

The Role of Communication Media in Enabling Inclusion of Women  
in Man-Dominated Teams

by

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Dalhousie University is located in  
Mi'kma'ki, the ancestral and  
unceded territory of the Mi'kmaq.  
We are all Treaty people.

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## ABSTRACT

Does communication media influence women's inclusion when they are minorities in man-dominated teams, and how? Drawing on media synchronicity theory, gender microaggression and gender differences literature, we investigated the impact of communication media (text-chat vs. videoconference) on women's perceived inclusion in man-dominated teams, and the underlying mechanism through two communication processes (knowledge sharing and knowledge integration). Through a randomized-experimental design, our findings reveal that women perceive greater inclusion in man-dominated teams when communicating via text-chat communication, compared to videoconference communication. Furthermore, we found that this effect is attributed to the communication process of knowledge integration. This study sheds light on the role that communication media and communication processes can play in enabling inclusivity in group interactions. Theoretical and practical implications for enhancing women's perceived inclusion in man-dominated teams are discussed.

## **LIST OF ABBREVIATIONS USED**

WFH	Work from Home
ICTs	Information and Communication Technologies
MST	Media Synchronicity Theory
F2F	Face-to-Face
ANOVA	Analysis of Variance
KS	Knowledge Sharing
KI	Knowledge Integration

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## CHAPTER 1 INTRODUCTION

The global workforce is increasing diversity, as indicated by demographic trends and projections, highlighting the importance of examining strategies to foster inclusivity for minorities (e.g., women<sup>1</sup>) in the workplace (Shore et al., 2018). Women, who have faced historical discrimination, encounter various forms of exclusion in the workplace, such as gender microaggression, sexual harassment, modern sexism, invisibility, and incivility (Yang & Carroll, 2018; Bhattacharyya & Berdahl, 2023). Despite constituting 46.9% of the global labor force, women hold only 29% of executive and managerial positions across industries (Catalyst, 2021). This gender gap is particularly pronounced in technical and quantitative fields like STEM (Science, Technology, Engineering, and Mathematics) (Catalyst, 2022). Consequently, it is not uncommon for women to find themselves working in man-dominated teams as they move up the organizational hierarchy or pursue traditionally man occupations, where their treatment is often influenced by gender stereotypes.

Moreover, global socioeconomic trends and the ongoing pandemic have significantly changed work conditions, with many organizations transitioning to remote work (also known as working from home (WFH) (Roberson, 2019). This shift has presented both challenges and benefits for employees, especially for women (Forbes, 2020). While women have benefited from the flexibility of remote- and hybrid work arrangements, they have also experienced increased work and non-work interruptions (e.g., family demands; easily available online; navigating new work and communication processes) (Leroy et al., 2021). Consequently, women have reported higher emotional exhaustion and lower performance compared to men (Leroy et al., 2021). One

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<sup>1</sup> In the present study, we employed the terms "man" and "woman" to refer to gender, as our focus is primarily on gender-related aspects rather than biological sex.

underexplored research question is how virtual group interactions, specifically the medium used for communication, influence the experiences of women working in man-dominated teams. In this study, we aim to investigate how communication media capabilities, such as synchronicity impacts communication processes and the perception of inclusion for women working in man-dominated teams.

In the present era, there exists a wide variety of communication media that supports virtual communication; the two most common media include text-based platforms (e.g., chat) and video-based platforms (e.g., videoconferencing). The question arises as to whether these media and their synchronicity levels affect the way in which minorities experience inclusion when working in teams remotely. Several studies have provided anecdotal evidence suggesting that women and men have different preferences for communication media in group conversations. For instance, Johnson (2011) found that women communicate more, perform better, and exhibit higher satisfaction with their performance than men when learning online. Caspi et al. (2008) found that women participate more in virtual communication using text-based platforms compared to men. Triana et al. (2012) manipulated the order of communication media, and found that using virtual communication first (e.g., text-based chatroom) facilitated the inclusion of women without impacting the inclusion of men. However, most of these studies have primarily focused on text-based communication and Face-to-Face interactions while overlooking the unique capabilities of recent virtual or digital communication platforms and the potential gender differences in communication styles.

Another substantial body of research has explored the effects of communication media on the

relationship between gender diversity and group performance. Some studies suggest that text-based communication can mitigate the negative effects related to separation (i.e., division among members) in diverse teams by reducing visual and vocal cues and enabling a safer knowledge sharing (Carte & Chidambaram, 2006; Giambatista & Bhappu, 2010). However, other empirical studies present contrasting findings, indicating that text-based communication hinders knowledge sharing and knowledge integration in gender-diverse teams (Robert et al., 2018), with women sharing significantly less in mixed-gender online discussion teams compared to homogenous women-only teams (Lawlor, 2006). Addressing such inconsistencies and challenges posed by remote working is crucial for developing a better understanding of how information and communication technologies can effectively support and include minorities, such as women in man-dominated virtual teams. In this study, we explore the role of communication media (i.e., text-chat versus videoconferencing) in facilitating women's inclusion in man-dominated teams. Additionally, we examine the potential mediated effects of communication processes (i.e., knowledge sharing and knowledge integration) in this process.

Drawing on media synchronicity theory, tokenism and gender microaggression literature, as well as gender differences literature on communication processes, we propose that a potential fit between the synchronicity capability of media and communication processes (knowledge sharing and knowledge integration) could enhance women's communication and perceptions of inclusion. The objective of the present study is twofold (1) to investigate whether communication media (text-chat vs. videoconferencing) differs in its impacts on how women perceive their inclusion in man-dominated teams, and (2) to determine the role of communication processes (knowledge sharing and knowledge integration) as underlying mechanisms relating

communication media to perceived inclusion of women in such team settings.

We developed and tested a conceptual model to show how communication media impacts women's perception of inclusion in man-dominated teams. We conducted a randomized experimental survey manipulating communication media (two levels: text-chat vs. videoconferencing). Our findings reveal that women in man-dominated teams perceive a greater sense of inclusion when using text-based platforms as a communication medium compared to videoconferencing. Furthermore, our findings suggest that this effect is partially mediated by the communication process of knowledge integration rather than knowledge sharing.

This study makes several valuable contributions. Firstly, the study adds to the literature on women as minorities in man-dominated environments by proposing a technological intervention to address potential gender microaggressions and examining specific communication processes and their impact on women's inclusion (Farh et al., 2020; Finseraas et al., 2016). Secondly, the study complements existing research on communication media and team diversity by introducing a mechanism that explains the effects of media and by comparing two distinct media rather than solely comparing them with traditionally Face-to-Face communication (Robert et al., 2018; Triana et al., 2012). Lastly, the study extends the Media Synchronicity Theory (Dennis et al., 2008) by exploring its application in the context of women as minorities and emphasizing the significance of considering gender and team composition. In summary, this research enhances our understanding of how communication media can enable inclusivity in diverse workgroups.

## CHAPTER 2 LITERATURE REVIEW

### 2.1 WOMEN AS MINORITIES IN MAN-DOMINATED TEAMS

Women in man-dominated teams face numerous challenges (e.g., invisibility, incivility, and silenced voices) because of the gender imbalance and prevailing cultural norms (Farh et al., 2020). Two interconnected perspectives (i.e., tokenism and microaggressions) have shaped our understanding of these challenges. One perspective is the tokenism and gender stereotypes literature that investigate the psychological mechanisms that contribute to the perception of women as less competent or suitable for certain roles within man-dominated teams (Heilman, 2012). Scholars have referred to women in these contexts as "tokens" meaning they are the sole woman in a group of men (Kanter, 1977). Tokens often experience being ignored, or their voices being overshadowed (Sandberg & Grant, 2015; Tessier, 2016). As the lone representatives of their gender, tokens' perceived differences from the dominant group tend to be magnified by majority members, and their actions are frequently scrutinized through the lens of stereotypes (Rustad, 1982; Yoder et al., 1983). This dynamic is particularly prominent for token women, as their lower status in society's gender hierarchy diminishes their ability to challenge the assertions of gender stereotypes made by a man majority (Fairhurst & Snavely, 1983). Furthermore, in contexts where token women are newly integrated into man-dominated settings, there may be a lack of established interpersonal knowledge and experience. Consequently, gender stereotypes likely shape the initial perceptions and interactions of the man majority towards the token woman (Finseraas et al., 2016).

The literature on gender stereotypes reveals several cognitive and attributional factors that can hinder the expression and inclusion of a woman in man-dominated teams (Farh et al., 2020). Firstly, both descriptive and prescriptive gender stereotypes suggest that women are expected to possess communal, conforming, nurturing, and self-effacing qualities (Heilman, 2012). When the man majority anticipates token women to conform to these pre-existing generalizations about their gender (Kanter, 1977), they are likely to perceive any assertive or change-oriented behavior, such as expressing their ideas, as incongruent with their expectations (Eagly, 1987; McClean et al., 2018). Consequently, women may face penalties or negative evaluations for voicing their suggestions from the man majority (Heilman, 2001; Rudman & Glick, 2001). Furthermore, being a token amplifies perceived differences between the dominant man majority and the token woman, often resulting in social isolation and exclusion, diminishing trust and inhibiting her performance (Kanter, 1977; Yoder et al., 1983, Farh et al., 2020).

In addition, the dynamics of man-dominated teams also face challenges due to the presence of a token woman. The presence of a token woman may disrupt the team's established dynamics and highlight the gender imbalance. Team members may then struggle to create an inclusive and supportive environment, leading to strained interactions and difficulties in harnessing the diverse perspectives and talents of the team (Heilman, 2012; Kanter, 1977). Token women may face challenges in having their ideas and contributions fully valued and considered by the team. Groupthink and confirmation bias can lead to the dismissal or undervaluation of their input, limiting the team's ability to benefit from diverse viewpoints and innovative solutions. By not fully leveraging the unique perspectives and insights of women, man-dominated teams may miss out on valuable contributions and innovative ideas (De Dreu & West, 2001). The lack of

diversity may limit the team's ability to think critically, problem-solve creatively, and adapt to changing circumstances effectively (Phillips et al., 2009; Phillips et al., 2006).

Another related perspective is gender microaggression (Sue, 2010). In man-dominated teams, women often find themselves exposed to gender microaggressions. Gender microaggressions refer to subtle, intentional or unintentional acts or behaviors that convey derogatory or negative messages based on gender that potentially have a harmful impact on women (Sue, 2010; Nadal, 2010). Unlike concepts of gender discrimination and sexual harassment, gender microaggression focuses more on undetected and unaddressed interpersonal behaviours experienced from the perspective of the target group (i.e., women) (Kim & Meister, 2022), and presents discrimination of various levels of explicitness from subtle to apparent classified as three subtypes: microinvalidations, microinsults and microassaults in Sue et al.'s model (2007). These microaggressions can manifest through dismissive comments, exclusion from important discussions, or biased treatment, all of which can undermine women's contributions and perpetuate stereotypes and biases. Women may face heightened scrutiny and their actions may be evaluated through the lens of gender stereotypes, making them more vulnerable to experiencing gender microaggressions. Understanding the relationship between being a token and the occurrence of gender microaggressions is crucial in recognizing and addressing the unique challenges faced by women in man-dominated teams, and promoting a more inclusive and equitable work environment ignored (Basford et al., 2014; Riordan & Shore 1997; Tsui et al. 1992).

Gender microaggressions are regularly experienced by women, especially in workplaces, which devalue their contributions, dismiss their accomplishments, and imposing limitations on their



effectiveness in various settings, and are causing tremendous harm to women's occupational well-being (Sue & Spanierman, 2020; Sojo et al., 2016). In the workplace, numerous women describe a recurring pattern where they feel overlooked, disrespected, and dismissed by their male colleagues (Sue & Spanierman, 2020). Harmful workplace experiences, such as gender harassment (i.e., personal experiences involving verbal, physical, or symbolic actions expressing hostile and offensive attitudes), are detrimental to women's full range of work attitudes (e.g., organizational commitment, job satisfaction) and health (e.g., physical health, mental health). Women are at a higher risk of experiencing gender harassment and discrimination compared to men, and the negative consequences of these behaviors seem to be amplified in work environments that are predominantly man-dominated (Sojo et al., 2016). Therefore, we contextualize our study in an exclusionary man-dominated work context to examine the gender microaggressions in the virtual work environment for women.

Recent studies suggest that women in virtual teams may experience increased vulnerability to microaggressions and feelings of exclusion due to the lack of face-to-face interactions (Lawlor, 2006). The virtual setting may provide more opportunities for subtle forms of bias and exclusion to occur, such as dismissive or condescending comments in online discussions or exclusion from important conversations, as there are few consequences for bad actors due to physical distance (Heilman et al., 2010; Kabat-Farr & Labelle-Deraspe, 2022). Remote work settings could amplify communication challenges, making it harder to address tokenism and microaggressions effectively. Misinterpretation of tone and body language cues, reduced opportunities for informal interactions, and increased reliance on written communication can hinder the resolution of

conflicts and contribute to a less inclusive environment (Anderson et al., 2007). The limited social cues present in virtual environments could intensify biased views of women being less oriented towards achievement, leading to them receiving less favorable task assignments (Villamor et al., 2023). Despite these insights, research on tokenism and microaggressions against women in virtual teams or remote work is still emerging.

## **2.2 THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN ENABLING INCLUSIVITY**

Information and communication technologies (ICTs) have significantly transformed the way teams collaborate and interact in various organizational contexts. A large body of this literature has examined the positive influence of ICTs in enabling collaboration and decision-making in groups. Virtual collaboration tools, such as video conferencing, online project management platforms, and shared document repositories, enable seamless information sharing, coordination, and task allocation among team members (Leonardi & Barley, 2008). These technologies provide real-time communication and improve team responsiveness, enabling teams to overcome geographical barriers and work together effectively (Gibson & Gibbs, 2006). Other studies also found that ICTs support knowledge sharing, collaboration, and communication leading to team cohesion, reduced conflict (Wiesenfeld et al., 1999), increased innovation and problem-solving capabilities within teams (Majchrzak et al., 2012).

ICTs also have the potential to foster inclusion and support diverse team dynamics. The capabilities of virtual collaboration platforms have the potential to create equal opportunities for participation and contribution, as they minimize hierarchical and status-based cues often present

in face-to-face interactions (Anderson et al., 2007). For instance, earlier studies compared communication processes in virtual and Face-to-Face (F2F) teams and found that virtual teams reported greater equality of participation, exchanged higher rates of supportive communication, group cohesiveness (Lind 1999), and had higher proportions of task communications than F2F teams (Strauss 1997). Other studies demonstrated that virtual teams have greater equality of participation and influence, generate more unique ideas, and experience less member dominance than F2F teams (Rain, 2005; Fjermestad, 2004; Straus, 1996).

Further, other studies focusing on minorities (e.g., race, language, disability, gender) have demonstrated the positive impacts of ICTs on minorities' participation and inclusion in groups. Some of these studies have examined certain media capabilities of ICT. For instance, Yilmaz and Yilmaz (2016) suggested that unique features of ICT, such as anonymity and interactive text communication can enhance the strength of minority influence in groups by deterring the formation of stereotypes and weakening conformity with the groups' norms due to reduced salient cues. Other scholars examined particular ICT such as group support systems (GSS) and found that the use of these systems can enable higher participation rates and greater influence of racial minorities (e.g., Chinese in teams with Caucasians) in groups (Dennis et al., 1997; Kelsey, 2000). Other studies have explored the capabilities of synchronicity of ICT in enabling decision-quality in diverse groups and found that text communication improved knowledge sharing and knowledge integration, and in turn enhances decision-quality in racially diverse teams (Robert et al., 2018).

Nevertheless, only a handful of studies have examined the role of Information and Communication Technologies (ICTs) in reducing tokenism and microaggressions against women in man-

dominated teams. Three media capabilities have been examined in this context. Prior studies found that remote collaboration platforms (e.g., virtual platforms) where participants can share their ideas either in real time (i.e., synchronous) or asynchronously ensured that women were actively involved and included in teams' discussions and initiatives (Bergdahl & Craig, 1996; Lind 1999; Savicki et al., 1996). These studies suggest that virtual platforms provide a space where contributions can be assessed based on merit rather than gender. Anonymity in communication channels have also been a key capability. Anonymity can help reduce microaggressions by providing a safe space for women to voice their opinions, contribute to discussions, and challenge stereotypes or biases without immediate identification. For example, one study found that minority group members could take advantage of the anonymity feature of ICT to resist majorities' opinions by freely voicing (Spears et al., 2002). The order of using different communication media (e.g., using computer chat before F2F) in teams also seems to play a role in enabling inclusion in women who work in man-dominated teams. Triana and colleagues (2012) conducted an experiment with students grouped within 50 four-person teams of one woman and three men with 25 teams communicating first with F2F and then computer-mediated chat, and the other 25 using computer chat first and then F2F. They found out that when the first group interaction is virtual using computer-mediated chat and then they meet F2F, women felt more included in teams and in turn had higher levels of individual participation. Therefore, ICTs have been recognized as promising tools that can facilitate inclusion in work teams.

Inclusion in virtual organizational teams is considered to be highly valuable as it serves as the binding force that fosters unity among the group, even in the absence of in-person communication (Fiol & O'Connor, 2005). Inclusion is defined as the extent to which an employee feels satisfied

with the needs of belongingness and uniqueness through work group experience (Shore et al., 2011). In fact, inclusion is, especially of gender minorities (e.g., women in man-dominated groups), only tangentially explored in most of the studies just noted. The prior work has also focused primarily on whether and what impacts ICTs have on minorities' inclusion in groups by comparing virtual teams and F2F, largely ignoring the underlying processes and effects of different communication media. To the best of our knowledge, the scant research that has focused specifically on the impact of communication media on the inclusion of women minorities in groups has not investigated how communication media through participation (e.g., communication processes) affects inclusion. As a result, we know little about how the inclusion of women minorities develops in virtual teams or groups that use an ICT to communicate and perform the group task. In this study, we seek to contribute to this line of research by investigating the role that communication media (videoconferencing vs. text-chat) and communication processes (e.g., knowledge sharing and knowledge integration) play on enabling women' perceptions of inclusion in man-dominated groups. The next chapter provides the theoretical rationale of the study.

## **CHAPTER 3 THEORETICAL FRAMEWORK**

This chapter introduces the concept of Media Synchronicity Theory and explores its significance in facilitating effective communication processes within groups, particularly in the contexts of knowledge sharing and knowledge integration as well as in enabling inclusivity for women in men-dominate teams.

### **3.1 MEDIA SYNCHRONICITY THEORY**

Media Synchronicity Theory (MST) is a communication theory that explains how different forms of media influence the effectiveness of communication and information transmission and processing within a group or organizational context (Dennis & Valacich, 1999). This theory seeks to understand the relationship between the choice of communication media and the synchronization of group activities, communication processes, information transmission and sharing.

MST posits that media possess varying levels of synchronicity and richness, influencing the effectiveness of communication. Synchronicity refers to the degree of real-time interaction, while richness pertains to the ability of a medium to convey multiple cues. By aligning communication media with specific tasks and communication needs, teams can enhance their communication processes and achieve desired outcomes (Dennis et al., 2018).

According to MST, most groups accomplish their tasks through two fundamental communication processes: knowledge sharing (i.e., *conveyance*: the transmission of a diversity of new information) and knowledge integration (i.e., *convergence*: the discussion of preprocessed information). Both these communication processes require individuals to engage in two individual processes: *information transmission* (encoding message for transmission, and transmitting it to others via a medium), and *information processing* (comprehending the information and cooperating it into a mental model). Knowledge sharing refers to the effective transmission of diverse and new information to the recipients, facilitating the creation and revision of their mental models of the situation. This process involves comprehensive information transmission, where the conveyed information is rich in cues and facilitates shared understanding among group members. Knowledge sharing is closely related to conveyance (as termed in communication studies) because it encompasses the effective transmission of knowledge from one individual to another, ensuring that the conveyed information is rich in cues and facilitates shared understanding (van Knippenberg et al., 2004; Robert et al., 2018). Knowledge integration defined as the exchange of preprocessed information that encompasses each member's interpretation of a given situation (known also as convergence in communication literatures) involves substantial information processing, enabling group members to align their understanding, coordinate actions, and collectively address the task or problem at hand. It involves the synthesis, assimilation, and collective sensemaking of diverse knowledge inputs to develop new insights or solutions (van Knippenberg et al., 2004; Robert et al., 2018). To align with the focus of this research, we adopt the terminology of diversity research, incorporating knowledge sharing and knowledge integration, analogous to conveyance and convergence (Robert et al., 2018).

According to MST, *media synchronicity* refers to the extent to which communication media enable individuals to engage in fundamental communication processes previously mentioned. MST identifies five media capabilities that support different levels of synchronicity, such as: transmission velocity, parallelism, symbol sets, rehearsability, and reprocessability (Dennis et al., 2008). According to this theory, media with higher levels of synchronicity, such as face-to-face and video communication interactions (e.g., video chat) are preferred or better support knowledge integration communication needs, thereby, enabling interactive sensemaking and integration of group knowledge. Media with lower levels of synchronicity better support knowledge sharing needs, as individuals can transmit information and analyze it independently. Table 1 summarizes the media capabilities in relation with synchronicity attributes.

Table 1 Definitions of Media Capabilities and the Relationships with Media Synchronicity

<b>Media Capability</b>	<b>Definition</b>	<b>Relationship with Synchronicity</b>
Transmission Velocity	The rate at which a medium can transmit a message to its intended recipients.	Support
Parallelism	The number of simultaneous transmissions that can effectively take place.	Undermine
Symbol Sets	The number of ways in which a medium enables information to be encoded for communication.	Support (more natural cues, more fit with content)
Rehearsability	The degree to which the media allows the sender to practice or refine a message during encoding prior to sending it.	Undermine
Reprocessability	The degree to which the medium allows a message to be reconsidered or reprocessed during decoding, either within the communication event's context or after its occurrence.	Undermine



Note. Adapted from “Media, tasks, and communication processes: A theory of media synchronicity.” by A. R. Dennis et al., 2008, MIS Quarterly, 32(3), p. 584-587 (<https://www.jstor.org/stable/25148857>). Copyright by JSTOR.

### 3.2 THE ROLE OF COMMUNICATION MEDIA ON WOMEN’S COMMUNICATION PROCESSES IN MAN-DOMINATED TEAMS

Media Synchronicity Theory (MST) asserts that the arrangement of media capabilities plays a crucial role in determining the media's potential to support information transmission and processing, ultimately influencing their effectiveness in team communication. Within the MST framework, transmission velocity, parallelism, and symbol sets are identified as capabilities that facilitate knowledge sharing, while rehearsability, reprocessability, and symbol sets are capabilities that support knowledge integration. In this study, we delve into the comparison between text-based (e.g., text-chat) and video-based (e.g., videoconference) communication media, as they exhibit fundamental differences in these media capabilities (refer to Table 2) and are commonly employed to meet the communication needs of remote working scenarios. Specifically, we explore the synchronicity capabilities of these communication media (text-chat vs. videoconferencing) and their impact on communication processing and perceived inclusion among women working in man-dominated teams. By investigating these relationships, we aim to shed light on how adoption of different media can influence the communication experiences of women in such team settings.

Table 2 Synchronicity capabilities of videoconference versus text-chat

Media Capability	Performance	
	Videoconference	Text-chat
Transmission Velocity	High	Low-Medium
Parallelism	Medium	High
Symbol Sets	More	Less
Rehearsability	Low	High
Reprocessability	Low	High

*Note.* Adapted from “Media, tasks, and communication processes: A theory of media synchronicity.” by A. R. Dennis et al., 2008, *MIS Quarterly*, 32(3), p. 589 (<https://www.jstor.org/stable/25148857>). Copyright by JSTOR.

### 3.2.1 Communication Media and Women’s Knowledge Sharing in Man-dominated Teams

MST (Dennis et al., 2008) proposes that information transmission, the main process involved in knowledge sharing, will be better supported by a media lower in synchronicity (e.g., text-chat) because lower synchronicity enables individuals to have more opportunities and time to craft messages in a more considerable way. Empirical evidence suggests that women may adapt to text-based communication better than men. First, studies found evidence indicating that women prefer higher parallelism than men. For instance, women exhibit higher media multitasking (Kononova, 2013; Voorveld & Viswanathan, 2015) and generate more accurate judgements of words presented at fast exposure rates than men (McGuinness & Pribram, 1979). Second, women adapt to less symbol sets better than men. While lacking certain symbol sets may affect social perceptions for both women and men (Dennis et al., 2008), women perceive a higher level of social presence in text-based communication than men do (Gefen & Straub, 2000), and therefore are less influenced by the inaccessibility of natural symbol sets (e.g., visual, verbal cues). Moreover, as a token, the woman’s amplified perceived difference and gender stereotype expectations from the men majority will be reduced due to less symbol cues, and thus promoting token women to share their ideas (Farh et al., 2020; McClean et al., 2018). Last, although women may prefer higher transmission velocity (e.g., higher immediacy of feedback) than men in the context of CMC (Triana et al., 2012), this effect will be negligible on knowledge sharing, because the main purpose of knowledge sharing is to convey information rather than seeking evaluation and feedback from others. Thus, together we hypothesize:

*H1: Women in man-dominated teams using text-chat (vs. using videoconferencing) will intend to participate more in knowledge sharing.*

### 3.2.2 Communication Media and Women's Knowledge Integration in Man-Dominated Teams

The selectivity model of gender differences in information processing proposed by Meyers-Levy and Maheswaran (1991) contends that women tend to use a comprehensive information processing strategy, and men tend to use a selective information processing strategy. That is, men tend to use cues that are highly available and particularly salient in the focal context and employ various heuristics devices (i.e., the use of cue(s) that convergently imply a single inference) that serve as surrogates for more detailed processing (Darley & Smith, 1995). In contrast, women tend to use a comprehensive strategy and attempt to assimilate all available cues, which leads women to give relatively equal treatment to information relevant to self and to the external world of others. Women have been found to exhibit greater sensitivity to the particulars of relevant information when forming judgements and may encode information more extensively than men.

MST (Dennis et al., 2008) proposes that information processing, the main process involved in knowledge integration communication, will be better supported by a media higher in synchronicity (e.g., videoconference) because higher synchronicity enables a greater level of interaction and shared focus, which reduces cognitive effort to encode and decode information. We expand on this view and draw upon the selectivity model (Meyers-Levy & Maheswaran, 1991) to instead propose that women minorities' information processing will be better supported by a media lower in synchronicity (e.g., text-chat). Based on the selectivity model, women on average attempt to assess all available cues and engage in effortful, comprehensive, itemized analysis of all available

information. Therefore, higher reprocessability (decoding) better supports women to seek more comprehensive information, and higher rehearsability (encoding) better supports women to deliberate information in a more detailed way. Regarding symbol sets, we follow the previous argument that women adapt to less symbol sets better than men. Thus, we predict:

*H2: Women in man-dominated teams using text-chat (vs. using videoconferencing) will intend to participate more in knowledge integration.*

### **3.3 EFFECTS ON PERCEIVED INCLUSION**

We aim to conduct a comprehensive investigation into the role of communication media (text-chat vs. videoconference) as a potential factor influencing perceived inclusion for women in exclusionary predominantly-men teams. This study seeks to explore both the direct and indirect effects of communication media on perceived inclusion through two critical communication processes: knowledge sharing and knowledge integration. To analyze these relationships effectively, we will employ a parallel mediation model (refer to Figure 1).

#### **3.3.1 The Role of Communication Media on Perceived Inclusion**

Self-categorization theory (Tajfel & Turner, 2004) posits that individuals (e.g., women) tend to categorize themselves into in-group or out-group members based on most salient cues (e.g., gender) in the social context. In virtual interactions, relative to men, women are more sensitive of non-verbal social cues (Bonaccio et al., 2016), upon which people significantly rely when expressing attitudes (Dennis et al., 1999). Therefore, non-verbal cues are critical triggers inducing

self-categorization processes for women. Media lower in synchronicity (e.g., text-chat) with much less symbol sets could help filter substantial salient and non-verbal cues leading to less self-categorization for women, and therefore, could better foster women to feel more included in man-dominated teams by reducing their gender-based self-categorization processes, as compared to use of videoconferencing. In addition, lower synchronicity with less salient cues inhibits the man majority to form initial gender stereotypes towards the token woman, and thus decreased scrutinization of the token woman's behaviors through the stereotyping lens, which in turn results in less exclusion for the token women. Thus, we hypothesize:

*H3: Women in man-dominated teams using text-chat (vs. using videoconferencing) would have higher perceived inclusion.*

### 3.3.2 The Mediating Roles of Communication Processes on Perceived Inclusion

One possible mechanism explaining the impact of communication media on the perception of inclusion is participation in communication processes. Several studies have demonstrated that involvement in group processes, such as participation in decision-making (Mor Barak et al., 2016) and work engagement (Pearce et al., 2004) are associated with individuals' perceived inclusion, as employees often evaluate their sense of inclusion by assessing their accessibility to information and resource, connection with co-workers, participation in and impact on decision-making (Mor Barak, 2000; Nishii, 2013). Drawing on MST, we consider knowledge sharing and knowledge integration as main communication processes through which women minorities involve and participate in group interactions. Based on the interplay between action and perception proposed in the embodied cognition model (Varela et al., 2017), cognitive processes (e.g., perception) are

deeply influenced by the body and its interactions with the environment. Media with lower synchronicity (i.e., text-chat) may enhance women minorities' perception of inclusion through their participation in knowledge sharing and knowledge integration. It is expected that participation in communication processes mediates the association between communication media and perceived inclusion. Taken together then, we predict:

*H4: Women in man-dominated teams using text-chat (vs. using videoconferencing) will intend to participate more in knowledge sharing, which will in turn increase perceived inclusion.*

*H5: Women in man-dominated teams using text-chat (vs. using videoconferencing) will intend to participate more in knowledge integration, which will in turn increase perceived inclusion.*

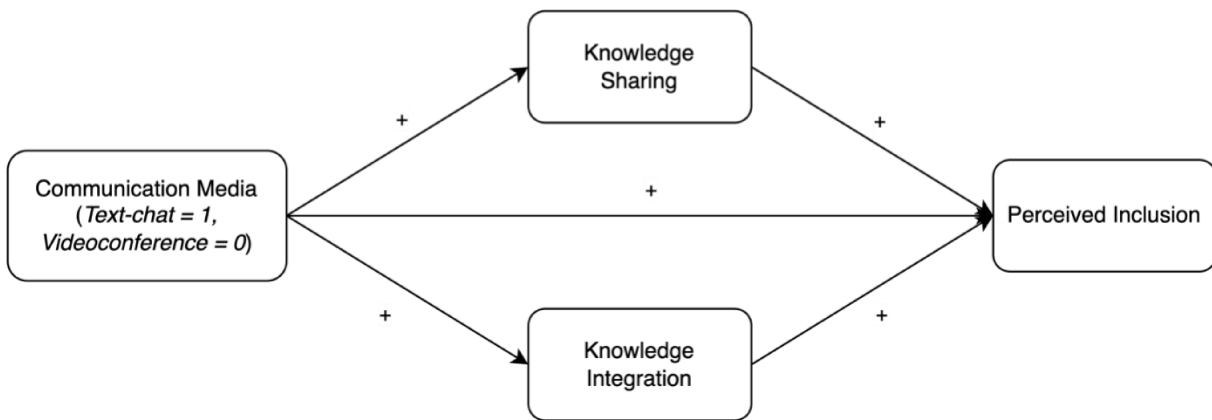


Figure 1 Conceptual Mediation Model

## CHAPTER 4 METHOD

This chapter begins by describing the sample used in the study. Next, the experimental design and manipulation material are introduced. Detailed descriptions of the measurement of variables are then presented. Finally, the procedure for conducting the study is outlined.

### 4.1 PARTICIPANTS

The present study was conducted online using the Qualtrics platform. 149 participants were recruited from Prolific, an online crowdsourcing platform. Each participant received £1.63 as a compensation for completing a 13 - 15-minute survey. The participants were prescreened for those individuals who self-identified as women (including Trans Woman) between the ages from 19 to 28 from the United States and Canada, with a minimum of one year of undergraduate studies. We selected these prescreening criteria because: 1) We based our scenario and video vignettes on college student population. Therefore, to ensure the manipulation takes effect, it is important to keep target population with similar age to characters in the scenario so that participants could relate to the characters and experiences in the video presented; 2) Moreover, we explored the impact of communication media on women's communication and inclusion in groups based on the gender differences in communication style. Therefore, we prioritize gender to age if a sacrifice needs to be made on generalizability to keep study valid and feasible. From the initial pool of 149 participants, 16 participants were excluded due to not following experiment instruction or failing the attention check, resulting in a final sample size of 133 participants.

The mean age of the participants was 24.04 years ( $SD = 2.90$ ). Only 6% participants reported work experience of less than 1 year, meanwhile 60% participants reported having more than 3 years of work experience, and the average work experience was 4.63 years ( $SD = 3.23$ ). The racial breakdown was 20.3% Asian, 8.3% Black, 4.5% Hispanic, 2.3% Arab, 1.5% Latin, 58.6% White, and 4.5% other. For education, 15.8% participants have high school degrees, 8.3% and 22.6% participants are in their 1<sup>st</sup> year or 2<sup>nd</sup>-4<sup>th</sup> year of undergraduate studies, 45.1% participants completed their bachelor's degrees, 6.8% hold master's degrees, and 1.5% have doctoral degrees. The employment sector breakdown of the sample was Marketing & Sales (26.3%), Education and Training (12.8%), Retail (9.8%), Government and Public administration (9.1%), Medicine (7.5%), Business management and administration (4.5%), and others (30%, including Food, Architecture, Arts, Hospitality, Information Technology, Legal, Policing, Military, Manufacturing, Science and Social science, Transportation, etc.). 87.2% of the participants speak English as first language, while 12.8% were non-native English speakers.

## **4.2 PRECEDURES**

After reviewing the letter of information and informed consent, participants were reminded that the study was about “the impact of communication media on small-group performance” and instructed to watch the videos of a group of students at a west coast university. Before watching the videos, a short description of the students was given demonstrating the equal competencies of these students such as “excellent analytical and communication skills” and “active contribution to varsity teams and various college clubs”. In addition, to mitigate any attractiveness bias, head



photos of the actors were added to the description. Please refer to Appendix A for details of the questionnaire.

In the survey, after reading an overview instruction, participants first completed a demographic questionnaire (i.e., age, education, work tenure, employment sector, ethnicity, and English language proficiency). They then read the description of the group task and were randomly assigned to either videoconferencing or text-chat vignettes. Participants watched a 6-minute video specific to their assigned condition, with time to complete a manipulation check. After viewing the vignettes, participants completed the perceptual scales of knowledge sharing intention, knowledge integration intention (Hung, 2004; Hung et al., 2008), and perceived inclusion (Chung et al., 2020).

Following completion of the perceptual questions, and a check on gender composition of the presented group, participants proceeded to complete the treatment fairness perception scales (Chung et al., 2020) respectively to the minority woman and one of the majority men based on their initial impressions about the group interaction. Participants then were asked to provide their first thoughts on the viewed video, share any previous similar experience if applicable, and completed a scale measuring their media preferences. Finally, participants were thanked for their participation and provided with a debriefing regarding the study.

#### **4.3 EXPERIMENTAL DESIGN AND MANIPULATION MATERIAL**

Upon consenting to participate in the survey, participants completed demographic questions. They were then randomly assigned to one of two conditions in a between-groups design, manipulating

communication medium (text-chat vs videoconference). The video vignettes consisted of a six-minute group interaction of students addressing a class project. One experimental condition presented the interaction of the students using a video-conference platform (e.g., Zoom) as a communication medium. The other condition presented a similar group interaction but using a text-chat communication medium (e.g., WhatsApp). The students in the video vignettes were actors recruited through an online agency platform. The actors participated in a short audition and were selected according to their acting skills and resemblance with the average student population. Four actors were selected among 489 applications. The four actors participated in the two experimental conditions, video conference (e.g., Zoom) and text-chat (e.g., WhatsApp). Each actor performed the script for the same role twice—once using Zoom and once using WhatsApp).

To develop the script for each video, a pilot study was conducted at a Canadian University. Students were recruited and offered a \$20 gift card as compensation for participating in a decision-making task of a mismanagement business case, which is similar to the task performed in vignettes (description below). Two groups were formed, each consisting of four students (three men and one woman). The participants were instructed to engage in the task in two stages: brainstorming for 15 minutes and decision-making for 20 minutes. One group completed the task through video conference, while the other group used text-chat.

The group conversations were recorded and transcribed, and based on these transcripts, the scripts for the video vignettes were developed. The scripts underwent editing and adaptation. Two scholar experts in group communication processes and gender microaggressions, as well as a professional scriptwriter, proofread the scripts to ensure realistic group conversation and interaction. The

content was made consistent between the two experimental conditions, with the video conferencing condition scripted in natural spoken language and the text-chat condition scripted in online written language.

The final recorded videos contained groups of four students (performed by three actors and one actress). In each video, the students were working on a business course project to resolve a mismanagement business case that instructed the following situation: *“After years of mismanagement, poor-quality food, and high prices, the University restaurant has gone bankrupt and is being shut down. The school administration is trying to decide what new business should now occupy that space.”* Students were having a group conversation to generate ideas for a new business on campus and select one as a group. A similar task has been previously used in group decision making and communication process studies (Pearsall et al., 2008; Goncalo & Staw, 2006). As noted by these studies, the task prompts two main communication process across groups: idea generation (knowledge sharing) and idea selection (knowledge integration) (Marheineke et al., 2016).

#### **4.4 DEPENDENT MEASURES**

A questionnaire was used to assess (1) participants’ intention to participate in knowledge sharing and intention to participate in knowledge integration, (2) participants’ anticipated perception of inclusion, and (3) participants’ first impressions about the group interaction presented in the video vignette.

#### 4.4.1 Manipulation Check

The effectiveness of the manipulation was confirmed through the use of a multiple-choice question: "Which business ideas were proposed during the group discussion? (Select all options that apply)" with two out of four options being correct answers ("Which business ideas were proposed during the group discussion?"). In addition, attention check failures were observed ("I commit to providing thoughtful answers to the questions in this survey").

Although gender microaggression was not manipulated but rather remained constant across the conditions of this study (with both conditions exhibiting minor microaggression towards the woman minority in the man-dominated group), it was important to ensure that each participant acknowledged the presence of microaggression in the group interaction and recognized the gender composition of the group. The participants' perceptions of treatment fairness were captured using four items, such as "involvement in the group discussion" and "value as a group member," rated on a scale from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The same scale assessing perceived treatment fairness was employed for both the minority woman and the majority man in the group. To confirm the gender composition, participants were asked, "What was the gender composition of the group presented in the video clip?" (Measured as 1 = *Man-dominated group*, 2 = *Woman-dominated group*, and 3 = *Evenly mixed men and women group*).

#### 4.4.2 Knowledge Sharing and Knowledge Integration Intentions

Two 4-item measures based on the production conveyance and production convergence scales (Hung et al., 2008; Hung, 2004) were utilized to assess participants' perception of intention to participate in knowledge sharing and knowledge integration in the group. This involved the

utilization of modified items from Hung et al. (2008, 2004) as well as additional items developed for this study to enhance coverage of the construction domain (e.g., "resolve conflicts related to the project with other group members"). Participants were instructed to report the likelihood of each behavior being performed (ranging from 1 = *Extremely unlikely* to 7 = *Extremely likely*). This allowed for a more accurate measurement of behavior intentions (Warshaw & Davis, 1985).

#### 4.4.3 Perceived Inclusion

The reliable and valid work group inclusion scale (Chung et al., 2020), comprising two components (belongingness and uniqueness) aligned with the conceptual definition of inclusion by Shore et al. (2011), was used to measure participants' perception of inclusion in the man-dominated group. Additionally, two items from the perceived group inclusion scale (Jasen et al., 2014) were incorporated to capture other constructs, and the scale was modified into an anticipated workgroup inclusion scale. The complete instrument is included in Appendix A. Responses were collected from participants on a 7-point scale (1 = *Strongly agree* to 7 = *Strongly disagree*), indicating how they would feel if they were to continue working in the presented group as the woman minority.

## CHAPTER 5 ANALYSES AND RESULTS

### 5.1 DATA ANALYSES

Data was first screened for ineffective manipulation or careless responses according to McGonagle et al., (2016). 16 participants were excluded for failing effectiveness check of manipulation ( $n = 5$ ), and attention check ( $n = 11$ ). Convergent and discriminant validity, and internal consistency reliability of all measures using multi-item scales were then verified based on Fornell-Larcker criterion and the calculations of Cronbach's alpha. Then, the effectiveness of experimental randomization was validated by examining whether conditions differed in age, education, language proficiency etc. The means, standard deviations, and correlation matrix were calculated and presented in Table 3. To verify the effectiveness of the manipulation, participants' perceived treatment fairness toward the women minority and one of the men in the vignette group across two conditions were compared, and man-dominated gender composition of the presented group was identified by participants.

To test hypotheses 1 and 2, Analysis of Variance (ANOVA) were used to compare conditions on participants' intention to participate in knowledge sharing and knowledge integration in the group as we intend to explore the media synchronicity fit (i.e., the fit between different communication processes and communication media varied in synchronicity capability) for women minorities. Thus, we examined the effects of communication medium on two communication processes (i.e., knowledge sharing and knowledge integration) respectively using ANOVA. To test the indirect and direct effects predicted by hypotheses 3, 4, and 5, PROCESS macro model 4 (Hayes, 2017)

was employed to investigate whether text-chat communication versus videoconferencing positively affects knowledge sharing and knowledge integration intentions, which in turn positively affect perceived inclusion of women in man-dominated groups, and whether text-chat (vs. videoconferencing) positively influences women's perception of inclusion in man-dominated groups.

Additionally, to supplement findings from the prior analyses, we examined between-condition differences in the perception of treatment fairness to the minority woman (i.e., Mary) and to one of the majority men (i.e., David) in the vignettes through a one-way ANOVA analysis. We also investigated the media preferences (text-chat vs. videoconference) of women in man-dominated teams for communication processes (i.e., knowledge sharing and knowledge integration) by using paired samples tests.

## **5.2 PRELIMINARY ANALYSES**

Means, standard deviations, and correlations among study variables are presented in Table 3. Cronbach's alpha for the items measuring intention to participate in knowledge sharing were 0.72, 0.93 for knowledge integration, and 0.96 for perceived inclusion, indicating adequate reliability. Internal consistency was also validated for items measuring perceived treatment fairness to Mary ( $\alpha = 0.89$ ) and to David ( $\alpha = 0.80$ ). Convergent and discriminant validity were tested for main constructs in the research model based on the Fornell-Larcker criterion for convergent and discriminant validity, all constructs have sufficient convergent validity and satisfactory discriminant validity (all AVEs > 0.7;  $\text{sqr}(\text{AVEs}) < \text{correlations}$ ).

Table 3 Descriptive statistics, alpha coefficients and correlations among study variables

Variables	<i>M</i>	<i>SD</i>	$\alpha$	1	2	3	4
1. Communication medium ( <i>videoconference</i> = 0, <i>text-chat</i> = 1)	—	0.50	—	1.00			
2. Knowledge sharing (1 <i>Extremely unlikely</i> to 7 <i>Extremely likely</i> )	4.31	1.67	.72	-.02	1.00		
3. Knowledge integration (1 <i>Extremely unlikely</i> to 7 <i>Extremely likely</i> )	3.85	1.72	.93	.29***	.22**	1.00	
4. Perceived inclusion (1 <i>Strongly disagree</i> to 7 <i>Strongly agree</i> )	2 .72	1.50	.96	.37***	.22*	.70***	1.00

Note.  $N = 133$ .

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

We checked the effectiveness of randomization by examining whether conditions differed in participant age, education, work experience, employment sector, ethnicity, native or non-native English speaker identity. While a chi-square test of independence found conditions differed significantly ( $p < .05$ ) in native or non-native English speaker identity ( $\chi^2 = 4.215$ ), a two-way ANOVA found no statistically significant interaction between the native or non-native English speaker identity and communication medium on perceived inclusion score ( $F_{(1, 127)} = 3.639$ ,  $p = .059$ ), nor on knowledge sharing intention score ( $F_{(1, 129)} = 2.743$ ,  $p = .100$ ) and knowledge integration intention score ( $F_{(1, 129)} = .947$ ,  $p = .332$ ).

### 5.3 MANIPULATION CHECKS



We verified the effectiveness of the manipulation by examining gender microaggressions across conditions and checking the gender composition of the group. We examined gender microaggressions by comparing the perceptions of treatment fairness to one of the majority men and to the minority woman using paired samples tests. Statistically significant differences between the perceptions of treatment fairness to the majority man and minority woman was found in both conditions (videoconferencing condition:  $M_{pair} = 3.11$ ,  $SD = 1.62$ ,  $p < .001$ ; text-chat condition:  $M_{pair} = 4.37$ ,  $SD = 1.32$ ,  $p < .001$ ), such that the perceived treatment fairness to the minority woman is significantly lower than the perceived treatment fairness to the majority man across two conditions. We also asked participants the gender composition of the group in the vignettes, and one hundred percent of participants correctly identified man-dominated group as group gender composition. Thus, the results confirmed that the experimental stimulation successfully imposed participants group experience with microaggressions as a gender minority and group composition.

#### **5.4 TESTS OF HYPOTHESES**

Hypotheses 1, 2, and 3 examined whether women's intention to participate in knowledge sharing and knowledge integration, and perceived inclusion were higher when communicating with text-chat medium compared to communicating with videoconference medium in man-dominated groups. We conducted a series of one-way ANOVAs with experimental condition as the predictor and knowledge sharing intention (H1), knowledge integration intention (H2), and perceived inclusion (H3) as outcomes. The results are presented in Table 5.

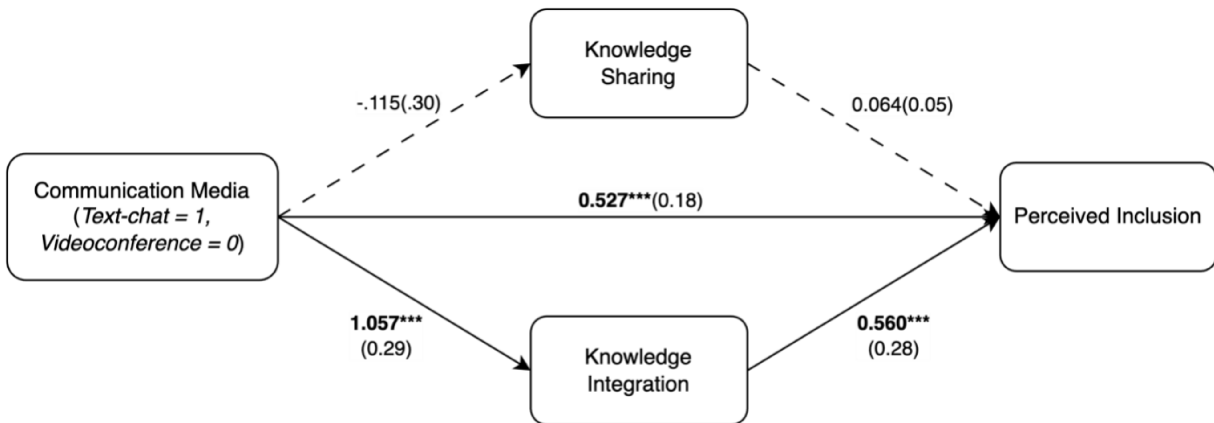
Results showed that participants in different communication medium conditions experienced different levels of perceived inclusion,  $F(1, 130) = 20.826$ ,  $p < .001$ , and reported different levels

of knowledge integration intention  $F(1, 131) = 11.826, p < .001$ , while no significant difference was found in their knowledge sharing intention  $F(1, 131) = 0.047, p = .829$ . Specifically, participants in the text-chat communication condition reported higher perceived inclusion ( $M_{\text{text-chat}} = 3.25, SD_{\text{text-chat}} = 1.60$ ) and higher knowledge integration intention ( $M_{\text{text-chat}} = 4.31, SD_{\text{text-chat}} = 1.66$ ), compared to those in the videoconferencing communication condition (perceived inclusion:  $M_{\text{videoconferencing}} = 2.14, SD_{\text{videoconferencing}} = 1.13$ ; knowledge integration:  $M_{\text{videoconferencing}} = 3.33, SD_{\text{videoconferencing}} = 1.64$ ). These results provided support for our H2 and H3, however, H1 is not supported.

Table 4 presents the results of the hypothesis tests using the PROCESS macro (Hayes, 2017). First, results showed that text-chat communication condition, compared to videoconferencing condition, resulted in higher perceived inclusion (total effect = 1.11,  $SE = .24, p < .001$ ). Second, we found a positive indirect effect of the text-chat communication condition on higher perceived inclusion via enhanced knowledge integration intention (indirect effect = 0.59,  $SE = .17, CI [.28, .95]$ ). However, there was no indirect effect of text-chat communication on perceived inclusion via knowledge sharing intention (indirect effect = -0.007,  $SE = .024, CI [-.06, .04]$ ). Third, except for effect mediated by knowledge integration, text-chat communication directly increases perceived inclusion (direct effect = 0.53,  $SE = .18, p < 0.01$ ), compared to videoconferencing. Therefore, H5 was supported while H4 was not supported. Overall, this model explained 73.1% of the variance in perceived inclusion. The statistical model is diagrammed in Figure 2.

Table 4 Direct and Indirect Effects of Communication Media on Perceived Inclusion: (n=133)

Antecedent	Consequent								
	KS			KI			INCLUSION		
	Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE(HC4)	p
X(CM)	-0.115	0.295	.698	<b>1.057</b>	0.286	.000	<b>0.527</b>	0.180	.004
M1(KS)							0.064	0.046	.167
M2(KI)							<b>0.560</b>	0.061	.000
Constant	4.343	0.243	.000	3.290	0.206	.000	0.021	0.277	.940
	$R^2 = 0.035$ F (1, 129) = 0.151			$R^2 = 0.309$ F (1, 129) = 13.682			$R^2 = 0.731$ F (3, 127) = 35.441		



\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

Figure 2 Statistical Parallel Multiple Mediator Model

## 5.5 EXPLORATORY ANALYSES

Revised: In order to gain a deeper understanding of the mediating effects of two communication processes, we conducted separate analyses to examine the influence of knowledge sharing and knowledge integration on the relationship between communication media and perceived inclusion, as depicted in Figure 3 and Figure 4. The findings revealed that knowledge sharing is not influenced by communication media, but it does have a positive impact on perceived inclusion within the same communication media condition. Additionally, there was a positive indirect effect

of knowledge integration on the relationship between communication media and perceived inclusion.

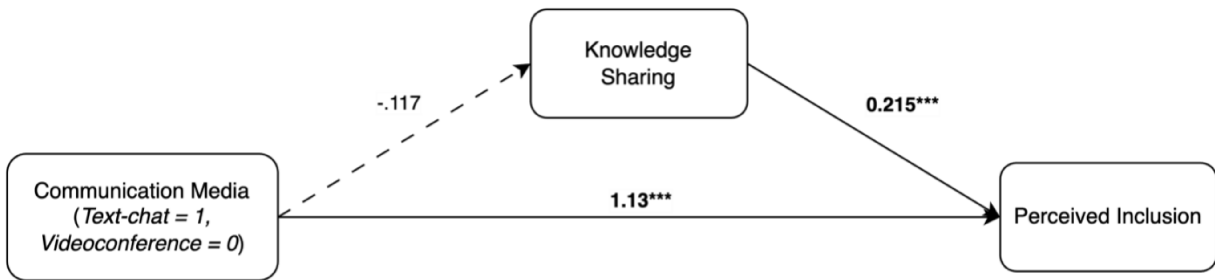


Figure 3 Statistical Mediator (Knowledge Sharing) Model

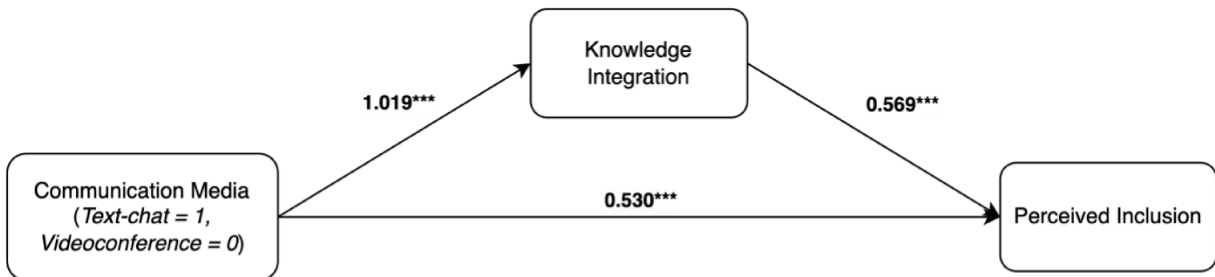


Figure 4 Statistical Mediator (Knowledge Integration) Model

In addition, to explore whether there are potential differences in the effects of communication media on the perception of group inclusion for majority men compared to minority women, we conducted a one-way ANOVA with communication medium as predictor and perceived treatment fairness to Mary (i.e., minority women in the vignette) and to David (i.e., one of the majority men in the vignette) as the outcomes. Results showed that participants in different communication medium conditions reported different levels of perceived inclusion to Mary ( $F(1, 131) = 39.27, p < .001$ ) between the videoconferencing condition ( $M = 2.00, SD = 1.02$ ) and text-chat condition ( $M = 3.38, SD = 1.46$ ). However, no significant difference was found in the perception of treatment fairness to David ( $F(1, 131) = 1.59, p = .210$ ), between the videoconferencing condition ( $M =$

6.36,  $SD = .609$ ) and text-chat condition ( $M = 6.49$ ,  $SD = .56$ ). These results suggested that text-chat communication promote inclusivity for women as minorities, while communication media does not seem to influence the perceived fairness for men as majority (see Table 5).

Table 5 Means (Standard Deviations in Parentheses) of Knowledge Sharing, Knowledge Integration, Perceived Inclusion, and Perceived Treatment Fairness to Mary and David, and as a Function of Communication Medium (Text-chat vs. Videoconferencing)

Variable	Condition		M difference
	Text-chat (A)	Videoconferencing (B)	A-B
Knowledge sharing	4.28(1.45)	4.35(1.90)	-0.07
Knowledge integration	4.31(1.66)	3.32(1.64)	0.99***
Perceived inclusion	3.25(1.60)	2.14(1.13)	1.11***
Perceived treatment fairness to Mary	3.38(1.46)	2.00(1.02)	1.38***
Perceived treatment fairness to David	6.49(0.56)	6.36(0.61)	0.13

Note.  $N = 133$ .

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

We also conducted paired samples tests to examine whether there exist differences in women minorities' media preferences (text-chat vs. videoconferencing) for different communication processes (i.e., knowledge sharing and knowledge integration). The results indicate that preference score of text-chat is significantly higher than that of videoconferencing for both knowledge sharing ( $M_{\text{text-chat}} = 5.01$ ,  $SD_{\text{text-chat}} = 1.63$ ;  $M_{\text{videoconferencing}} = 4.46$ ,  $SD_{\text{videoconferencing}} = 1.80$ ,  $p < .001$ ) and knowledge integration communication ( $M_{\text{text-chat}} = 4.43$ ,  $SD_{\text{text-chat}} = 1.83$ ;  $M_{\text{videoconferencing}} = 4.03$ ,  $SD_{\text{videoconferencing}} = 1.86$ ,  $p < .01$ ). These results indicate preliminary evidence for the proposed gendered essence of the media synchronicity fit.

Additionally, and towards the end of the survey, we asked participants to share their initial impressions and reflections upon viewing the videos. First participants were asked to list their first

impressions about Mary’s feelings in the group. Even though, microaggressions were intended to be subtle in the group interaction, participants consistently expressed that Mary was undervalued and disrespected by the other members. Participants noted that Mary’s ideas went often unnoticed and were disregarded.

After this question, we asked participants if they have been a minority in a man-dominated group and what their experiences were. 84.2% of the participants reported to have been a minority in such teams, and 60.2% reported to have experienced similar group interaction to Mary. We analyzed the sentiments and free text responses of these two open questions and created a word cloud infographic illustrating the most frequently used words in describing these thoughts:

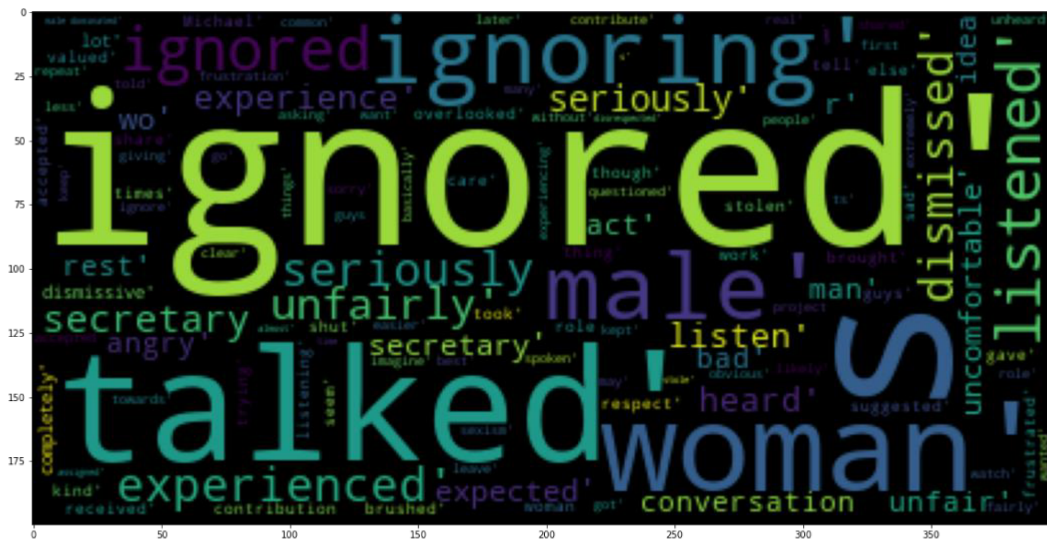


Figure 5 Word cloud of first impressions on women who have been a minority in man-dominated teams

Below are some examples of the quotations provided:

*“As a female, I have experienced situations like these throughout my life, where my opinion is valued less. This happens often to me as I work in a hardware store, and many customers default to a male employee for advice, even when I am the more experienced employee.”*

*“Unfortunately, this has happened in nearly every work or school group I've been a part of.”*

*“I have been the only woman in a statistics group assignment and the men in the group didn't believe my answers because they assumed I would be bad at math and would always double check them and only believed I was right when a man would get the same answer.”*

*“I experience this a lot both in-person and online (more so online). A lot of times I've been in male-dominated groups and felt like I either had no say or had to pick up the slack for my male peers. Especially being in a STEM major (Comp sci), I really feel as though I'm seen as less. Not only in school, but it happens with people I know. Men will somehow try to domineer the conversation.”*

*“This has happened to me many times in research groups for classes and while at times I made my presence known a lot of the other times I was okay with fading to the background.”*

*“There have been plenty of times in my life when I've been the only woman in a group of men, as some of my interests are more stereotypically male oriented. While I've never had an experience exactly like the one Mary was in, I've definitely felt brushed aside or taken less seriously in these group settings.”*

## CHAPTER 6 DISCUSSION

The objective of this study was to investigate two key aspects: (1) the impact of communication medium (text-chat vs. videoconference) on the perceived inclusion of women in man-dominated teams, and (2) the role of communication processes (knowledge sharing and knowledge integration) as underlying mechanisms for the effect of communication medium on perceived inclusion in such team settings. Our findings demonstrate that text-chat communication medium (vs. videoconference) enhances women's perception of inclusion in man-dominated teams. Furthermore, we found that this effect can be attributed, in part, to the communication process of knowledge integration rather than knowledge sharing. Our work offers several theoretical and practical implications.

### 6.1 THEORETICAL IMPLICATIONS

This study contributes to the existing literature on women as minorities in man-dominated teams, including research on tokenism, gender stereotypes, gender microaggressions. While previous research has demonstrated the significance of employees' voice (i.e., expression of work-related ideas and opinions), voice enactment (i.e., voice's integration into immediate decision-making concerning team strategies and processes) (Farh et al., 2020), and participation in communication (Triana et al., 2012) for women as minorities to get involved in man-dominated teams, our work takes a more nuanced approach by examining specific communication processes: knowledge sharing and knowledge integration, as well as their underlying roles on women's inclusion in man-dominated teams. Furthermore, although previous studies have proposed several interventions to mitigate the negative outcomes resulted from gender tokenism and microaggressions (Carnes et



al., 2012; Nishii, 2013), we complement the current interventional approaches with the technological intervention of communication media. Specifically, we propose that text-chat communication medium outperforms video-based communication medium in facilitating women's communication and inclusion in exclusionary man-dominated teams. This technological approach offers a novel perspective on reducing obstacles and biases faced by token women, complementing existing intervention strategies.

Second, this study contributes to the research on communication media and team diversity and inclusion. Previous studies focusing on the effects communication medium have on diverse teams have overlooked the underlying processes through which these effects occur (Robert et al., 2018; Triana et al., 2012). We examined the potential effects of two main communication processes: knowledge sharing and knowledge integration as underlying mechanisms. Our findings reveal that synchronous text-chat medium, as compared to videoconference, tend to facilitate women minorities' knowledge integration while it seems to have minimal impact on their knowledge sharing. The results demonstrate that text-chat compared to videoconference better supports knowledge integration (i.e., the exchange of preprocessed information that encompasses each member's interpretation of a given situation) but does not significantly influence knowledge sharing (i.e., the effective transmission of knowledge from one individual to another) for women in exclusionary man-dominated teams. In doing so, this study complements and extends the literature on team diversity and communication media by identifying the type of communication media capability that can influence communication processes in diverse teams, especially for teams with an exclusive environment.

Third, our findings extend the MST. In this study, we examined instances of the MST's conveyance and convergence processes, which we refer to as knowledge sharing and knowledge integration, respectively. By applying and testing the MST in the context of exclusionary man-dominated teams, we extend theory by exploring the media synchronicity fit for women minorities in exclusionary work contexts. Specifically, the results of our study indicate that, for women as minorities in exclusionary man-dominated teams, media with lower synchronicity better facilitates knowledge integration. However, we found no significant difference between the effects of low synchronicity and high synchronicity mediums in facilitating knowledge sharing. It is noteworthy that MST does not account for the potential influence of gender, team gender composition, and exclusion (e.g., gender microaggression) in the work environment. Therefore, our findings contribute to the theoretical understanding of MST in relation to gender, team gender composition, and gender exclusionary work environment.

Moreover, and to the best of our knowledge, prior studies exploring team diversity and inclusion within the framework of MST have not considered the important concepts introduced by MST, such as the five media capabilities, transmission velocity, parallelism, symbol sets, rehearsability, and reprocessability. Unlike these studies, our study has grounded its hypotheses on the MST framework by comparing communication media based on each synchronicity capability. Furthermore, we have identified the different media synchronicity needs in communication processes specific to women as minorities, especially in exclusive (e.g., gender microaggressions) man-dominated teams. By adopting this theoretical approach, our study offers a more comprehensive and meticulous examination of MST within the context of women in exclusionary man-dominated teams.

Note that we found that knowledge sharing is not affected by the communication medium and does not mediate the relationship between communication media and perceived inclusion. This finding differs from the original MST proposition and previous work testing MST (Niinimäki et al., 2012), which suggest that media with lower synchronicity supports minorities' (e.g., team members with lower language proficiency) knowledge sharing more effectively. However, as this study focuses specifically on women as minorities in man-dominated teams, one possible explanation of our finding is that voicing opinions or concerns during knowledge sharing does not necessarily have a significant impact on team outcomes, such as decision-making and work group inclusion. This is particularly salient for minority members (e.g., token women) as they differ from the majority and face more difficulties in getting their voice enacted. (Farh et al., 2020). Therefore, knowledge sharing may receive less evaluation and scrutiny in relation to gender stereotypes, compared to knowledge integration, and the mitigating effect of communication medium on gender stereotyping and social categorization may be weakened.

Finally, this study contributes to the general diversity and inclusion literature by examining the impact of communication media on perceived inclusion through communication processes. While previous research has explored factors like organizational culture, authentic leadership, and diversity in relation to inclusion (Shore et al., 2018), the role of communication media on inclusion and its underlying mechanisms remains unclear. Our study extends this knowledge by highlighting that importance of communication media and communication processes in mitigating tokenism and microaggression in virtual group interactions.

## **6.2 PRACTICAL IMPLICATIONS**

In practice, it is not uncommon that women find themselves in man-dominated teams in organizations encountering harmful workplace experiences (Triana et al., 2012; Sojo et al., 2023). How should organizations support and promote inclusion of women as minorities in such team settings and enhance their team performance? Organizations embracing remote work have access to a variety of media, including text-based and video-based communication media. (Robert et al., 2018; Carte & Chidambaram 2004; Giambatista & Bhappu, 2010). As such, organizations may want to provide guidance on how to utilize communication media with different capabilities to promote inclusivity and to empower women as minorities, especially in exclusionary man-dominated teams.

Our results suggest that for communication process that requires achievement of a common understanding among team members (e.g., knowledge integration), video-based communication medium (e.g., videoconference) might not be as effective as text-based media (e.g., text-chat) to support minority women participating in the communication and getting included in the exclusive group. Of course, video-based media might be necessary for efficient synchronous communication, especially when there are complex tasks to be completed in a short time, but team members, particularly those in majority, need to be aware that video-based communication can create difficulties and problems for the women as minorities in the team, especially those with an hostile environment, to voice themselves and engage in the team processes, which in turn has potential impacts detrimental to team outcomes.

As for the communication process that involves creating and revising individuals' own mental models independently (e.g., knowledge sharing), our results indicate that text-chat communication

facilitate the participation of women as minorities in exclusionary man-dominated teams as effectively as videoconferencing. However, this result does not suggest that knowledge sharing for women minorities is as easy as it for the man majority. In addition, we analyzed the mediating effect of knowledge sharing alone on the relationship between communication media and perception of inclusion and found that knowledge sharing intention has significantly positive relationship with perceived inclusion for women minorities. Therefore, regardless of communication medium, members in majority should be mindful of the engagement and participation of minorities in both knowledge sharing and knowledge integration communication processes to promote inclusivity in teams.

However, practical workgroup interactions involve a combination of knowledge sharing and knowledge integration, rather than solely focusing on one process. Therefore, promoting the inclusion of women as minorities in exclusionary man-dominated teams requires a flexible and practical approach to the utilization of communication media. For exclusionary teams with women as minorities, it is important to consistently incorporate text-chat communication as one of the options during group discussions, regardless of the specific type of communication. This approach ensures that all team members, especially women minorities, have an inclusive and accessible platform for expressing their ideas and participating in discussions.

### **6.3 LIMITATIONS AND FUTURE RESEARCH**

As with all research, there are several key limitations in our work. First, the study was an experimental design survey with vignettes, creating man-dominated teams and group interactions that may not fully mirror real-world dynamics. This compromises the external validity of our

findings, as actual workplace situations encompass a broader range of diversity and complexities. It is essential to acknowledge the limitations associated with generalizing from the experimental survey design to real-world contexts (Robert et al., 2018). In addition, our study relied on perceptual measures of outcomes, which may not fully capture the objective behaviors exhibited by participants during the experiment. To mitigate this limitation, we modified the measures to utilize behavior expectation scales, as they have been shown to be more accurate predictors compared to behavior intention (Warshaw & Davis, 1985). However, future research could enhance the validity of the findings by conducting replications of this study with real group interactions and employing objective measures to assess outcomes. For example, real student-male-dominated teams can be recruited and their interactions be analyzed. That is, knowledge sharing and knowledge integration can objectively be measured and individuals' perception of inclusion be determined after the interaction.

Second, the study has limitations with regard to generalizability. The sample consisted of women aged between 19 and 28, chosen to ensure effective manipulation by aligning participants' age with the characters in the vignette. However, it is possible that certain characteristics specific to this age range may not apply universally to the broader population. Additionally, it is worth considering whether the findings can be extrapolated to other types of minorities. Conducting replications of this study with different samples would enhance its generalizability. Further, this study focused on initially formed project teams that have a limited duration of interaction. Thus, it remains unclear whether the reported effects are short-term or enduring over time. Last, this study is contextualized in exclusionary man-dominated teams with gender-based harmful workplace experiences (e.g., gender microaggressions), where women are devalued or treated unfairly because of their gender.

Therefore, the generalizability of the results is best suited to women in short-lived, man-dominated teams with an exclusionary team environment. To extend the scope of our findings, similar studies should be conducted in real-world settings involving long-term teams or non-exclusionary teams.

Third, it is important to note that this study focused solely on women as the gender minority, despite proposing theoretical gender differences in media capability requirements. As discussed in Chapter 3, compared to men, women tend to prefer communication media with lower synchronicity for both knowledge sharing and knowledge integration. However, due to the limitations of our study design, we were unable to explore gender differences in media synchronicity preferences. Therefore, future research is needed to compare women and men as minorities in teams dominated by the opposite gender and examine the effects of communication medium on perceived inclusion for different genders.

## **6.4 CONCLUSION**

Drawing from the media synchronicity theory, tokenism and gender microaggression, and gender differences in information processing literatures, this study makes a contribution to the teams and diversity literature by identifying the impact of communication media on inclusion perceptions for women in man-dominated teams and the underlying mechanism via communication processes. The research aims to inspire further exploration of gender diversity and inclusion in exclusionary man-dominated virtual teams, as well as understanding the communication processes through which communication media impact these aspects. Additionally, it offers evidence-based and theoretically backed guidance for managing communication processes and promoting inclusivity in man-dominated teams with computer-mediated communications.

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## APPENDIX A Research Instruments

### INSTRUCTIONS:

This questionnaire is part of larger study that explores the role of communication media in small group performance. Today, we are interested in your first impressions of a student group interaction. The questionnaire consists of three short sections:

- i) you will be asked to complete questions related to your personal background (e.g., demographic questionnaires).
- ii) you will watch a short video (6 minutes) depicting a group interaction between students working on a course project. Please watch the video in its entirety before proceeding.
- iii) you will be asked to report your perceptions of the group interaction.

Please only participate in this research ONCE and complete this task in one sitting.

----- (represents page screen break) -----

### Section 1: Background Questions

- What is your age (please enter the number)?
- Please indicate the highest level of your education now.  
Highschool degree \_\_\_\_  
1<sup>st</sup> year undergraduate degree in college or university \_\_\_\_  
2<sup>nd</sup> – 4-year undergraduate degree in college or university \_\_\_\_  
Completed undergraduate degree from college or university \_\_\_\_  
Master's degree \_\_\_\_  
Doctoral degree \_\_\_\_
- How many years of work experience (part-time or full-time) do you have (please enter the number)?
- Which of the following statements applies to the organizations you have worked for? Please select the most representative industry to your work experience.  
Banking and Financial Services \_\_\_\_  
Computer and Electronics \_\_\_\_  
Aerospace and Engineering \_\_\_\_  
Retail \_\_\_\_  
Food industry \_\_\_\_  
Other \_\_\_\_

- What is the ethnic heritage you most closely identify with (choose one)?

Asian, Asian American, or Pacific Islander \_\_\_\_  
Black, African, or African American \_\_\_\_  
Hispanic or Hispanic American \_\_\_\_  
Middle Eastern, Arab, or Arab American \_\_\_\_  
Native American or Alaskan Native \_\_\_\_  
Latin, Central and South American \_\_\_\_  
White, European, or European American \_\_\_\_  
Other \_\_\_\_

- Is English your first language?

Yes  
No

## Section 2: Video

We are now presenting you with a video of the student interaction.

The students in the video are undergraduate students (David, James, Michael, and Mary) at the School of Business at West Coast University who are coming up with ideas for a business case. The project entails them doing the following:

After years of mismanagement, poor-quality food, and high prices, the University restaurant has gone bankrupt and is being shut down. The school administration is trying to decide what new business should now occupy that space.

The students are all outstanding and determined students with excellent analytical and communication skills. They are active members of varsity teams and other college clubs.

Please find attached the photos of each team member below:



David





James



Mary



Michael

Due to the pandemic, all group communication happened online. Please click on next to watch the video.

----- **(represents page screen break)** -----

The following video represents one of the interactions of the student group when working on the course project. If you would like to watch the video in a larger size, click on the "YouTube" icon located at the bottom right of the video player to open it in a new window. You will not be able to proceed to next page until 6 minutes.

*[Video presented here]*

----- **(represents page screen break)** -----

Which business ideas were proposed during the group discussion? (Select all options that apply)

- Hair salon
- Food-to-go
- Café/study
- Ice cream shop
- 

[*Note:* Each participant will read only one scenario, selected randomly and be assigned one condition of a video with interaction via video conferencing (e.g., Zoom) OR an interaction via text communication (e.g., chat).]

### Section 3: Perceptual Questions

[*Note:* The items below measure a participant’s intention to share knowledge in a group based on the scenario.] (Hung et al., 2008; Hung, 2004)

Imagine if you were Mary, and you will continue working in the group as presented in the video. Please indicate how likely it is that you would perform each of the following behaviors from 1 (Extremely unlikely) to 7 (Extremely likely):

	1	2	3	4	5
	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely Likely
Express my opinions related to the project to other group members	1	2	3	4	5
Seek clarification for questions related to the project from other group members	1	2	3	4	5
Explain my ideas to other group members	1	2	3	4	5
Share project-related information with other group members	1	2	3	4	5

	1	2	3	4	5
	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely Likely
Debate issues related to the project with other group members.	1	2	3	4	5
Resolve disagreements when working on the project with other group members.	1	2	3	4	5

Express my opinions to reach a solution with other group members.	1	2	3	4	5
Resolve conflicts related to the project with other group members.	1	2	3	4	5
I commit to providing thoughtful answers to the questions in this survey	1	2	3	4	5

[Note: The items below measure a participant’s perception of work group inclusion based on the scenario.] (Chung et al., 2020; Jasen et al., 2014)

Imagine if you were Mary, and you will continue working in the group as presented in the video, please indicate to what extent do you agree with the following statements from 1 (strongly disagree) to 7 (strongly agree):

	1	2	3	4	5
	Strongly Disagree	Agree	Neutral	Agree	Strongly Agree
I would feel treated as a valued member of the group.	1	2	3	4	5
I would feel belongingness in the group.	1	2	3	4	5
I would feel connected to the group	1	2	3	4	5
I would feel that I am part of this group	1	2	3	4	5
I would feel that I fit in this group	1	2	3	4	5
I could bring aspects of myself to this group that other members in the group don’t have in common with me.	1	2	3	4	5
People in my group would listen to me even when my views are dissimilar.	1	2	3	4	5
While working on the project, I would feel comfortable expressing opinions that diverge from the group.	1	2	3	4	5
I could share a perspective on work issues that is different from the group members.	1	2	3	4	5
When the group’s perspective becomes too narrow. I would feel comfortable bringing up a new point of view.	1	2	3	4	5

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What was the gender composition of the group presented in the video clip?

- Male-dominated group
  - Womale-dominated group
  - Evenly mixed men and women group
- 

**Section 4: First impressions about the group interaction**

[Note: The items below measure a participant’s impression on the extent to which Mary was included in the group based on the scenario presented.]

Based on your impressions of the group interaction in the video clip shown, please indicate to what extent do you agree with the following statements:

	1	2	3	4	5
	Strongly disagree	disagree	Neutral	Disagree	Strongly Agree
Mary was involved in the group discussion.	1	2	3	4	5
Mary was treated fairly in the group.	1	2	3	4	5
Mary was valued as a group member.	1	2	3	4	5
Mary’s ideas were accepted by the group.	1	2	3	4	5

	1	2	3	4	5
	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
David was involved in the group discussion.	1	2	3	4	5
David was treated fairly in the group.	1	2	3	4	5
David was valued as a group member.	1	2	3	4	5
David’s ideas were accepted by the group.	1	2	3	4	5

Please take a minute to briefly list the first thoughts that came to your mind when you thought about what Mary, as the only woman in the group, experienced or might experience in that group.

- Have you ever been a minority in a man-dominated group? Yes No
- Have you ever experienced group interaction similar to Mary in this group? Yes No. Why, yes or no?

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When using online communication platforms and working in a group similar to the one shown in the video clip, please indicate how likely it is that you would perform the following behaviors according to your preferences and experiences:

	1	2	3	4	5
	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
Comfortably share my ideas/opinions in a group through a <b>video call</b> (e.g., zoom)	1	2	3	4	5
Comfortably share my ideas/opinions in a group through a <b>chat (no video/call)</b>	1	2	3	4	5
Comfortably resolve conflict on a group through a <b>video call (e.g., zoom)</b>	1	2	3	4	5
Comfortably resolve conflict through a <b>chat (no video/call)</b>	1	2	3	4	5

## Section 5: Video Scripts

### VIDEO CONFRENCING SCRIPT

The following conversation takes place over a video conference, such as in a Zoom meeting.

David: Hey, guys.

Michael: What do you guys think What should we do?

David: I jotted down a couple ideas like maybe there's a problem with how much they're paying their staff, like the people making the food -if they, like – or - making bad food or something. Or perhaps it's too pricey. *[Pause....]*

David: So, either poor quality food or high prices is definitely going to have to change because people are OK with paying a little for shitty food or paying a bit more for better food. But you can't be doing both.

Michael: So. Are you putting like fast food, cheap food kind of alternative? So cheap credit.

David: Sure. Like whatever we would think is better, either keep the prices low. Or sorry - either keep the food bad and lower the prices, or upgrade the food.

Michael: I think we should keep taking notes of these ideas to not lose track. Can anyone take notes of the ideas? *[Pause....]* Mary, how about you?

Mary: Sure, I can. *[Pause....]*

Mary: I think, If it goes for fast food or something quick, a little grab-and-go place where you don't have to worry about management as much as you would in a restaurant it could be a good choice.

Michael: Um, grab-and-go places can be pricey or cheap and poor quality *[Michael an indecisive face]*

David: Um, how about a series of fridges with food-to-go. You know that eliminates the poor management problem because you would only have to hire a few people.

James: Oh yes, that makes sense.

Michael: Yeah David, the “food-to-go”, excellent idea!  
*[Mary Rolls her eyes in the video conferencing condition]*

Mary: How about study spaces? Some way to incorporate that?

David: To incorporate study spaces in, are we still going with like the food idea or what?

Mary: I think so, study spaces and the grab and go, as I said earlier.

Michael: Study spaces? What? *[Contempt face and voice tone]*  
*[Mary was going to talk and then David jumped saying]*

David: What she's trying to say is like, a coffee lounge kind of thing. People grab and go, or sit and study or eat their food.

Michael: Oh, that sounds doable.

James: Ok, then, the idea would be a study area with a café involved, like you said a small grab and go business, right?  
*[everybody nods in agreement]*

Michael: Yeah, like a kind of late-night study area cafe.

James: Yeah.

David: So, we could have kind of rules in place that would be like, you know, don't be too loud while you're here sort of thing.

Michael: Yeah; café/study. Yeah, OK, that's a good one.

Michael: *[Pause....]* Umm. It's a good idea but kind of hard, I don't know.

Mary: Well, it's possible, like a bookstore situation or like a stationary store like some sort of pharmacy type.

Michael: That's interesting. You could do like in the grocery.

James: *[Laughing]* A pharmacy?

Mary: Like, I don't know. Snacks and toothbrushes and toothpaste, stuff like that.

Michael: Oh, James, what she meant is like a convenience store kind of thing.

James: Oh, now it makes sense!

David: It's kind of interesting to do, it'd be almost like a student local grocery store. Do you know? Weird but it's kind of like the pharmacy. Yes, a student-only grocery store.

Michael: Yeah.

David: I like that idea. Are we still working with study spaces?

Michael: We've gone as far as we can with that idea and, it makes sense. Don't you think?

David: Yeah.

Mary: Yeah.

James: How about a Farmers market kind of thing, that would be cool too. Students could run it; like the local serving restaurant at the student union building, it's run by students. Instead of a study space, there could be a kiosk.

David: I like the idea of student-centred. Right on....

Michael: Yeah, like local food.

David: Yes, it'll be like students selling to other students - excellent.

Michael: Yeah, it could be that too.

Mary: OK. Interesting, but –

*[David interjects before Mary can finish]*

David: I think the student-centered idea lowers the chances of mismanagement, don't you think?

Michael: Yes, but that idea also goes along well with the “grab and go” thing where no one is serving food, you might open a fridge or something like that and take it out yourself and go pay for it.

James: Yeah.

David: Oh, in that way you don't need many staff. Less people could probably increase the quality of management. Less people to handle.

James: Hey, David, you are talking like a businessman! Way to go dude!

*[Everybody laughs, but Mary]*

Michael: Yes. The “grab and go” is where we're gravitating because it seems to be the simplest.

James: Yes, it's a lot easier to manage, it shouldn't be too many problems with it.

Michael: Yeah, I feel good about that. Mary, write down please before we forget

*[He blinks his eyes and smiles at Mary]*

Michael: We should think of something not related to food too since we need to come up with lots of solutions.

James: Alright, a bookstore could be a good idea.

Michael: Yeah, there is not a lot of physical bookstores in downtown

James: That could work. *[pause...]* Yeah, that sounds really good!

David: Yeah, I doubt the university have any bookstores right now.

Michael: Maybe it could also turn into a bar at night to maximize the space

James: That'd be awesome.

David: Yeah, I really like your idea of night club.

Mary: [*Hesitant...*] How about a bookstore and a game room? And later at night, a bar?  
[*No one responds to Mary.*]

Michael: Another idea could be a smoothie store. That would be busy, I feel.

David: I think smoothie would be good, like the business in the other Campus.

James: Yeah, that's a really good one, bro!

Mary: It could require high-quality ingredients.  
[*No one responds again.*]

Michael: How about a board game room? That'll be easy to do.

David: Yes! That would be really great! Although, that would need a huge space.

James: Yes, I was picturing a huge space.

Mary: OK. Do we want to add anything on to that grab and go idea? Do we want to expand it?

Mary: What would we sell? Premade sandwiches? Or would that be too much? Too many resources and staff? Or would it just be like that? Things you could find in the grocery store.

David: I think, having two or three staff would be fine: two of them are making the food and the third one would be the one, putting it in the fridge and dealing with payment, something like that. And, yeah, I think that easy meals like sandwiches or Mac and cheese can be pretty good.

Michael: Yeah, fast, you know, easy meals to go, small staff.

Mary: Um...  
[*Mary tries to continue to speak with a thoughtful face but is interrupted once more.*]

David: [*Interrupting Mary*] I'm thinking about ready-made meals you can get in the superstore. Remember when you to the store and you see the fridge near the entrance and you see a bunch of stuff you can grab and like, have for lunch? That's what I thought about the "grab and go"

Michael: Yeah, I like the idea of selling premade the sandwiches.

David: It's a good thing to kind of pace ourselves off.

Mary: Alright. Noted.

Michael: OK, good. So, I think we have arrived at the solution.

David: Now, do you think it's better to have one place in one part of the campus, or small places spread throughout? Like, for example - having a few different grab-and-go locations near different study rooms for instance or something like that, I don't know.

James: I'd say probably have one for now. Just because you know, it'd important to see if the idea is successful.



Michael: Yeah, I agree with only one location to start with.

David: Alright, start simple before you expand and go too crazy, yeah.

Michael: That's good. Yeah. But you know, that's an idea for later. That's a good point.

[*Pause in the group*]

Mary: I feel like a restaurant also has a lot more space than a little kiosk, so I don't know. We have a lot of extra space. We could do something else with it.

Michael: Well, you can convert extra space to study space as I said earlier.

James: I'd say that's good because it did specifically say it's like on a university campus.

David: So, it's good to focus on things that might help students. So, a grab-and-go, with fresh food from a local market and then close to study places! [*assertive smile*]

Michael: Yeah, you got it man!

David: We could discuss this further, as we don't have all the fine details right now.

Michael: I think it's good.

James: Yes, I agree.

Mary: [*nods without saying anything*]

#### TEXT SCRIPT

The following conversation is a series of messages in a chatroom, such as WhatsApp. We see the conversation from Mary's WhatsApp perspective.

David: Hey guys

Michael: What do you think we should do about the problem?

David: I wrote down a few ideas.

David: It might be a problem with how much they're paying their staff, or it could be that the prices are too high

David: We need to change either the quality of the food or the prices

David: Because people would be willing to pay little for bad food or a bit more for better food

David: But we can't do both

Michael: Are we thinking of a fast food or cheap food alternative?

David: Sure, like whichever option we think is better. Keep the prices low or upgrade the food.

Michael: I think we should keep track of these ideas so that we don't have to keep scrolling up and down.

Michael: Who wants to take notes? [*pause*], hey, Mary, can you take notes?

Mary: [*typing in the chatbox, delete and then write*] Yes, I can.

Mary: OK, If we go for fast food, a grab-and-go place could work

Mary: As you don't have to worry about management as much as you would in a restaurant.

Michael: Grab-and-go places can be pricey or cheap and poor quality

David: How about fridges with food-to-go?

David: That eliminates the management problem and only requires a few employees

James: That makes sense

Michael: That's a great idea, David!

Mary: How about study spaces,

Mary: Some way to incorporate that?

David: To incorporate study spaces in, are we still going with like the food idea or what?

Mary: I think so, study spaces and grab-and-go, as I said earlier.

Michael: Study spaces? 😊

David: What she's talking about a coffee lounge kind of thing where people can grab food, study, or sit.

Michael: Oh, that's doable.

James: So, the idea is a study area with a café involved.

James: like we said a small grab-and-go business, right?

Michael: Yeah, like a late-night study area café

James: Yeah.

David: We could have rules in place, like not being too loud

Michael: Yeah, café/study. That's a good one.

Michael: ...It's a good idea but kind of hard.

Mary: It's possible, like a bookstore or stationary store.

Mary: or pharmacy type

Michael: That's interesting. You could do it in a grocery store.

James: A pharmacy? lol

Mary: No, like snacks and toothbrushes, stuff like that.

Michael: What Mary meant is like a convenience store.

James: Oh, now it makes sense! [*Click "Thumb button" on Michael's previous message*]

David: It's interesting, almost like a student-only grocery store.

David: It's kind of like the pharmacy, or a student-only grocery store.

David: I like that idea. Are we still working with study spaces?

Michael: We've gone as far as we can with that idea, and it makes sense. Don't you think?

Mary: Yeah.

James: How about a farmer's market kind of thing run by students?

James: like the local serving restaurant at the student union building

James: Instead of a study space, there could be a kiosk.

David: I like the student-centered idea.

Michael: Yeah, like local food.

David: Yes, it'll be like students selling to other students, excellent.

Michael: Yeah, it could be that too.

Mary: [*typing "interesting, but" and David's text prompts*]

David: I think the student-center idea lowers the chances of mismanagement

*[Mary deletes the text typed]*

Michael: Yes, and it goes well with the grab-and-go where customers can grab food from a fridge and go pay for it.

James: Yeah

David: In that way you don't need many staff.

David: Less people could probably increase the quality of management.

David: Less people to handle.

James: Hey David, you're really talking like a businessman today! Way to go dude!

*[Everyone except Mary Click "Thumb button" on James' preceding message]*

Michael: Yes, the "grab and go" idea is really simple and easy to manage, so there shouldn't be many problems with it.

James: Yes, it's a lot easier to manage, it shouldn't be too many problems with it.

Michael: Yeah, I feel good about that.

Michael: Mary, can you write that down for us before we forget? 😊

Michael: We should think of something not food too, since we need lots of solutions.

James: A bookstore could be a good idea

Michael: Yea there is not a lot of physical bookstores in downtown

James: That could work

James: Yeah, that sounds really good!

David: Yeah, I doubt the university have any bookstores right now

*[Everyone except Mary Click "Thumb button" on James' preceding message]*

Michael: Maybe it could also turn into like a bar at night to maximize the space

James: That'd be awesome

David: Yeah, I really like your idea of night club

Mary: *[Typed "We could..." and deleted]* How about a bookstore and a game room?

Mary: And later at night, a bar?

*[No one responds.]*

Michael: Another idea could be a smoothie store

Michael: would be busy I feel

David: I think smoothie would be good, like the business in the other Campus

James: Yeah, that's a really good one, bro!

Mary: It could require high-quality ingredients

*[No one responds again.]*

Michael: A board game room is easy to do

David: Yes! That would be really great. Although that would need a bigger space.

James: Yes, I was picturing a huge space

Mary: *[Roll up to check historical messages]* OK. Do we want to add anything on to that grab and go idea? Do we want to expand it? What would we sell? Premade sandwiches?

Mary: Or would that be too much? Too many resources and staff? Or would it just be like things

you could find in the grocery store?

David: I think having 2-3 staff members should be fine. Two can make the food and the third can handle the fridge and payments. Simple meals like sandwiches or mac and cheese would work well.

Michael: Yeah, fast and easy meals with a small staff.

Mary: [*Typing "Yeah,"*, but got interrupted by David's message again and delete the text]

David: I was thinking about the ready-made meals you can find at the supermarket.

David: When you go to the store and there's a fridge near the entrance with a bunch of things you can grab for lunch? That's what I thought about with the "grab and go".

Michael: Yeah, like pre-made sandwiches.

David: It's good to start off slow and see if the idea works.

Mary: Yes. Noted.

Michael: Alright, I think we have a solution.

David: Now, should we one place in one part of the campus, or small places spread throughout?

David: For example, having a few different grab-and-go locations near different study rooms for instance or something like that.

James: I'd say probably have one for now. Just because you know, it'd important to see if the idea is successful.

Michael: I agree with James, it's important to start with one location first.

David: Alright, start simple before you expand and go too crazy, yeah.

Michael: But David, that's an idea for later. That's a good point.

Mary: [*Roll up to check historical messages*] I think a restaurant would have more space than a kiosk, and we have extra space on the campus.

Mary: We could use it for something else.

Michael: Well, you can convert extra space to study space as I said earlier.

James: That's a good idea, since it's on a university campus.

David: We should focus on things that will help the students, like a grab-and-go with fresh food from a local market near study spaces! 😊

Michael: Yeah, that's a great idea man!

David: We can discuss the details further, since we don't have everything figured out yet.

Michael: Yeah, I think that's good.

James: I agree.

Mary: Yeah