H3b were not supported. Fig. 2 represents the analysis results, standardized regression weights, and squared multiple correlations for the study model.

### 4. Discussion

This study investigates the effects of two forms of online anxiety, DTA and OCA, on VOD. The first significant finding that employees who are more anxious use online communication more extensively to dissent supports the social compensation hypothesis. This finding is in line with previous research that shows individuals with communication deficits or higher in introversion are more likely to be more active in online communication (Ruppel & Burke, 2015; Van Zalk et al., 2011; Weidman et al., 2012; Zywicka & Danowski, 2008). It is likely that highly anxious employees find offline dissenting intimidating; therefore, they may postpone or avoid expressing their dissent in face-to-face situations. The more democratic and rich online communication in VTs may help anxious employees compensate for their suppressed voices and comments through expressing a higher amount of VOD.

Second, the results reveal that online anxiety increases VOD. Specifically, higher DTA increases both forms of organizational dissent, while OCA has a significant effect on VAD and a barely significant effect, yet with considerable effect size, on VLD. This is an interesting finding considering that appropriate and effective online communication can be challenging for those with high anxiety and counting the correlation between OCA and DTA with lower technology use, higher reluctance and uncertainty in online communication (Brown et al., 2004; Burns et al., 2019; Fuller et al., 2006), and higher introversion (Mazur et al., 2000; Powell, 2013).

The reason for a higher VOD among the more anxious employees could be bifold. First, as introversion is associated with feelings of worry (Beatty & Pascual-Ferrá, 2015), introvert employees might pay more attention to trivial things and have a low tolerance for inadequate conducts. The lower tolerance triggers employees to use their decision premises and express dissent (Kassing, 1997). Unlike offline communication, where extroverts are more likely to initiate communication due to lower CA (Goby, 2006), the tempo-spatial flexibility of online media allows individuals to have more control over and less fear during online communication. As such, alternative concepts in an online setting, such

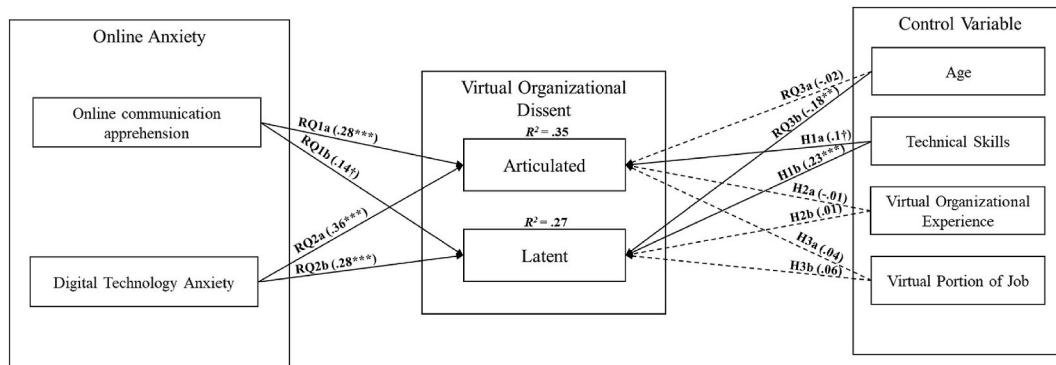
**Table 4**  
Validity and invariance measurements of the study models.

	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	PClose
Latent Model (CFA)	684.198***	367	1.864	0.95	0.05	0.052	0.290
Path Model (SEM)	798.761***	440	1.815	0.944	0.052	0.05	0.437
Construct Validity Measurements							
	$\sqrt{\text{AVE}}$ (on the diagonal) – Construct Correlations (under the diagonal) – HTMT Measurements (above the diagonal)						
	$\alpha$	CR	AVE	MSV	MaxR(H)	1	2
(1) OCA	.938	.939	.721	.497	.945	.849	0.711
(2) DTA	.929	.932	.637	.497	.947	.705***	.798
(3) Tech Skills	.888	.889	.617	.038	.894	-.112†	-.134*
(4) VLD	.875	.877	.588	.169	.886	.343***	.393***
(5) VAD	.833	.832	.5	.296	.843	.518***	.544***
						3	4
						0.105	0.351
						0.138	0.392
						.786	0.2
						.194**	.767
						.025	.411***
							5
							0.508
							0.546
							0.019
							0.424
							.707

Note: CMIN: Minimum Discrepancy; DF: Degree of Freedom; CFI: Comparative Fit Index; SRMR: Standard Root Mean Square Residual; RMSEA: Root Mean Square Error of Approximation; PClose: Probability of Close fit;  $\sqrt{\cdot}$ : Square Root; AVE: Average Variance Extracted;  $\alpha$ : Cronbach's Alpha; CR: Construct Reliability; MSV: Maximum Shared Variance; MaxR(H): Maximal Reliability; HeteroTrait-MonoTrait Ratio of Correlations; †:  $p < .1$ ; \*:  $p < .05$ ; \*\*:  $p < .01$ ; \*\*\*:  $p < .001$ .

**Table 5**  
Specific direct and indirect effects.

Proposition	Research Finding	Effect	Unstandardized Estimate	Standardized Estimate	<i>p</i>	$f^2$ (Effect Size)	Effect Size Interpretation
RQ1a	Answered	OCA → VAD	0.255	0.276	<0.001	0.05	Small
RQ1b	Answered	OCA → VLD	0.112	0.142	0.081	0.14	Small
RQ2a	Answered	DTA → VAD	0.421	0.359	<0.001	0.08	Small
RQ2b	Answered	DTA → VLD	0.282	0.282	<0.001	0.05	Small
H1a	Partially Supported	Tech Skills → VAD	0.169	0.1	0.087	0.02	Small
H1b	Supported	Tech Skills → VLD	0.334	0.234	<0.001	0.07	Small
RQ3a	Answered	Age → VAD	-0.002	-0.02	0.721	-	-
RQ3b	Answered	Age → VLD	-0.017	-0.18	0.002	0.11	Small
H2a	Not Supported	Virtual Experience → VAD	-0.006	-0.005	0.928	-	-
H2b	Not Supported	Virtual Experience → VLD	0.012	0.013	0.821	-	-
H3a	Not Supported	Virtual Portion → VAD	0.042	0.039	0.48	-	-
H3b	Not Supported	Virtual Portion → VLD	0.056	0.061	0.279	-	-



Note. †:  $p < 0.1$ ; \*\*:  $p < .01$ ; \*\*\*:  $p < .001$ ; dashed line: insignificant impact

Fig. 2. Analysis results, standardized regression weights, and squared multiple correlations

as comfort with technology, might account for online apprehension. For example, a technology-savvy introvert with high levels of OCA might be confident in approaching online communication, even in a confrontational context such as organizational dissent. While the general positive impact of technical skills on VOD supports this theory, further study of the moderated effect of technical skills and self-efficacy on the relationship between OCA and VOD is needed.

Second, VOD among anxious employees may be higher as while previous studies have shown extraversion positively predicts voicing behavior (LePine & Van Dyne, 2001, Ötken & Cenkcı, 2015), the more democratic and engaging context of online communication might facilitate and encourage higher online dissent among apprehensive employees. For example, metavoicing enables employees to establish/restore control in the workplace through various forms of synchronic and asynchronous communication (Majchrzak et al., 2013). The asynchronicity and editability afforded by online communication allows employees to express their contradictory opinions more effectively and appropriately (Evans et al., 2017). Modern organizations are eager to adopt technology that facilitates workplace communication across culture, time, and location limitations (Miller, 2015). Implementation of online communication technology increases the amount of organizational communication and can potentially decrease resistance against sharing information (Mei et al., 2004), democratizes the decision-making processes (Miller, 2015), and increases organizational trust, as a higher amount of online information sharing indicates higher confidence in the organization (Liang et al., 2016). The more inclusive online sphere encourages employees with higher anxiety to express their opinion and dissent to their managers and colleagues.

Interestingly, our research also suggests that virtual latent dissent (VLD) has a positive relationship with technical skills and a negative association with age. In other words, younger people with higher

technical skills are more likely to engage in VLD expression. This result could indicate the new generation’s different work values and ethics. Often referred to as “digital natives”, younger people have a higher level of digital immersion and are more competent technology users (Livingstone et al., 2021, pp. 1–27). Younger generations care more about job satisfaction and organizational ethics than their predecessors (To & Tam, 2014). For this reason, they may be less tolerant of problematic organizational conduct and wrongdoings. Thus, it is unsurprising that younger workers who are well-versed in technology would not hesitate to share their dissatisfactions with their peers. The study showed that previous experience in virtual teams and accomplishing higher amount of work via online communication do not affect the amount of VOD. This finding supports the idea that, once the decision to dissent is made, the more democratic structure of online organizational communication enhances VOD regardless of employees’ level of previous online experience or the level of involvement in online communication.

**5. Managerial and theoretical implications**

Employee dissent is essential for a healthy and functioning workplace. In terms of managerial implications, this research reveals information that may help managers solicit employee voices. Managers can introduce training that reduces DTA, and also consider how employees might be more proficient in some modes of VT communication than others. This helps managers avoid organizational silence, where employees hold their true opinions to themselves and grow indifferent about the organizational operations and missions (Morrison & Milliken, 2000). Moreover, the fact that higher anxiety increases VOD indicates the important aspect of dissent in releasing organizational tensions by revealing employee discontent to the managers and peers. As a practical outcome of this study, it is recommended that managers use online



communication to provide shy employees with the opportunity to express their dissent. Also, this finding implies that high levels of dissent in organizations could be related to higher levels of anxiety among employees. Understanding what motivates employees to engage is particularly important in light of the drastic changes that workplaces have undergone during the Covid-19 pandemic, where there has been a shift to flexible work arrangements and a greater dependence on CMC. The findings also reveal that the use of VTs in the workplace can help shy employees participate more in voicing their opinions – something that has the capacity to build greater democratization in the workplace and more communication amongst teams. Managers might look to diversify communication channels and improve personal and non-formal communication by building communication and technical skills. This research reinforces the significant role of the technology, leadership, and design (Abarca et al., 2020) in the performance of VTs, but also the importance of considering employee psychological factors. Feeling equality and connectedness are necessary to improve collaboration in teams (Boroş et al., 2010). As suggested by this research, organizational dissent can help establish and strengthen this feeling through democratizing the workplace and enhancing employee productivity and mental well-being.

In terms of the theoretical implications of this research, it demonstrates the importance of theorizing workplace communication in the online environment. Previously, management and organizational communication studies have predominantly focused on the face-to-face setting. As one of the few studies of online organizational dissent, this research makes a significant contribution to our understanding of the field by investigating two primary affectional constructs that impact VOD. More broadly, it also contributes to our understandings of how online environments enable shy employees or people to voice their opinions and engage in self-expression. These findings provide valuable information for both scholars and practitioners on the important role that individual anxiety plays in online dissent expression.

## 6. Limitations and areas for further development

This research shows that DTA and OCA increase dissent in VT, with our model explaining 35% variance in articulated dissent and 27% in latent virtual dissent. To measure VOD, this study utilises Kassing's (1998) scale, which measures face-to-face dissent. The study's success in adapting and developing the dissent scale in an online context may also help future scholars develop the area of dissent studies. While rigorous exploratory and confirmatory factor analyses in combination with an examination of the construct's convergent and discriminant validity provide relative assurance about the precision of virtual dissent measurement, the contextual differences between online and offline organizational communication warrant the development of a specific VOD measurement scale in future. Moreover, our findings could be further supported by the information on participants' face-to-face dissent and anxiety. As behavior results from several cognitive, social, emotional, and contextual variables (Triandis, 1977), future studies should use more inclusive models to explain virtual dissent better. Further development in this area is needed to incorporate the affordances of online communication in measuring VOD.

Moreover, while previous studies of organizational dissent used cross-sectional samples (Goodboy et al., 2008), due to its cross-sectional design, this study is limited in its ability to confirm the causal relationship among the variables. This study also surveyed participants' total VT experiences, without accounting for the amount of time spent in a particular VT. As VTs are often project-based and can be quickly assembled and dismissed, understanding more about how the length of time impacts on behavior and levels of anxiety is an area for future investigation. Finally, this research did not account for the seniority level and relationship with other members. Future investigations should consider the impact of employee status (i.e., management vs. non-management) in online dissent.

## 7. Conclusion

This study investigates the effect of online anxiety on VOD and shows that higher online anxiety in the forms of OCA and DTA generally increases the possibility of latent and articulated forms of VOD. The unexpected increasing impact of higher anxiety on VOD in this study emphasizes the complex and unique nature of online organizational communication. The interaction of technological competencies, social structures, and personal skills and characteristics has made online communication a resourceful context to present one's views and opinions. It allows those who feel less comfortable to compensate for the various forms of suppression and censorship imposed by oneself and others in offline organizational communication. The research findings emphasize the vital role of online communication in establishing a more democratic and inclusive organization, where higher organizational dissent, self-presentation, self-disclosure, participation, and freedom of speech improve psychological and well-being status of individuals and teams and contribute to their productivity and performance.

## Credit author statement

Diyako Rahmani: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Funding acquisition, Writing – original draft, Writing- Reviewing. Cheng Zeng.: Writing – original draft, Writing- Reviewing, Investigation. Melissa (Hui) Chen: Writing – original draft. Phoebe Fletcher: Writing- Reviewing and Editing. Ryan Goke: Writing – original draft.

## Data availability

The authors do not have permission to share data.

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# Investigating the effects of online communication apprehension and digital technology anxiety on organizational dissent in virtual teams

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2023-07

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