Feeling Seen: Leader Eye Gaze Promotes Psychological Safety, Participation, and Voice

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Abstract

Psychological safety is a hallmark of effective team functioning. Although prior work shows that characteristics of the leader influence employee judgments of psychological safety (and subsequent decisions to speak up), we know very little about "the specific behaviors leaders employ to lead employees to assess an interaction as safe to speak" (Morrison, 2011). In this paper, we shift scholarly focus from gestalt evaluations of leader traits to focus instead on moment-to-moment leader behavior. We examine how a specific nonverbal behavior—eye gaze, especially eye gaze received from a leader—affects group members' feelings of psychological safety and subsequent participation and voice decisions. In two lab studies of face-to-face group interactions (*N*=482) and one study of computer-simulated group conversation (*N*=547), receiving more eye gaze predicted more participation and voice (correlationally and causally), and this relationship was mediated by increased feelings of psychological safety and decreased feelings of ostracism. These relationships were moderated by individual characteristics of group members, such that the effects of eye gaze were stronger for racial minorities and more introverted individuals. When people feel seen, they feel safer and more welcome to share their ideas, and are more likely to do so.

Keywords: eye gaze; psychological safety; voice; participation; nonverbal behavior; verbal behavior; ostracism; conversation; groups

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Can leaders create a context where employees feel safe to voice their views? Prior work in organizational behavior suggests the answer is yes. But *how*? Though an extensive body of work has highlighted the benefits of employee participation (Woolley et al., 2010) and voice, a specific type of participation that challenges the status quo and seeks to improve it (Edmondson, 2003; Grant & Ashford, 2008; Morrison, 2011; Van Dyne & LePine, 1998; Barry & Stewart, 1997; Hyatt & Ruddy, 1997; Mesmer-Magnus & Dechurch, 2009; Detert, Burris, Harrison & Martin, 2013), and the important role that leaders play in establishing the psychological safety required to encourage voice behavior (Edmondson, 1999; Nembhard & Edmondson, 2006), relatively few studies have examined the behavioral underpinnings that leaders use to establish a workplace environment that employees perceive as safe to speak up (Coutifaris & Grant, 2021).

The benefits of psychological safety are well established: when employees believe they can take risks without being punished, they participate more often, especially with challenging or dissenting views that are likely to improve their groups and organizations (e.g. Edmonson, 1999; Detert & Burris 2007; Sherf, Parke & Isaakyan, 2021; Frazier, Fainshmidt, Klinger, Pezeshkan, Vracheva, 2017). And the fact that leaders play a key role in establishing the context for psychological safety to both flourish and flounder is similarly well delineated (Edmondson, 1999; Nembhard & Edmondson, 2006). In particular, prior work suggests that some leader traits are associated with more psychological safety (e.g., authentic leadership; Hsiung, 2012, leader openness; Detert & Burris, 2007, moral leadership; Chan, 2014, leader trust and empowering leadership; Gao, Janssen, & Shi, 2011) while other leader traits are associated with less psychological safety (e.g., authoritarian leadership; Chan et al., 2013, low managerial self-efficacy beliefs; Fast, Burris, & Bartel, 2013). However, prior work has relied on gestalt

judgments, often made by employees, about who leaders *are* (i.e., stable and observable leader traits), not by what leaders *do* (i.e., choices and behaviors)—often revealing confounded or tautological links between leader traits, leader and employee behaviors, and outcomes (Sitkin & van Knippenberg 2013). For instance, it is perhaps unsurprising to find that leaders seen by employees as open to feedback are also rated by those same employees as establishing a psychologically safe environment (Detert & Burris, 2007). This leaves us to ask: What exactly can leaders *do* to foster psychological safety? Are there identifiable causal links between leader behaviors and team psychological safety? And can other leaders learn to enact those behaviors?

In this paper, we investigate the link between a discrete behavior—eye gaze, especially eye gaze received from the leader of a group—and psychological safety. While shared gaze marks the natural rise and fall of shared attention in dyadic conversation (Wohltjen & Wheatley, 2021), eye gaze may be particularly influential in group interactions, where more people must share airtime, with less airtime available for verbal contributions per person on average, compared to dyadic interactions (Cooney et al., 2020).

While coordinating speaking time and conversational turn-taking is difficult, nonverbal cues may allow group members to exchange valuable information more continuously and coordinate turn-taking more inclusively during group interaction. Moreover, while the content of a leader's verbal communication is important, nonverbal cues can be quite influential, sometimes more so than verbal content (Hall, Bernieri, & Carney, 2005). Leader nonverbal behaviors can be particularly influential, with recent evidence that leader nonverbal behavior affects perceptions of social hierarchy in a group (Shim et al., 2020) as well as team members' speaking time (Locke & Anderson, 2015). We focus on eye gaze because it is one of the most important forms of nonverbal behavior—both in terms of pervasiveness (people must decide where to look at all

times), and because it signals respect, attention, and focus (Frischen, Bayliss, & Tipper, 2007; Conty, George, & Hietanen, 2016).

In the current work, we explore whether receiving eye gaze, especially from leaders, increases psychological safety and decreases feelings of ostracism, which in turn, may influence employee voice and participation. Our methodological approach follows an emerging emphasis on analyzing people's discrete behaviors (captured in unfolding interaction data such as transcripts and/or video recordings) *alongside* their individual characteristics (captured in survey data; Bhatia & Gallus, 2020; Li, Berger & Packard, 2020; Brown et al., 2020; Hart et al., 2021; Huang et al., 2017; Mastroianni et al., 2021; Sun & Slepian, 2020; Swaab et al., 2021; Truong et al., 2020; Voigt et al., 2017; Yeomans & Brooks, forthcoming; Yeomans et al., 2021). This approach allows us to capture the interplay between (and disentangle the unique contributions of) a discrete behavior, leader eye gaze, and person-level traits (e.g. employee introversion, power, race) on psychological safety, ostracism, and voice.

Eye Gaze

Together with smiling, close physical distance, direct orientation, and hand gesticulation, eye gaze belongs to a group of nonverbal behaviors that connote "immediacy" (Prisbell, 1985). Direct gaze from others activates the ventral striatum, a brain region associated with reward processing (Kampe, Frith, Dolan, & Frith, 2001), where the reward, in this case, is interpersonal: interest and attention from one's interaction partner (Conty, George, & Hietanen, 2016; Jarick & Kingstone, 2015; Khalid, Deska, & Hugenberg, 2016; Frischen, Bayliss, & Tipper, 2007; Wohltjen & Wheatley, 2021).

Humans pay significant attention to where other people are looking, spending a disproportionate amount of time visually fixating on the eyes of others in photographs compared

to other face and body parts (Birmingham, Bischof, & Kingstone, 2008). The amount spent gazing at the eyes of others increased as the number of people in the photo increased, when photos were more social in content (i.e. group conversations as opposed to sitting in a waiting room), demonstrating that eye gaze takes on increased importance in group conversations (Birmingham, Bischof, & Kingstone, 2008). Fixation on others' gaze starts from a young age. Infants begin to monitor and follow the direction of adults' visual attention around three months of age (Frischen, Bayliss, & Tipper, 2007), and research on "gaze cueing" suggests that people learn early on to detect stimuli that are placed in line with where a cartoon face is "looking" faster and more readily than stimuli placed away from where the face is "looking" (Friesen & Kingstone, 1998).

In the context of conversation, emerging research shows that eye gaze tracks the rise and fall of shared attention during dyadic conversation. When people pay attention to each other, their pupils dilate. Prior to eye contact, pupillary synchrony increases, reaches a peak as eye contact begins, then quickly declines while mutual gaze is maintained, only beginning to recover again once eye contact is broken (Wohltjen & Wheatley, 2021). This work suggests that eye gaze signals when dyads are on the same page, leading to a sense of reciprocal engagement and attention. This sense of engagement also spurs dyads to find cognitive space to think and contribute their own thoughts.

Importantly, group conversation is a categorically different task than dyadic interaction because group interaction des not demand continuous, reciprocally sustained engagement (Cooney et al., 2020). Group members can remain relatively (or completely) silent, and the conversation can carry on. In this way, group members may be able to contribute to the group

interaction in meaningful ways, even while they aren't speaking, by using nonverbal cues like eye gaze.

Eye gaze not only signals the gazer's attention and grabs the perceiver's attention: it also signals positive evaluation. Watching where others direct their eye gaze imbues the target of their gaze with more positivity and value (Bayliss, Paul, Cannon, & Tipper, 2006; Corneille, Mauduit, Holland, & Strick, 2009), and eye gaze functions as a signal of respect, approval, receptiveness, and recognition toward a receiver. Those who receive it tend to feel valued, accepted, and safe (Friedman, 1967). Even receiving brief eye contact from a passerby can increase feelings of connectedness (Wesselmann et al., 2012), and receiving eye contact from another person increases the perceived value of the relationship, compared to observing the same person's averted gaze (Wirth et al., 2010). Thus, eye gaze gives attention, spurring the engagement and expectation that another person will pick up the conversation, and provides a visible signal of positive evaluation for what is about to be said. Taken together, we expect that receiving more gaze during group conversation increases feelings of psychological safety:

Hypothesis 1a: Receiving more eye gaze will increase psychological safety.

On the other hand, *not* receiving gaze inhibits the inclusion of individuals in conversation, partitioning the conversation into participants who are included and those who are not (Stivers, 2021; Valsesia et al., 2021). Averted eye gaze is the most frequently used nonverbal cue to enact ostracism (Wirth et al., 2010). Compared to the safe, inclusive feelings associated with receiving gaze, averted gaze conveys a negative interpersonal evaluation—receiving less gaze reduces self-efficacy and decreases feelings of social connection with an interaction partner (Wirth et al., 2010), even among strangers (Wesselmann et al., 2012).

An extensive body of research shows that ostracism—feeling excluded or ignored by individuals or groups—is a powerful interpersonal emotion, which threatens people's sense of belonging, control, self-esteem, and meaning, and harms their ability to make sound decisions (Jones & Kelly, 2010; Williams, 2009). Even minimal forms of exclusion can lead to negative psychological consequences. For example, in the popular Cyberball paradigm, used in over 200 published papers with over 19,500 participants, group members can be made to feel ostracized if they are not passed a pretend ball after an initial phase of being included in a simulated game of catch (Hartgerink, Van Beest, Wicherts, & Williams, 2015). The emotional anguish associated with feeling ignored, even within the Cyberball paradigm, is similar to physical pain (Riva, Worth, & Williams, 2011), and the same neural mechanisms underlie the experience of physical pain and social pain (Lieberman & Eisenberger, 2005). The pain of ostracism can be triggered by minimal cues, such as when people feel "out of the loop" during conversation (e.g. when they are on the outside of inside talk, or under-informed about a topic of shared knowledge among others in the group; Iannone, Kelly, & Williams, 2018). Thus, we predict that receiving gaze during a group conversation will decrease feelings of ostracism:

Hypothesis 1b: Receiving more eye gaze will decrease feelings of ostracism.

Receiving Gaze from a Leader

While we expect that receiving increased gaze from any group member leads to increased psychological safety and decreased ostracism, receiving eye contact from a leader may be especially impactful. First, people attend more to leaders and their behaviors than other group members. Leaders hold a romanticized influence over organizations, teams, and individual employees (Meindl, Ehrlich & Dukerich, 1985). A long history of research in social psychology has documented how low-power individuals pay more attention than individuals with high power

to social information and to others in social settings (Keltner, Gruenfeld & Anderson, 2003; Galinsky et al., 2006). Conversationalists and third-party observers alike gaze at high-status individuals more frequently and for longer durations of time compared to low-status individuals (Foulsham, Cheng, Tracy, Henrich, & Kingstone, 2010; MacDonald & Tatler, 2013), and, in particular, people pay more attention to the eye gaze of high-status group members compared to low-status group members (Dalmaso, Pavan, Castelli, & Galfano, 2012).

According to evolutionary scientists, monitoring and following the eye gaze of high-status group members is an adaptive process—paying attention to high-status members brings survival advantages (e.g., Van Vugt, Hogan, & Kaiser, 2008). This finding extends to primates; macaque monkeys follow the gaze of high-status monkeys more than the gaze of low-status monkeys (Shepherd, Deaner, & Platt, 2006). Indeed, one of the primary functions of nonverbal behaviors is that they reveal information about a person's personality, intentions, and attitudes (Ambady, Bernieri, & Richeson, 2000). Goffman (1959) noted that we are constantly "giving off signals" via nonverbal behavior that are interpreted by those around us (either accurately or inaccurately) as expressive of our underlying attributes. In workplace settings, where leaders have a large influence over followers' experiences and outcomes, it makes sense that followers attend to leader nonverbal communications to determine appropriate behaviors to display and the extent to which they contribute divergent ideas (Bonaccio et al., 2016).

The effects of eye gaze may therefore be amplified when coming from leaders. As eye gaze signals attention, respect, and an expectation of a valued contribution, leaders' eye gaze should be especially powerful in conveying those signals. When leader gaze distribution is more balanced, team members perceive their team as more democratic, egalitarian, and fair— perceptions associated with higher workplace satisfaction and feelings of authenticity (Koch et

al., 2010). For example, eye tracking goggles reveal that, in classrooms, expert teachers are more egalitarian in their gaze distribution compared to novice teachers (Cortina et al., 2015), and receiving teacher gaze is associated with positive teacher evaluations from students (McCroskey, Richmond, Sallinen, Fayer, & Barraclough, 1995). Recent work suggests that leaders who increased their eye gaze towards racial minorities reduced collective perceptions of status disparities in the group, leading to better group performance in collective decision-making tasks (Shim, Livingston, Phillips, & Lam, 2020). This work also suggests that leaders are able to intentionally direct their gaze, and doing so can change group dynamics. Taken together, because people pay particular attention to the gaze of high-power individuals, we expect that one's role in the group will moderate the relationship between eye gaze and psychological safety and ostracism, such that gaze received from a leader will have a stronger effect on feelings of psychological safety and ostracism..

Hypothesis 2: The effects of eye gaze on psychological safety and ostracism will be stronger when received from a leader (compared to a non-leader).

Receiving Gaze While Speaking Versus Silent

Eye gaze conveys attention, respect, and an expectation of contribution (Friedman, 1967; Mauduit, Holland, & Strick, 2009; Wirth et al., 2010). During conversations, it is normative to look at someone more or less continuously while he or she is speaking (Cook, 1977), and experimental evidence shows that, descriptively, people most often look at the person who is currently speaking (Foulsham, Cheng, Tracy, Henrich, & Kingstone, 2010; Müller, Zhang, Huang, & Bulling, 2018).

According to expectancy violation theory, humans employ expectations to frame their interactions, and when these expectations are violated, because someone acts in a manner that

deviates from typical behavior, we pay special attention to the violating behavior (Burgoon & Jones, 1976; Burgoon & Hale, 1988). Because being gazed at while someone *else* is speaking is counter-normative, we expect that receiving gaze when silent enhances the effect of gaze on psychological safety and ostracism:

Hypothesis 3: The effects of eye gaze will be stronger when received while not speaking (compared to gaze received while speaking).

Psychological Safety, Ostracism, and Speaking Up

We suspect that the attention, respect, and value that eye gaze conveys (Bayliss, Paul, Cannon, & Tipper, 2006; Corneille, Mauduit, Holland, & Strick, 2009; Friedman, 1967) not only leads to feelings of connectedness and psychological safety (Wesselmann et al., 2012) but may also impact the behavioral responses of those who receive it. When people feel as though others are paying attention to them and value what they have to say, they are more likely to participate in the group discussion (Liang & Yeh, 2019). A hallmark of classic theories like expectation states theory (Balkwell, 1991) and status characteristics theory (Berger, Cohen & Zelditch, 1972) rest on the assumption that people come to understand the expectations that other group members have for them, which then influences the extent to which they participate in the group's discussion. Nonverbal signals like eye gaze likely send signals that will influence subsequent participation in the group's discussion (Ridgeway, Berger, & Smith, 1985). We expect that eye gaze, especially from a leader, will invite more individuals to share their ideas.

Compared to verbal triggers such as cold calls ("What's on your mind?"), eye gaze may be especially effective in making people feel welcome to participate if and when they are ready to speak (Li & Tian, 2016; Gkorezis,Panagiotou, & Theodorou, 2016; Twenge et al., 2007; Wu et al., 2019). Further, because employee voice is a specific type of communication that is not only

improvement-oriented but also challenging in nature (Van Dyne & LePine, 1998), employees are likely attuned to such nonverbal signals to determine whether their challenging voice is welcome. If leaders send signals that convey less receptiveness to an individual or that the relationship is not strong, employees tend to withhold their voice (Burris, Detert & Chiaburu, 2008).

There is a strong and well-documented link between psychological safety and speaking up (Detert & Burris, 2007). Many studies, spanning a wide range of contexts, have found that psychological safety often mediates the relationship between antecedent variables and speaking up (e.g., Ashford et al. 1998, Miceli & Near 1992, Walumbwa & Schaubroeck, 2009). As such, we expect receiving eye gaze to not only lead to increased feelings of psychological safety, but also to influence subsequent behavior such as participation and voice.

Hypothesis 4a: Receiving more eye gaze will lead to increased participation and voice.

Hypothesis 4b: The relationship between eye gaze and participation and voice will be mediated by increased psychological safety and decreased feelings of ostracism.

Group Member Traits as Moderators

We expect that the effects of eye gaze on psychological safety, ostracism, and speaking up will be moderated by certain employee characteristics, given that individual characteristics interact with situational factors (such as gaze received) to contribute to the likelihood of employees engaging in proactive behavior, such as speaking up in the workplace (Grant & Ashford). We investigate two employee characteristics that could disrupt employees' propensity to perceive signals of attention, respect, and an expectation for contribution to the group's conversation: race, a demographic cue of power (Talaifar et al, 2021; Berger & Zelditch, 1985;

Ridgeway & Walker, 1995), and employee introversion (Tuovinen, Xin Tang, & Salmela-Aro, 2020; Williams, 2009).

Prior work suggests that non-majority employees face a greater pressure to remain silent in the workplace (Morrison & Milliken, 2000) and are less inclined to speak up at work compared to majority members (Harrison, Harrison, & Shaffer, 2019). Even when they do participate, their attempts to speak up are recognized less by managers (Howell, Harrison, Burris, & Detert, 2015). As a result, compared to racial majority members, racial minorities are highly attuned to social cues such as eye gaze, especially from leaders (Shim, Livingston & Phillips, 2020). In contrast, majority members are likely to feel more psychologically safe and speak up more overall, although their ideas may be less creative because their perspective is shared by many (Harrison, Harrison, & Shaffer, 2019). High status group members and racial majority members may be less sensitive to the social context when decided whether to participate and/or voice their views, making the impact of eye gaze on psychological safety and voice less pronounced. Taken together, the effect of eye gaze may be stronger for minority group members.

Similarly, because introverts are already less inclined to participate in groups (Rashidi, Yamini, & Shafiei, 2017), they may be more sensitive to the eye gaze of other team members, including leaders. Introverts are more sensitive to signals that others are socially engaged with them; when introverts perceive others are engaging with and including them, they feel better in social interactions (compared to introverts who do not perceive that others are engaging with them), an effect that is less pronounced for extraverts, who are more vocal overall, and less sensitive to engagement from others (Tuovinen, Xin Tang, & Salmela-Aro, 2020). Compared to introverts, extraverts also feel less ostracized after being told that no other participants in an experiment wanted to work with them, because they require less social validation in social

interactions (Williams, 2009). Extraverts tend to feel more psychologically safe and hence participate and engage in voice more frequently overall (LePine & Van Dyne, 2001), irrespective of the level of eye gaze they receive. Thus the effect of eye gaze may be stronger for introverts than extraverts.

Hypothesis 5a: The relationship between receiving eye gaze on psychological safety, ostracism, and speaking up will be stronger for racial minorities (compared to those in the racial majority).

Hypothesis 5b: The relationship between receiving eye gaze on psychological safety, ostracism, and speaking up will be stronger for introverts (compared to extroverts).

We depict our full theoretical model (and all hypothesized relationships therein) in Figure 1.

Overview

Across three studies, we explore the relationships between eye gaze, psychological safety, ostracism, and speaking up (participation and voice). In Study 1, we examine eye gaze and speaking up on a turn-by-turn basis in unconstrained face-to-face group meetings between participants. In Study 2, we manipulated eye gaze by training an experimenter to direct high or low levels of eye gaze toward each participant during group conversations. In Study 3, we varied the amount of gaze participants received in a computer-simulated conversation that allowed us to control verbal content across experimental conditions. Data, analysis code, stimuli, and preregistrations for all studies are available on OSF: https://osf.io/4bx3k/.

Study 1: Eye Gaze in Live Conversations

In Study 1, we observed all variables of interest during unconstrained group conversations between participants in groups of three. We captured their eye gaze, participation (airtime), and voice behaviors (via post-hoc content coding) at every turn of the conversation, as

well as self-reported survey measures of psychological safety and ostracism after their conversations had ended.

Method

Participants. We recruited 75 groups of three people to participate in live conversations in a behavioral lab (*N*= 225). One group encountered a technical issue with their video, leaving 74 triads (*N*= 222) for analysis (70% female, M_{age}= 23.6, SD= 6.27). These 74 triads produced a total of 7,304 conversational turns (M = 98.7 turns per conversation, SD = 44.1).

Design. Participants consented to participate in a three-person, face-to-face group meeting in a behavioral lab. At the beginning of the session, one participant in each group was assigned to be the group leader, who would be in charge of recording the group's final decision on a hidden profile (asymmetric information) hiring task. Each participant received clues about three different job candidates, some of which were shared with other members and some of which were unique. The hidden profile task was structured such that Candidate A was objectively more qualified than the other two candidates (more positive and less negative points compared to Candidates B and C), but Candidate A's clues were dispersed across group members, such that participants could only discover that Candidate A was the superior candidate if they shared their asymmetric information with the group and it became common knowledge.

Measures

Psychological Safety. After they had recorded their ratings of the hypothetical job candidates, participants answered survey questions independently, including a psychological safety scale adapted from Edmonson (1999). This scale had seven items including: "It is safe to take a risk on this team" (responses ranging from 1= *strongly disagree* to 7 = *strongly agree*). All items are included in Appendix B.

Participation. Because the meetings were video recorded and transcribed, we created a measure of individual participation by aggregating the total number of seconds that each participant spoke during the conversation (airtime), relative to the total duration of the conversation (proportion of total airtime).

Eye Gaze. After the study had ended, we hired independent raters to watch the videos and code eye gaze at every conversational turn. Two research assistants coded the 15-minute videos of each conversation, reading alongside the transcripts. They coded the eye gaze of all three participants at each conversational turn (each row of the transcript). Their options for coding gaze were: "At Person A", "At Person B", "At Person C", "Down at their sheet", and "Away." Coding was cross-checked, and when the two assessments disagreed, the raters returned to the video to reconcile. We created a measure of *gaze received* for each participant by summing the total number of turns in which they received gaze from another participant. A sample coding guide is included in Appendix B.

Voice. The raters also provided subjective ratings of voice. The raters coded for voice whenever a participant challenged the other members in the group, or contributed information and opinions that were counter to what was being discussed by the rest of the group. See sample coding guide in Appendix B.

Results

All variables were scaled and zero-centered prior to analysis.

Main Effects. In a linear regression, receiving more eye gaze significantly predicted self-reported ratings of psychological safety ($b= .29$, $t= 4.40$, $p<.001$) (supporting Hypothesis 1A), participation ($b= .84$, $t= 22.98$, $p<.001$), and voice ($b= .61$, $t= 11.34$, $p<.001$), (supporting

Hypothesis 4A). The results are summarized in Table 1, which reports linear and mixed-effects models controlling for group.

Although we operationalized participation by focusing on proportion of total time spoken, two other potential measures of airtime, total word count and total seconds spoken, were highly correlated with the proportion of time spoken (rs > .71, ps <.001). Word count and total seconds spoken were also significantly predicted by eye gaze (bs> .60, ps <.001).

Leader Gaze. To test Hypothesis 2, we examined whether *who* you receive gaze from (i.e. whether you receive gaze from the leader or from another team member) predicts psychological safety, participation, and voice. For these analyses, we considered team members only, not leaders (reducing our sample size from 222 to 148). We ran a regression with the total gaze received, the proportion of gaze received by the leader, and the interaction between the two as predictor variables, and found a significant interaction between leader gaze and total gaze in predicting psychological safety (b = .016, t = 2.06, p = .040).

To decompose these effects, we ran regression models including two gaze types as simultaneous predictor variables: gaze received from leaders and gaze received from team members. We found that receiving gaze from a leader significantly predicted psychological safety (b= .020, t=2.18, p = .030), while receiving gaze from a non-leader did not predict psychological safety (p = .36).

In another regression with participation as an outcome variable, and the total gaze received, the proportion of gaze received by the leader, and the interaction between the two as predictor variables, we also found a significant interaction between leader gaze and total gaze in predicting participation (b = .014, t = 3.44, p < .001). Decomposing this interaction in a regression with gaze received from leaders and gaze received from team members as simultaneous predictor

variables showed that receiving gaze from a leader significantly predicted participation (b= .042, t=8.70, p < .001), while receiving gaze from a non-leader also significantly predicted participation, but to a lesser extent (b= .018, t=7.51, p < .001).

Lastly, there was no significant interaction between the total gaze received and the proportion of gaze received by the leader on voice, however, in a regression with gaze received from leaders and gaze received from team members as simultaneous predictor variables, receiving gaze from a leader significantly predicted voice, (b= .050, t=7.05, p < .001), while receiving gaze from a non-leader did not (p = .19).

This pattern of results supports Hypothesis 2 that the effect of eye gaze is stronger when it comes from leaders compared to non-leaders. See Table 2 for a summary of these results.

Receiving gaze while speaking vs. silent. To test Hypothesis 3, we ran regressions with receiving gaze while speaking and receiving gaze while silent as predictors, and psychological safety, participation, and voice as outcome variables. We found only receiving gaze while silent predicted psychological safety. Both receiving gaze while silent and receiving gaze while speaking predicted participation, although the coefficient for receiving gaze while silent was almost twice as large. However, for voice as an outcome variable, we found that being gazed at while silent did not predict voice, while receiving gaze while speaking predicted voice (see Table 3 for results). The first two results support Hypothesis 3—the effects of eye gaze on psychological safety and participation were stronger when the gaze recipient was silent versus while they were speaking. However, we find that for voice, the pattern reverses. Overall, this pattern suggests that receiving gaze while silent can encourage psychological safety and speaking up at all, but being gazed at while you are speaking may encourage you to voice a more challenging view or idea.

Moderation by Race. Our sample included 10 participants who identified as African American or Black, 33 who identified as Multiracial, and 18 who identified as Hispanic/ Latino(a). We created a "racial minority" group ($N= 61$) by combining these three groups and tested whether race moderated the effect of gaze on psychological safety. In a mixed effects model controlling for group that predicted the psychological safety as an outcome variable, and eye gaze, racial group membership (minority vs. non-minority), and the interaction between eye gaze and racial group membership as predictors, there was a marginal main effect for gaze ($b = .17$, $p = .06$) and a significant interaction term, ($b= .31$, $p = .007$). Decomposing the interaction showed a significant effect of eye gaze on psychological safety for racial minorities ($b = .25$, $p = .028$), and a significant but smaller effect for non-minority participants ($b = .19$, $p = .041$). This provides support for Hypothesis 5a: that the effects of gaze on psychological safety are stronger for racial minorities compared to non-racial minority participants.

Mediation. We tested whether psychological safety mediated the effect of leader gaze on participation and voice. In a bootstrap mediation model (10,000 iterations) with team members as participants, eye gaze as the independent variable, ratings of psychological safety as the mediator variable, and participation or voice as the outcome variable, a significant indirect effect emerged for psychological safety as a mediator on participation (*indirect effect* = .07, 95% CI [.001, .017], $p =.020$), and a marginal indirect effect emerged for psychological safety as a mediator on voice (*indirect effect* = .001, 95% CI [.00, .02], $p =.12$).[1]

Moderated Mediation. Four hypothesized moderated mediation models were tested, with leader eye gaze as a moderator on participation and voice, and participant racial group as a moderator on participation and voice.

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[1] Mediation analyses produced the same pattern of results when we used leader eye gaze as the independent variable. We include those analyses in Appendix B.

For the first model, total gaze received was the predictor variable, with leader eye gaze as the moderator (on path a), psychological safety as the mediator, and participation as the outcome variable (Hayes, 2012). Leader eye gaze was found to significantly moderate the effect of total eye gaze on psychological safety (b = .016, t = 2.06, p = .040), and psychological safety was found to significantly predict participation (b = .61, t = 10.54, p < .001). However the overall moderated mediation model was not supported with the index of moderated mediation = b=-.010, [-.023, .00]), p = .23. A second model was tested with the same variables except with voice as the outcome variable. Leader eye gaze was found to significantly moderate the effect of total eye gaze on psychological safety (b = .016, t = 2.06, p = .040), and psychological safety was found to significantly predict voice (b = .61, t = 11.34, p < .001). However the overall moderated mediation model not supported with the index of moderated mediation = .004 (95% CI = .04; -.004), p = .42

Turning to racial group as a moderator, a model was tested with total gaze received was the predictor variable, racial group of the participant as the moderator (on path a), psychological safety as the mediator, and participation as the outcome variable (Hayes, 2012). Racial group significantly moderates the effect of total eye gaze on psychological safety (b = .01, t = 2.05, p = .042), and psychological significantly predicts participation (b = .61, t = 10.54, p < .001). However the overall moderated mediation model was marginal, b=-.010, [-.023, .00]), p = .057. Lastly, a model was tested with the same variables except with voice as the outcome variable (Hayes, 2012). Racial group significantly moderates the effect of total eye gaze on psychological safety and psychological significantly predicts voice (b = .61, t = 11.34, p < .001). However the overall moderated mediation model not supported with the index of moderated mediation = -.003 (95% CI = .03; -.00), p = .43.

Supplemental Analysis. Lastly, we ran a lagged analyses to explore the direction of the relationship between receiving gaze and participation, following methods from recent research using live transcript data (e.g. Martin et al., 2021; Voigt et al., 2017).

The sequential nature of turn-by-turn transcript measures of eye gaze and participation allowed us to explore the (potential) causal direction of the relationship between gaze and participation. That is, we evaluated gaze received and participation in the first half of the conversation (T1) versus the second half of the conversation (T2). We ran a regression with gaze received in T1 as a predictor, speaking time in T1 as a control, and speaking time in T2 as an outcome variable, and found that gaze received in T1 significantly predicts speaking in T2 (b $=.15, p <.001$), demonstrating that receiving more gaze in the beginning of the conversation predicts speaking later in the conversation.

We ran another model with speaking time in T1 as a predictor, gaze received in T1 as a control, and gaze received in T2 as an outcome variable, and found that speaking time in T1 does *not* predict gaze received in T2 ($p = .48$), demonstrating that speaking time does not predict receiving gaze later (see Appendix B for full results). Taken together, these lagged analyses provide suggestive evidence that eye gaze may influence speaking time later in the conversation, but not vice versa.

Discussion

In Study 1, we analyzed annotated transcript data alongside self-reported survey data from unconstrained face-to-face group conversations. Receiving more eye gaze predicted psychological safety, participation, and voice[2]. These relationships were moderated by characteristics of the eye gaze giver (whether s/he was the group leader or not), the eye gaze

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[2] We replicated the main effect in a separate sample of dyads, which we include in the Appendix A. In dyads, like groups, those who receive more gaze are more likely to speak.

recipient (whether s/he was in the racial minority or majority), and timing (receiving gaze while silent or while speaking). We found that receiving eye gaze was particularly empowering from group leaders, for minority group members, and when the gaze recipient wasn't speaking.

Though this study was observational, the sequential, unfolding nature of conversation data allowed preliminary analyses to explore causality. A repeated measures analysis provided strong but suggestive evidence that gaze may influence subsequent participation, and not the other way around. Gaze received in the first half of the conversation predicted participation in the second half of the conversation, while participation in the first half of the conversation did not predict receiving gaze in the second half of the conversation, suggesting that receiving eye gaze may *induce* feelings of psychological safety, leading to participation and voice—causal effects we explore experimentally in Studies 2 and 3.

Study 2: Manipulating Eye Gaze in Conversations

In Study 2, we manipulated leader eye gaze during live Zoom meetings, to examine the causal relationship between eye gaze and psychological safety, ostracism, participation, and voice. We explicitly test Hypothesis 2, which focuses on ostracism, and Hypothesis 5, which focuses on introversion as a potential moderator.

We recruited groups of four people, comprised of three participants and one confederate trained to deliver continuous or averted gaze while a specific group member was speaking. Though the results of Study 1 suggest that eye gaze may be particularly impactful for psychological safety when the gaze recipient isn't speaking, on Zoom, everyone makes near-continuous eye contact while they gaze at their cameras. Thus, it was only possible to distinguish who the target of direct or averted gaze was while a specific group member was speaking. This is both a limitation of eye gaze during virtual interaction, but also offers a conservative test of our

hypothesis that receiving more gaze increases speaking up, as continuous or averted gaze while speaking may be less impactful than gaze received while silent.

Method

We preregistered all hypotheses and analyses (https://aspredicted.org/blind.php?x=ep44hc).

Participants. We aimed to recruit 80 groups (each comprised of 3 participants and one confederate) to participate in live Zoom conversations in exchange for a $13 gift card, with 40 groups per experimental condition. A total of 87 groups (*N*= 260 people) completed the meeting, the post-conversation survey, and were included in our analysis (65% female, 2% non-binary, 33% male, average age= 29.47, SD= 12.31).[34]

Our analyses focus on a specific group member—the participant assigned to the role of "Delivery Manager"—for whom leader eye gaze from the confederate was either continuous (high-gaze) or averted (low-gaze) while they spoke. A total of 87 participants were assigned to the Delivery Manager role (62% female, average age= 30.68, SD= 13.91).

Participants were recruited via the SONA email listserv from two Behavioral Labs, the online platform Prolific, and other Slack channels and listservs.

Design and Procedure. Participants agreed to complete a conversation study about interpersonal relationships. We told them that they would have a short conversation on Zoom, which would be audio and video recorded, and that they would answer survey questions afterwards.

They were assigned to role play a group decision-making task as employees of a retail store, discussing different delivery strategies and reaching an agreement by the end of the

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[3] One participant did not complete their post-meeting survey, and was not included in our analysis, however we included the other two participants in their group in our analysis.

[4] Three groups were not video-recorded due to a technical issue, so for these three groups we have all self-report (survey) measures, but they are not included in our analysis of transcript measures.

conversation. We randomly assigned participants to one of three roles: Delivery Manager, Retail Manager, and Warehouse Manager (See Appendix C for full participant instructions). The trained confederate always assumed the role of the group leader, Chief Operations Officer. Importantly, three participants, including the confederate, were assigned to advocate for the same delivery strategy (Large Block Order strategy), while the participant assigned to the role of Delivery Manager was required to advocate for a different, opposing strategy (Just-In-Time strategy), positioning the Delivery Manager as an oppositional, dissenting party. The participant assigned to the Delivery Manager role was also the target participant for the gaze manipulation.

Groups were assigned to one of two between-subjects conditions: a *high-gaze condition*, and a *low-gaze condition.* In the high-gaze condition, the confederate was trained to maintain continuous gaze with the target participant (the Delivery Manager). In the low-gaze condition, the confederate was trained to avert their gaze whenever target participant was contributing to the conversation. Specifically, whenever the target participant began speaking, the confederate was instructed to avert their gaze from the camera by either looking elsewhere on their screen, at their phone, or moving their head away from the camera. Thus the target participant was the recipient of the gaze manipulation and is the focus of our analyses.

Measures

Psychological Safety. We measured psychological safety using the same seven-item scale as in Study 1 adapted from Edmonson (1999). Our measure yielded a Cronbach's alpha of .67. We include all survey measures in our Appendix C.

Ostracism. We adapted Gerber et al.'s (2017) measure of ostracism, comprised of seven items, such as "During this conversation I felt poorly accepted by the other people I had a

conversation with." and "During this conversation I felt good about myself." (1) *Strongly*

Disagree to (7) *Strongly Agree*. Our measure yielded a Cronbach's alpha of .86.

      Voice. In contrast to content-rated voice behavior in Study 1, here we measured voice

using four self-reported items, adapted from Van Dyne and LePine (1998), including "During

this conversation I felt I was able to express my views and feelings with the other people in the

conversation" and "During this conversation, I suggested new ideas which were beneficial to the

team." (1) *Strongly Disagree* to (7) *Strongly Agree*. Our measure yielded a Cronbach's alpha of

.87.

      Participation. As in Study 1, we created a measure of participation (airtime) for each

participant by aggregating the total number of seconds that each participant spoke during the

conversation (airtime), relative to the total duration of the conversation (proportion of total

airtime).

      Introversion/ Extraversion. We measured introversion and extraversion using four items

adapted from the Multidimensional Introversion-Extraversion Scale (MIES scale, Open

Psychometrics). This measure included items such as "I don't mind being the center of

attention." and "I don't like to draw attention to myself" (R). Response categories ranged from

(1) *Strongly Disagree* to (7) *Strongly Agree*. Responses below the scale mean indicated that a

participant was more introverted, while responses above the mean indicated the participant was

more extraverted. Our measure yielded a Cronbach's alpha of .70.

<center>**Results**</center>

      Psychological Safety. Analyzing the behavior of the target participant (the Delivery

Manager), we found support for Hypothesis 1A: Target participants in the high-gaze condition

felt more psychologically safe ($M = 4.81$, $SD = 1.10$) compared to participants in the low-gaze condition ($M = 4.30$, $SD = 1.03$), $t(85) = 2.23$, $p = .028$, $d = .48$.

Ostracism. We found evidence for our Hypothesis 1B: Target participants in the high-gaze condition indicated that they felt less ostracized ($M = 2.92$, $SD = 1.07$) compared to participants in the low-gaze condition, who felt more ostracized ($M = 3.50$, $SD = 1.48$), $t(85) = -2.03$, $p = .045$, $d = -.44$.

Participation. We found evidence for Hypothesis 4A: Target participants in the high-gaze condition participated more ($M = 0.25$, $SD = .96$) compared to participants in the low-gaze condition ($M = -0.23$, $SD = 1.00$), $t(82) = 2.23$, $p = .028$, $d = .49$.[5]

Voice (Self-report). Providing further evidence for Hypothesis 4a, we found that target participants who received less gaze felt less able to voice, as indicated in the post-conversation survey. Target participants in the high-gaze condition indicated that they felt marginally more able to voice ($M = 5.19$, $SD = 1.10$) compared to participants in the low-gaze condition ($M = 4.77$, $SD = 1.03$), $t(85) = 1.52$, $p = .13$, $d = .34$.

Mediation. We tested whether ostracism or psychological safety mediated the effect of condition on participation (transcript measure) and voice (survey measure) among target participants. In a bootstrap mediation model (10,000 iterations) that included condition as the independent variable, self-reported measures of ostracism and psychological safety as mediators, and self-rated ability to voice as a dependent variable, a marginal indirect effect emerged for ostracism (*indirect effect* = -.31, 95% CI [-.0024, -.75], $p = .066$) and psychological safety (*indirect effect* = .46, 95% CI [.04, .99], $p = .035$) as mediators of condition on voice. Thus we found support for both Hypothesis 4b. In a bootstrap mediation model (10,000 iterations) that

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[5] Three groups were not video-recorded due to technical issues, so ultimately 84 target participants were included in our speaking time analysis (as opposed to 87 target participants included in our analysis of survey measures).

included condition as the independent variable, self-reported measures of ostracism and psychological safety as mediators, and participation as a dependent variable, no significant indirect effects emerged for ostracism ($p = .78$) or for psychological safety ($p = .81$).

Moderation. To test Hypothesis 5b, that the effect of gaze on psychological safety is stronger for introverts compared to extraverts, we ran a regression analysis that predicted psychological safety, with condition (high- vs. low-gaze), extraversion, and the interaction between condition and extraversion as predictors. We found a marginal main effect for condition on psychological safety ($b = 1.78$, $t = 1.55$, $p = .12$), a main effect for extraversion ($b = .38$, $t = 2.00$, $p = .048$), and a marginally significant interaction term, $b = -.44$, $t = -1.49$, $p = .14$. To decompose this interaction, we used a median split to separate participants into two groups of more introverted and more extraverted participants. In a t-test, we found that for more introverted target participants, participants in the low gaze condition felt directionally more psychologically safe ($M = 3.48$, $SD =1.73$) compared to participants in the high gaze conditions ($M = 4.12$, $SD =1.83$), $t(42)= -1.14$, $p = .26$, whereas for more extraverted participants there was smaller difference in ratings of psychological safety between participants in the low gaze ($M = 4.29$, $SD =1.59$) versus high gaze conditions ($M = 4.04$, $SD = 1.65$), $t(43)= .50$, $p = .62$. This shows that gaze is particularly effective at increasing feelings of psychological safety for more introverted individuals (See Figure 4).

We ran the same regression model with ostracism as the dependent variable. We found a marginally significant interaction term, $b = .37$, $t = 1.70$, $p = .09$, such that for more introverted target participants, there was a significant difference between ratings of ostracism among participants in the low gaze ($M = 3.87$, $SD =1.61$) and high gaze conditions ($M = 2.82$, $SD =1.10$), $t(42)= 2.32$, $p = .26$, whereas for more extraverted participants' there was a non-

significant difference between ratings of ostracism among participants in the low gaze ($M = 3.05$, $SD =1.14$) versus high gaze conditions ($M = 2.98$, $SD = 1.09$), $t(43)= .22$, $p = .83$ (See Figure 4).

As an exploratory analysis, we also examined whether introversion/extraversion interacted with eye gaze condition to affect our dependent measures of participation and voice. We ran a regression that predicted participation (total amount of speaking time per person divided by total duration of the conversation) as the dependent measure, with condition (high- vs. low-gaze), extraversion, and the interaction between condition and extraversion as predictors. We found a statistically significant interaction term, $b = -.37$, $t = 2.24$, $p = .028$. Decomposing the interaction revealed for more introverted participants, participants in the high gaze condition spoke significantly more ($M = .48$, $SD =.78$) compared to participants in the low gaze conditions ($M = -.64$, $SD =.90$), $t(42)= 4.05$, $p < .001$, while for more extraverted participants, there was no difference in participation between high gaze ($M = .10$, $SD =1.07$) versus low gaze conditions ($M = .25$, $SD = .87$), $t(43)= -.51$, $p = .61$.

With self-reported voice as the dependent variable, we found a marginally significant interaction term, $b = -.39$, $t = 1.78$, $p = .078$. Decomposing the interaction revealed for more introverted participants, participants in the high gaze condition rated themselves as marginally more able to voice ($M = 5.21$, $SD =1.34$) compared to participants in the low gaze conditions ($M = 4.49$, $SD = 1.49$), $t(42)= 1.59$, $p = .12$, while for more extraverted participants, there was no difference in ratings of ability to voice between high gaze ($M = 5.10$, $SD =.92$) versus low gaze conditions ($M = 4.99$, $SD = 1.28$), $t(43)= .33$, $p = .74$.

Discussion

Study 2 demonstrates a causal relationship between receiving eye gaze, participation, and voice, mediated by psychological safety. It also demonstrates that the extent to which the gaze

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recipient is extroverted moderates the effect of eye gaze, such that the effects of eye gaze on psychological safety, ostracism, participation, and voice were stronger for introverted individuals compared to extraverted individuals, indicating that introverted individuals may benefit more from receiving increased eye gaze in conversations.

Importantly, this study has a number of limitations. First, gaze was only manipulated for the target participant in each group, limiting our sample size ($N = 87$). Although we found evidence that psychological safety and ostracism mediated self-reported voice, we found only directional evidence of a mediation on participation (i.e. airtime measured from the transcript), likely due to limited sample size. Secondly, both an asset and drawback of Studies 1 and 2 were that they allowed for naturalistic, open-ended conversation, but, aside from coding for voice behavior in Study 1, these studies did not account for the verbal content of the conversation—the meaning of what was said by participants. In combination with non-verbal cues (e.g. eye gaze), there may have been many aspects of verbal content that influenced participants' assessments of psychological safety, ostracism, and speaking up. The fact that we see effects in these uncontrolled, open-ended contexts signal the powerful impact of gaze. Nevertheless, in Study 3, we isolate the effects of gaze in a more controlled environment where many confounding variables (e.g. verbal, prosodic, and most nonverbal content) is stripped away.

Study 3: Computer-Mediated Gaze Experiment

In Study 3, we developed a computer-mediated simulated conversation environment, enabling us to experimentally control the content of a conversation and isolate the impact of eye gaze on psychological safety, ostracism, and voice. Inspired by Cyberball, a popular paradigm in psychology in which participants throw a virtual ball to each other, and participants who are purposefully excluded (by obtaining fewer ball tosses than the other players) feel ostracized

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(Williams, Cheung, & Choi, 2000; for a meta-analysis, see Hartgerink, Van Beest, Wicherts, & Williams, 2015), in our Gaze Paradigm participants received more or less gaze during a group "conversation." Instead of holding a ball or actually speaking, participants watch an animated text bubble appear above their avatar when it is their turn to "speak," and the gaze of all participants is indicated by yellow "vision fields" originating from other participants' avatars. See Figure 5 for screenshots.[6]

Method

We preregistered our hypotheses and analyses (https://aspredicted.org/blind.php?x=e3hr8c).

Participants. We aimed to recruit 600 participants from Amazon Mechanical Turk, with 200 participants per condition. In total, 613 people took our survey. We pre-registered exclusions: anyone who expressed suspicion about the gaze paradigm game (i.e., people who correctly suspected that the other 3 players were computers, and not really other participants playing with them). After excluding these participants, 547 participants were included in our analysis (49% female, average age= 32.2, SD= 10.89).

Design and Procedure. Participants were recruited to participate in a conversation game with three other participants (groups of 4).

Participants were given instructions that this was a 3-part study: they would play two rounds of a conversation game, and then they would return to a survey and answer questions independently. The game instructions were: "This game will be a conversation. Here are the main rules of the game: 1) During this conversation, only one person can speak at a time (no

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[6] Our Gaze Paradigm is online, open-source, and freely available for use by researchers. We have created a variety of features that are not used in the current paper, but may be of interest to other researchers, including varying the group size, gender, race, and power of the group members, or customizing who looks where and who speaks when. To customize the paradigm researchers can visit this link: http://gazeparadigm.com/Start.html, where they can either choose one of the three preset conditions that we use in this paper (high-gaze, medium-gaze, and low-gaze), or design their own iteration. After customization they will receive a code, which they can give to participants along with the link to begin the paradigm: http://gazeparadigm.com/Streets3/index.html.

words will be exchanged, but speaking will be represented by animated speech bubbles), 2) The other players' eye gaze (where they are looking) is indicated by the yellow triangles next to their avatars, 3) Whenever you speak, you will select who gets to speak next by gazing at that person."

The conversation was made realistic by keeping participants in a waiting room while they were ostensibly "paired" with other participants. In reality, the other three players in the group enacted a pre-programmed set of decisions (40 conversational turns total) to create a simulated group conversation.

There were three experimental conditions, mirroring the Cyberball paradigm in which the participants fully participate in the ball-throwing game initially and are subsequently are excluded (Williams, Cheung, & Choi, 2000). In the *high-gaze condition*, participants received an equal share of others' eye gaze during the conversation (25% of gaze time). They were gazed at as much as the other three group members. In the *medium-gaze condition*, participants received equitable gaze for the first 20 turns (first half of the conversation). During the second 20 turns (second half of the game), the conversation proceeded with the other three players gazing at each other and "speaking" to each other, without gazing at or including the participant. Finally, in the *low-gaze condition*, participants received equitable gaze for the first 10 turns, to ensure that they understood the game and the rules. They were subsequently excluded from the game for the remaining 30 turns.

Measures. After the first conversation finished, as a behavioral measure of interpersonal preference, we asked participants whether they wanted to complete the second round with their same group, or switch to a new group: "You will now move on to Round 2 of the game. Would you like to play with the same three people again, or would you like to be matched with a new group? (Same group/ Switch groups)." Finally, participants completed post-conversation survey

measures for psychological safety, ostracism, and voice independently. We used the same measures as in Studies 1 & 2 (See Appendix B for items).

Results

Psychological Safety. A one-way analysis of variance (ANOVA) revealed a main effect of eye gaze on psychological safety, $F (2, 362) = 43.45$, $p < .001$, $\eta^2 = .13$. In line with our pre-registered hypotheses, participants in the high-gaze condition felt significantly more psychologically safe than participants in the medium-gaze condition, who in turn felt significantly more psychologically safe than participants in the low-gaze condition (t's > 3.98, p's < 0.001, d's $> .51$).

Ostracism. A one-way analysis of variance (ANOVA) showed a main effect of experimental condition on ostracism, $F (2, 358) = 77.31$, $p < .001$, $\eta^2 = .21$. In line with our pre-registered hypotheses, participants in the high-gaze condition reported lower levels of ostracism compared to participants in the medium-gaze condition, who in turn had lower levels of ostracism compared to participants in the low-gaze condition (t's < -5.02, p's $< .001$, d's $< -.51$).

Voice. A one-way analysis of variance (ANOVA) showed a main effect of experimental condition on voice, $F (2, 362) = 20.10$, $p < .001$, $\eta^2 = .07$. Participants in the high-gaze condition felt marginally more able to voice compared to participants in the medium-gaze condition ($M = 4.86$, $SD = 1.34$), $t(362) = 1.52$, $p = .12$, $d = .16$, and significantly more able to voice compared to participants in the low-gaze condition ($M = 4.20$, $SD = 1.34$), $t(364) = 6.16$, $p < .001$, $d = -.64$. As we also predicted, participants in the medium-gaze condition felt more able to voice compared to participants in the low-gaze condition, $t(362) = 4.66$, $p < .001$, $d = .49$. See Figure 6.

Behavioral Choice: Stay or Switch Groups. More participants in the high-gaze condition chose to stay in the same group for round two (74%), compared to participants in the medium-gaze condition (69%) and participants in the low-gaze condition (56%), $X^2(2, 547) = 14.42$, $p < 0.001$. Note that although "stay" was the default option, almost half of participants in the excluded group opted out (i.e. chose to move to a different group).

Mediation. We tested whether ostracism or psychological safety significantly mediated the effect of condition on voice. In a bootstrap mediation model (10,000 iterations) that included gaze condition as the independent variable, self-reported measures of ostracism and psychological safety as mediators, and self-rated ability to voice as a dependent variable, a significant indirect effect emerged for both ostracism (*indirect effect* = -.36, 95% CI [.21, .52], *p* < .001) and psychological safety (*indirect effect* = .35, 95% CI [.20, .50], *p* < .001) as mediators of condition on voice.

Discussion

In Study 3, we developed a computer-mediated conversation paradigm to experimentally test the effects of eye gaze in a simulated conversation, controlling for many aspects of conversational content—there was no verbal (words) or prosodic (acoustic) content, and very little nonverbal content (only eye gaze). Our findings replicate findings from Studies 1-2 that receiving more eye gaze decreases feelings of ostracism, increases psychological safety, and increases the likelihood of voice. And, behaviorally, receiving less gaze caused participants to switch groups at the end of the conversation.

Importantly, we suspect that this was a conservative test of the effects of eye gaze on conversational dynamics. Because the conversations were simulated, conversation partners were represented as avatars, and no actual words were exchanged. It is notable that minimal social

exclusion in the form of receiving less gaze in a computer game with simulated strangers led to feelings of ostracism, decreased psychological safety, and less participation.

General Discussion

Psychological safety is an important ingredient for effective group functioning, especially in creating environments where employees can freely speak up and voice challenging ideas (Edmondson, 1999; Detert & Burris, 2007). While the importance of psychological safety is rarely questioned, the conventional advice for leaders largely focuses on creating general impressions (e.g., be more open, more transformational), with little attention paid to the behavioral underpinnings that lead followers to form those impressions. Our studies focused on a specific, non-verbal behavior that signals attention, respect, and expectations of valued contributions, thereby increasing psychological safety: eye gaze. Results across three studies with multiple methodologies, multiple measurement strategies, and different participant populations show consistent effects: receiving more eye gaze, especially from leaders (compared to non-leaders), and especially at moments when the recipient is not speaking, predicts lower ostracism, higher psychological safety, triggers participation, and more voice.

Importantly, we identify two moderators that suggest that increasing visual attention may empower speaking up more for those who need it most. In Study 1, we find that the race of the gaze recipient moderates the effect of gaze on psychological safety, such that the effect of gaze on perceived safety may be stronger for racial minorities compared to non-racial minorities, an effect that corroborates recent work on eye gaze and perceptions of racial equity (Shim & Livingston, 2021). In Study 2, we also found that gaze recipient extraversion moderates the effect of gaze on speaking time, and voice, psychological safety, such that the effect of gaze on these outcomes was stronger for introverted individuals. Taken together, these results suggest

that increasing gaze towards introverted people and racial minorities may be particularly effective in empowering them to feel more psychologically safe, and to speak more, especially with dissenting or challenging views.

Lastly, across all studies, we used several methodological features to establish causality. In Study 1, our turn-by-turn analysis revealed that receiving gaze in the first half of the conversation predicted participation later in the conversation, but not vice versa. In Studies 2 and 3, our experimental designs suggest a consistent pattern of causal effects. These findings point to the importance of changing seemingly small gestures and can speak to the power of even brief, shared, knowing glances on fundamental team dynamics.

Contributions to Theory

This work makes several fundamental contributions. First, this work identifies eye gaze as an important behavioral strategy for leaders to establish psychological safety. Although the outcomes for teams with high levels of psychological safety is well established (Edmonson, 1999; Baer & Frese, 2003; Nembhard & Edmondson, 2006), relatively few studies have examined how employees and teams come to view a context as psychologically safe in the first place (a recent exception is Coutifaris & Grant, 2021). We offer a new theoretical perspective that explains the specific drivers of psychological safety and subsequent participation and voice behaviors in teams. Rather than focus on what leaders can say to compellingly create a culture of safety (Coutifaris & Grant, 2021), we outline how non-verbal behaviors, irrespective of what is said, can signal the attention, respect, and value that drives feelings of safety and associated behavioral outcomes.

Second, this research shifts scholarly focus from overall gestalt judgments of leader traits associated with psychological safety and speaking up to the moment-to-moment behaviors that

cause employees to assess a climate as safe to speak up. Past literature has focused on what types of leadership styles lead to psychologically safe environments, i.e., authentic leadership (Hsiung, 2012); leader openness (Detert & Burris, 2007); moral leadership (Chan et al., 2013); and empowering leadership (Gao, Janssen, & Shi, 2011). However, rather than focus on who leaders *are*, we offer a new theoretical perspective by demonstrating what leaders *do* in terms of nonverbal behaviors to signal that an environment is safe, insights that can only emerge by examining turn-level conversation data, which allows for more granularity and precision compared to trait-level evaluations.

Third, we find that the effects of eye gaze were moderated by important features of the group members, building on the literature of how personality factors interact with situational factors (i.e., Ten Berge & De Raad, 2001; 2002; Parrigon, Woo, Tay, & Wang, 2017). Specifically we demonstrate that receiving eye gaze was particularly empowering for introverted group members and racial minorities, suggesting that eye gaze may be most empowering for those who need empowerment the most. Past theory shows that people with lower self-esteem are more responsive to situational factors that increase voice (LePine & Van Dyne, 1998). Our studies explain a new set of individual characteristics that lead to increased sensitivity to situational factors which are not accounted for in prior theory: racial minorities and more introverted people are more responsive to increased eye gaze, advancing the literature on person-situation interactions.

Lastly, we demonstrate a fundamental link between how the nonverbal behaviors of one conversation participant can affect the verbal conversational behavior of another, which has not been well established in prior work. One notable exception is Locke & Anderson (2015), which shows that people participated less in a discussion when they interacted with a powerful

individual who exhibited nonverbal signals of confidence, demonstrating a link between nonverbal and verbal behaviors of group members. We contribute to this emerging research by adding two new variables not accounted for in prior theorizing: how a pervasive nonverbal cue (eye gaze) of a group leader influences verbal choices (when to speak) of other group members.

Limitations and Avenues for Future Research

Our work has limitations that may offer fruitful avenues for future research. First, although we compared eye gaze versus no eye gaze, there is a question of where the leader is looking, if not at the participant. For instance, in Study 2, the confederate was instructed to be obvious about their averted gaze in the low-gaze condition, looking down at their phone or off the screen when the target person was speaking. Is there a difference if an individual's attention is averted toward something else (e.g., a phone), looking away as in deep thought, or towards another person? Research shows that the negative effects of someone averting their gaze and looking at a mobile phone are pronounced (Nakamura, 2013; 2015), which suggests that averted gaze may be particularly pernicious when attention is averted towards a mobile device or a computer (a cue that does not correlate strongly with actual listening, Collins et al., working).

Further, especially during online meetings, feigning interest is a common phenomenon. Future research could examine the object of attentional gaze, whether others are able to tell whether interest is feigned, and how feigned versus sincere attention affects psychological safety and ostracism in online versus face to face settings. Emerging research shows that people cannot easily discern between feigned and genuine attention from others, suggesting that merely feigning attention may be enough to lead others to feel included in online settings (Collins et al., working).

Second, future work could look into eye gaze, psychological safety, and speaking up in more naturalistic settings with real work teams who have worked together and who know each other, as group familiarity could alter the effects that we observed. Literature on group familiarity suggests that groups who know each other well are more productive (Goodman & Leyden, 1991) and more likely to share information (Gruenfeld, Mannix, Williams, & Neale, 1996). Newer acquaintances may be particularly attuned to subtle cues of trustworthiness or safety, like eye gaze. Though our experiments suggest that leader eye gaze offers a highly practical tool for increasing group engagement and participation, more data is needed to understand how implementable this intervention may be for individuals who are tasked with leading meetings with established groups.

Third, we found in Study 1 that receiving gaze while you are not speaking is more empowering than receiving gaze while you are speaking (which may be more expected). As group conversations and meetings increase in size, each individual spends less time speaking, on average, and there are many options of behaviors that each person can enact to facilitate the conversation without disrupting the flow of the conversation. These run the gamut from nonverbal cues like eye gaze, nodding, and smiling, to prosodic cues like laughing and back-channeling (saying "uh-huh"), to verbal cues, such as acknowledging and summarizing what somebody has just said (i.e., paraphrasing or demonstrating conversational uptake, Demszky et al., 2021). Backchannels in particular function as a signal of engagement and attention in a conversation without adding conversational content (Rich, Ponsler, Holroyd, & Sidner, 2010), and may thus perform a similar role. More research is needed to understand if and how other verbal, nonverbal, and prosodic cues can convey attention and respect, such as nodding, smiling, and back-channeling.

Relatedly, because giving direct eye contact to another person is impossible in online settings, further research could examine other ways to convey attention, respect, and care online. Conversational behaviors that are possible online include sending a private chat message to someone, sending emojis, displaying exaggerated facial expressions, or nodding while someone is speaking. Emerging research shows that people who receive emojis feel more confident after the conversation (Fadhil et al., 2018) indicating that emojis, like actual eye gaze, may also signal attention and care.

Practical Implications

Our findings are of high practical relevance. Our research calls on leaders to modulate their attentional gaze during the course of group discussions. Devoting visual attention to each group member, especially low status team members who may feel "invisible," can pay dividends, even if the leader isn't speaking. We demonstrate that merely making a conscious effort to make eye contact with employees who are silent in meetings empowers employees to feel more psychologically safe, and to participate and voice their ideas.

Our research also has important implications for remote teams. Our second study showed that receiving gaze of the group leader (a confederate) during a Zoom meeting made participants feel more psychologically safe and less ostracized, and led to them speaking more. Although people are not able to tell which individual face each person is looking at in a Zoom meeting, our study demonstrated that people can tell if someone is paying attention while people are speaking, or if they are looking at their phone or something off-screen. Visual attention (or the lack thereof) conveys attention and respect (or the lack thereof), whether in-person or online.

Our findings suggest that eye gaze may empower those who are least likely to speak up in the workplace: eye gaze was more effective for introverts (compared to extraverts) and racial

minorities (compared to non-racial minorities). Introverts are less likely to speak up in the workplace, and introversion strongly predicts having anxiety speaking up (Rashidi, Yamini, & Shafiei, 2017). Similarly, racial minorities are also less likely to speak up at work, and feel greater pressure to remain silent in the workplace (Morrison & Milliken, 2003). It is not enough to have an organization that *looks* diverse; "capitalizing on pluralism requires creating systems that enable employees to voice" (Morrison & Milliken, 2003)—organizations should make efforts to learn from diverse perspectives. Many organizations are therefore likely missing out on important ideas from introverted and/or racial minority employees, a problem that may be improved with subtle shifts in leader gaze patterns.

Conclusion

Although the benefits of increased psychological safety and speaking up in the workplace are well-documented, relatively little research has examined how to increase psychological safety. The studies in this paper show that simply changing patterns of visual attention—a cost-free, time-neutral nonverbal cue—can convey attention, dignity, and care, increase feelings of psychological safety and decrease feelings of ostracism, and lead to more voice and participation. In order for employees to feel seen and empowered, leaders should make sure to look at them.

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Figure 1. This figure depicts our theoretical model and all hypothesized relationships therein.
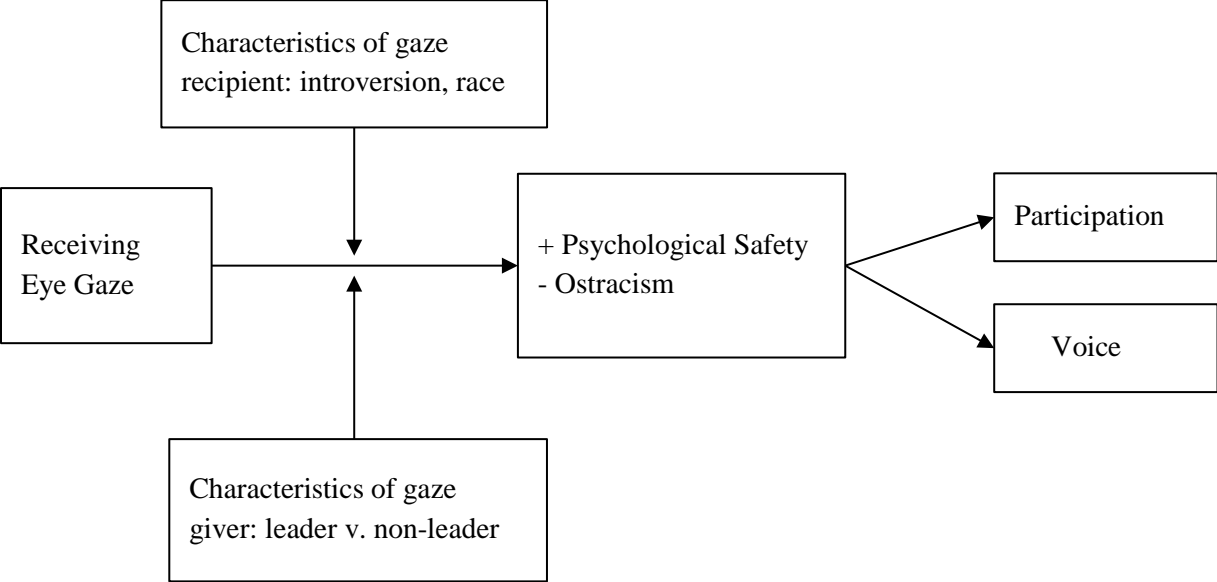
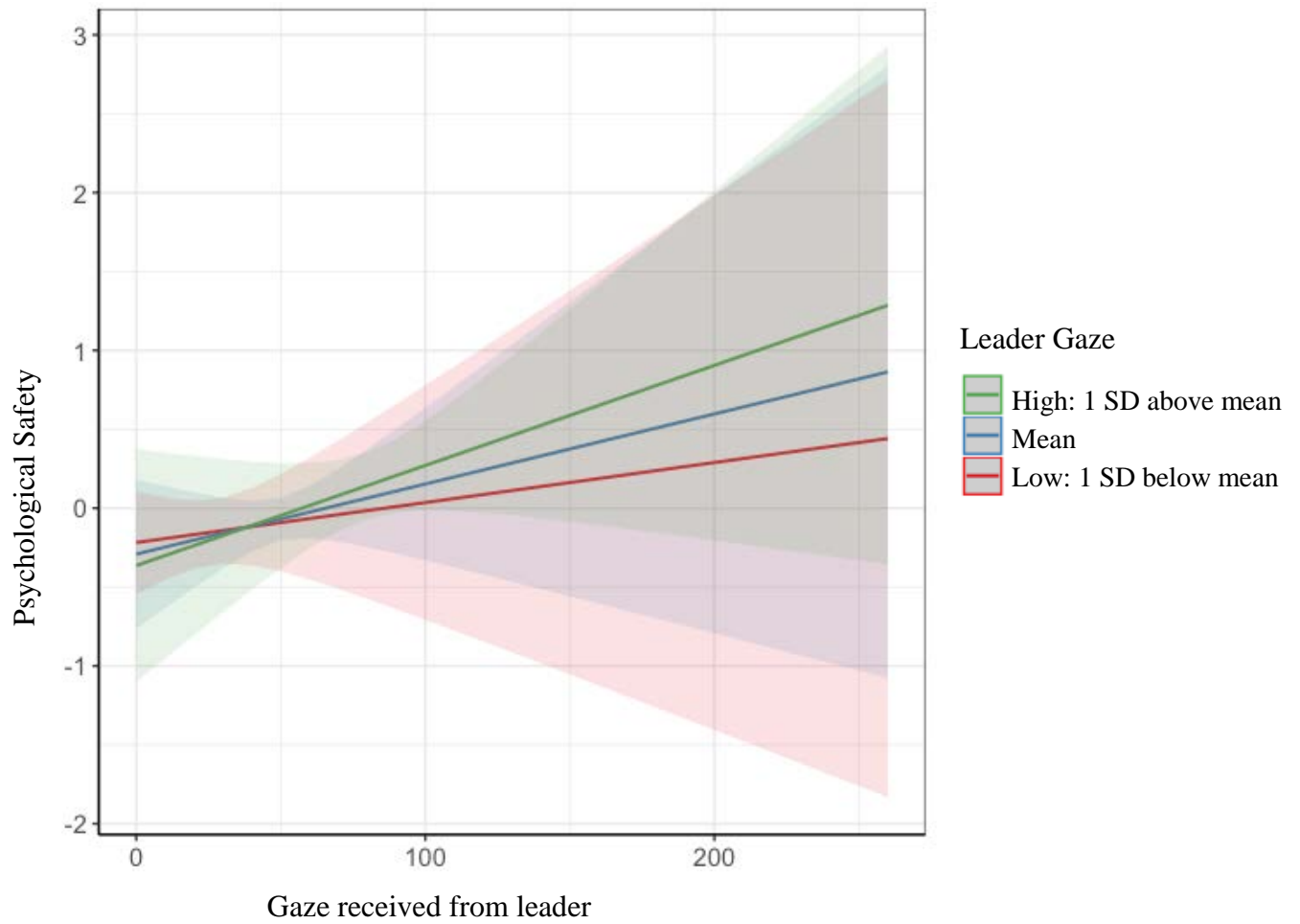**Figure 2.** The effect of leader gaze received on psychological safety (Study 1).

Figure 3. Race moderates the effect of total gaze received on psychological safety (Study 1).
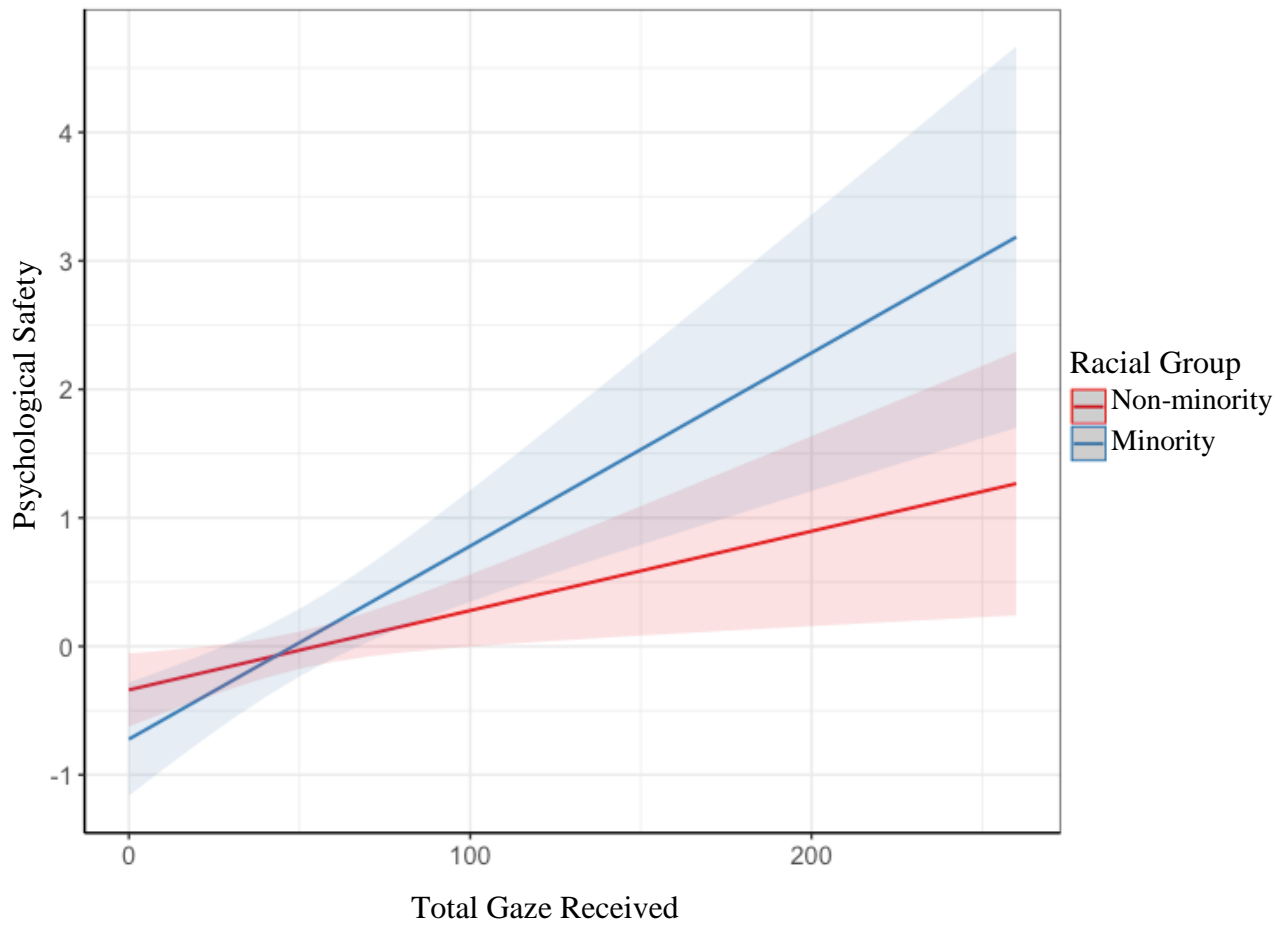
Figure 4. The moderating effect of Extraversion on Psychological Safety, Participation, Ostracism, and Voice. In the High Gaze condition, differences in the experiences and behaviors of low, average, and highly extroverted individuals were attenuated (Study 2).
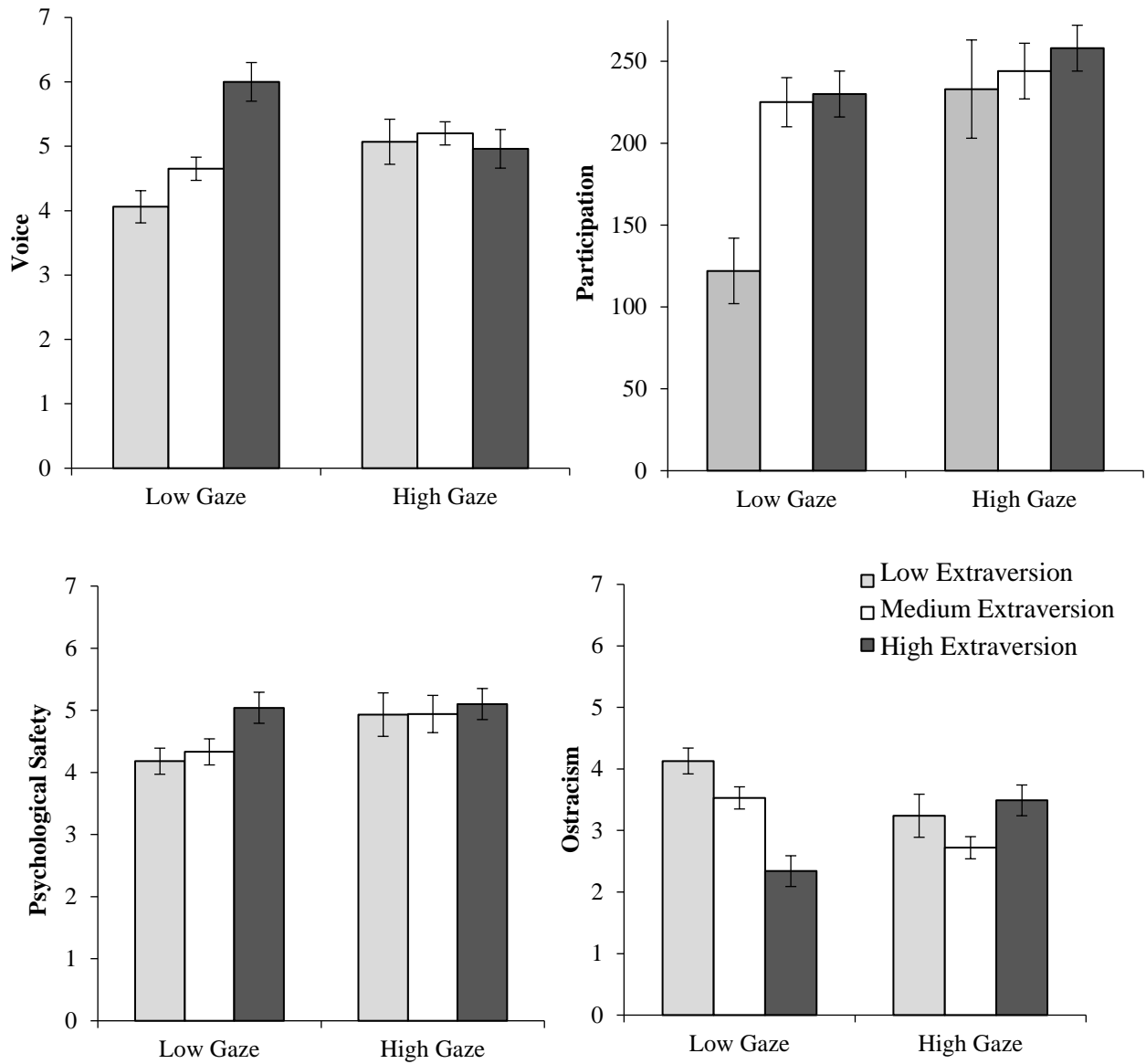
Figure 5. This figure shows 1) Gaze Paradigm pre-conversation instructions, and 2) an example of an in-progress conversation using the Gaze Paradigm (Study 3). See link to customize the paradigm and generate a code: http://gazeparadigm.com/Start.html and link to begin the paradigm: http://gazeparadigm.com/Streets3/index.html.
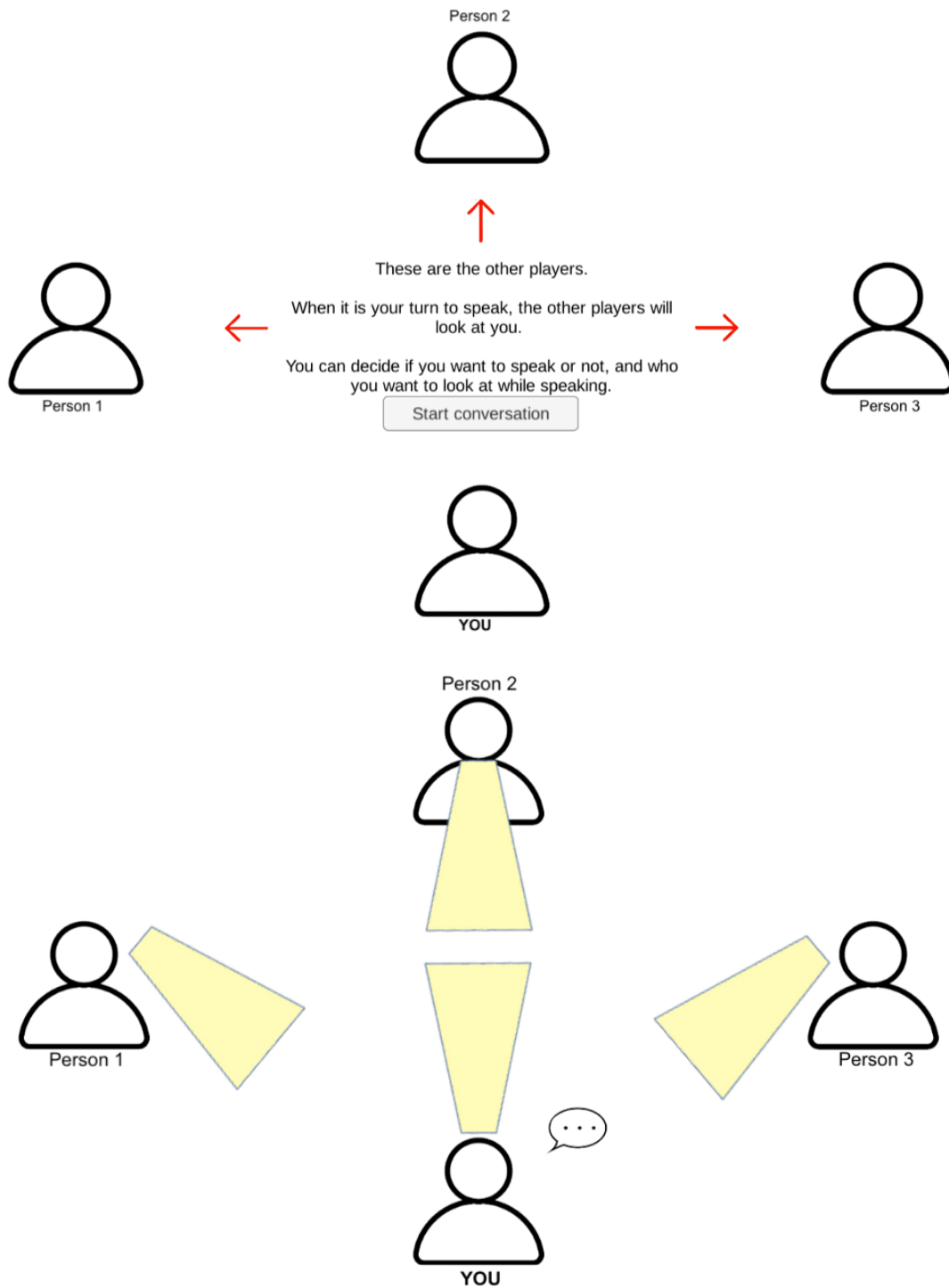
Figure 6. The effect of eye gaze condition on self-reported psychological safety, ostracism, and ability to voice (Study 3).

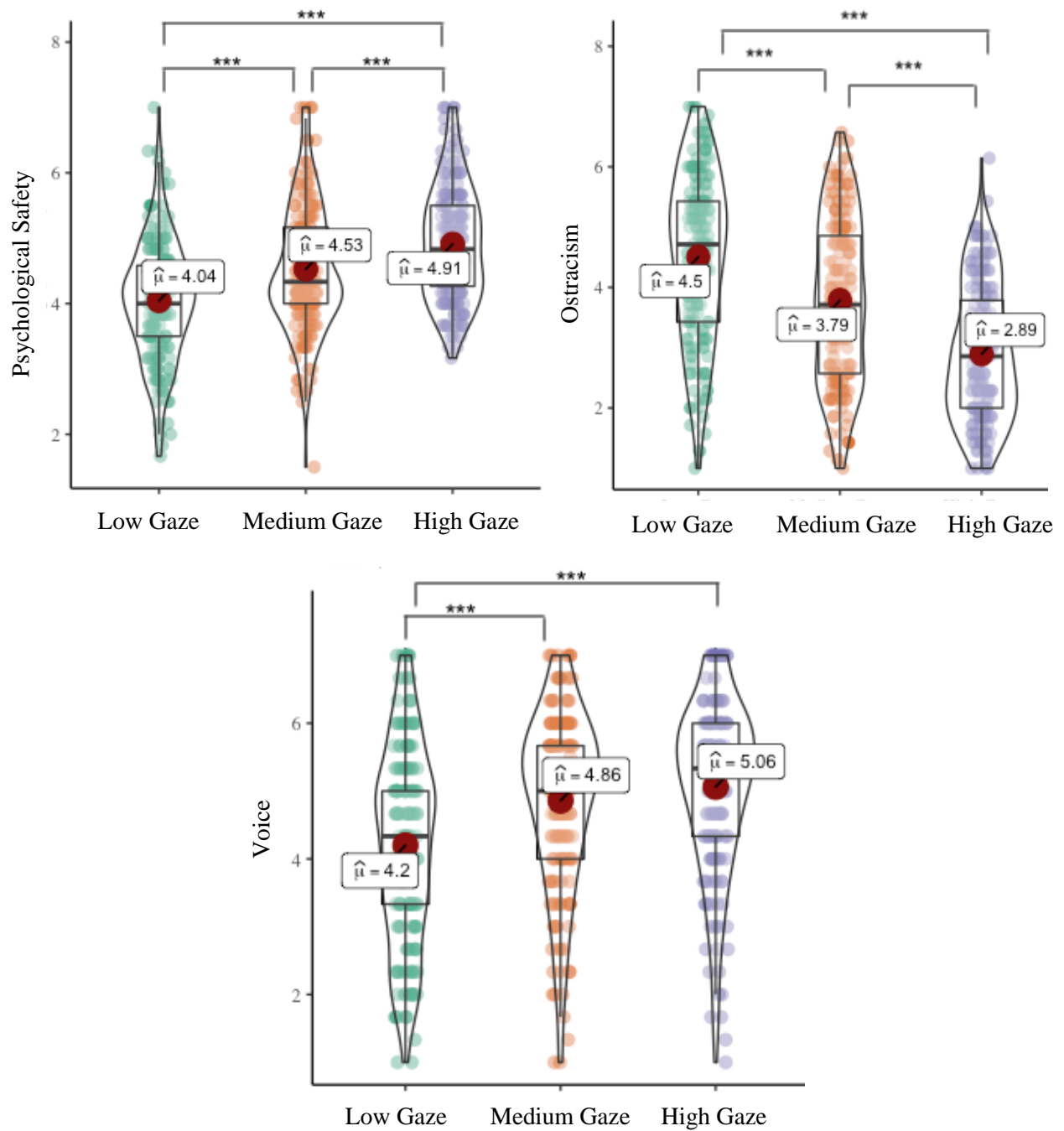**Table 1: Effect of Gaze on Psychological Safety, Participation, and Voice**

	Dependent variable:					
	Psychological Safety		Participation		Voice	
	linear	*mixed-effects*	*linear*	*mixed-effects*	*linear*	*mixed-effects*
	(1)	(2)	(3)	(4)	(5)	(6)
Gaze Received	0.289***	0.280***	0.836***	0.843***	0.610***	0.611***
	(0.065)	(0.069)	(0.036)	(0.042)	(0.054)	(0.055)
	-0.013	-0.012	0.014	0.016	0.018	0.018
Constant	(0.065)	(0.071)	(0.036)	(0.046)	(0.054)	(0.056)
R^2	0.083		0.709		0.372	
Adjusted R^2	0.079		0.707		0.369	
Log Likelihood		-303.569		-169.699		-263.311
Akaike Inf. Crit.		615.139		347.398		534.621
Bayesian Inf. Crit.		628.695		360.954		548.178
Residual Std. Error	0.960		0.537		0.795	
F Statistic	19.715***		527.896***		128.540***	

Note: $N = 222$; $^+p< .10$, $^*p< .05$, $^{**}p < .01$, $^{***}p<0.001$

Table 2: Effect of Leader vs. Non-Leader Gaze

	Dependent variable:		
	Psychological Safety	Participation	Voice
Gaze from leader	0.019^{*}	0.042^{***}	0.050^{***}
	(0.009)	(0.005)	(0.007)
Gaze from non-leader	0.004	0.019^{***}	0.005
	(0.005)	(0.002)	(0.004)
	-0.472^{***}	-1.314^{***}	-0.956^{***}
Constant	(0.122)	(0.067)	(0.097)
R^2	0.089	0.724	0.425
Adjusted R^2	0.081	0.721	0.420
Residual Std. Error	0.959	0.524	0.762
F Statistic	10.596^{***}	282.644^{***}	79.805^{***}
Note:	$N = 148;\ ^{+}p< .10,\ ^{*}p< .05,\ ^{**}p < .01,^{***}p<0.001$		

Table 3: Effect of Receiving Gaze while Speaking Vs. Silent

	Dependent variable:		
	Psychological Safety	Participation	Voice
Gazed at while speaking	-0.004	0.025***	0.033***
	(0.011)	(0.005)	(0.009)
Gazed at while silent	0.028*	0.048***	0.017
	(0.012)	(0.005)	(0.010)
Constant	-0.465***	-1.392***	-0.966***
	(0.121)	(0.055)	(0.099)
R^2	0.091	0.809	0.390
Adjusted R^2	0.083	0.807	0.385
Residual Std. Error	0.958	0.436	0.785
F Statistic	10.847***	457.669***	69.115***
Note:	$N = 222;$ $^+p< .10,$ $^*p< .05,$ $^{**}p < .01,$ $^{***}p<0.001$		

Appendix A
Supplemental Study: Measuring Eye Gaze in Dyads

To replicate Study 1 in dyads (compared to groups of three people), we recruited participants into the lab in pairs, and video-taped them having a live conversation. We asked participants survey measures after the conversation, including how much they enjoyed the conversation. After the study, third-parties coded the videos for how much eye contact each participant received. To evaluate how much each participant spoke, we measured their cumulative speaking time during the conversation.[7]

Method

Participants: Lab. We aimed to recruited 160 dyads to participate in live conversations. Ultimately 162 dyads participated and were included in our analysis (N = 324; 55% female; M_{age} = 23 years). All conversation partners were strangers.

Participants: Coders. A total of 419 participants (37% Female, Age = 34.82) were recruited through Amazon's Mechanical Turk (mTurk) to complete a 15-minute online survey.

Design. The experiment was originally designed to test if participants could tell who was listening to them. As such, there were three conditions.

Procedure: Lab. When they arrived at the lab, participants were randomly paired with a partner and were told that they would spend 5 minutes in conversation. Specifically, we instructed participants to get to know their partner and determine whether or not they would make good roommates. Researchers also told participants that there would be a series of videos playing on a TV in the conversation room. Within each dyad, one participant sat with their back to a TV which was in the room, was instructed to ignore the videos playing behind them. This

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[7] We also looked at wordcount and the number turns spoken, all measures of participation were highly correlated.

was the "unmanipulated partner." The other participant (the "manipulated" partner) was seated in full view of the TV screen, and was randomly assigned to one of three conditions: (1) *Listening* condition (told to ignore the videos and listen attentively to their partner), (2) *Distracted* condition (instructed to pay attention to the video playing on the screen behind their partner), or (3) *Feigned Listening* condition (instructed to pay attention to the commercials playing on the screen while pretending to listen attentively to their partner). The manipulated participants were video recorded throughout the interaction.

Supplemental Figure 1. Screenshot of the video recording of the participants. Person B (manipulated) is being recorded, and their body language and eye gaze was subsequently coded. Person A is the recipient of Person B's eye gaze, and our study evaluates whether their speaking time is associated with their conversation partner's gaze.

We decided to use this lab experiment for secondary analysis to explore the relationship between eye gaze and speaking time. We control for experimental condition in our results, and they are robust and significant with and without controlling for experimental condition.

Procedure: Coders. After all of the videos were collected, mTurk participants watched and evaluated the videos. In the videos, the camera is positioned facing Person B partner, offering the viewer an unobstructed frontal view of this participant. Participants on mTurk were recruited to act like coders: they watched a video from one of the interactions and were asked to report the extent to which the participant in the video engaged in several behaviors. To gather fine-grained coding of the videos, participants were asked to watch each video divided into 1-minute segments. After each 1-minute segment, the video would pause and the participant would be asked to report how frequently the individual engaged in various behaviors. Then the video would resume, and pause again after another minute.

Dependent Measures: Survey. After the conversation, participants were asked to answer a few questions about their experience having the conversation. This included the extent to which they agreed with five statements assessing their **enjoyment** of their partner as well as their conversation (e.g., "I liked my partner" and "I found the conversation with my partner interesting"); and **interpersonal evaluations of the conversation partner**: (e.g., "I liked my partner", "I would enjoy spending time with my partner", "I would enjoy working with my partner", "My partner was a good listener", "My partner was interested in what I had to say", "My partner was engaged in this conversation", "My partner is good natured", "My partner is sincere", "My partner is warm", and "My partner is tolerant"). All response scales ranged from 1= *extremely disagree* to 6 = *extremely agree*.

Dependent Measures: Video Coders. For each minute-long video segment, participants rated the extent to which Person B made eye contact with their partner on a scale from 1: "Not at all" to 4: "A lot." This process repeated until the video ended.

Results

Participation. We found evidence supporting Hypothesis 1a: in a linear regression, receiving more eye gaze is significantly and positively predicts speaking more, $b = 70.8$, $p = .046$. Controlling for experimental condition shows a similar pattern of receiving eye gaze on increased speaking up: $b = 68.4$, $p = .053$.

Evaluations of the conversation. Receiving eye contact is also significantly and positively correlated with enjoyment of the conversation ($r = 0.26$, $p = .005$), and rating of conversation as interesting ($r = 0.29$, $p = 0.002$).

Interpersonal evaluations of conversation partner. Our results show that receiving more eye contact is significantly and positively correlated with the participant's liking of their conversation partner ($r = 0.21$, $p = 0.002$), their rating of how much they would want to work with their conversation partner in the future ($r = 0.33$, $p < 0.001$), and their rating of their conversation partner as a good listener, as good natured, as sincere, and as warm (all p's < 0.01).

Discussion

In our supplemental study we show that receiving more eye gaze is associated with speaking more often during the conversation. As an exploratory analysis, we find that receiving more eye gaze is significantly positively related to a number of subjective variables, such as participant's enjoyment of the conversation, their rating of conversation as interesting, and interpersonal measures towards their conversation partner, including liking of their conversation partner, their desire to be paired with them again, and so on. Receiving more averted gaze is significantly negatively correlated with the above measures: participants enjoy the conversation less, find it less interesting, like their partner less, want to work with them less, and so on.

Measures, Coding Instructions, and Additional Analyses from Study 1

Study 1: Psychological Safety Survey Items (adapted from Edmonson, 1999):

1. During this conversation I felt if I made a mistake, the other people in the group would

    hold it against me. (R)

2. During this conversation I felt the other people in the group were able to bring up

    problems and tough issues.

3. During this conversation I felt the other people in the group sometimes rejected others for

    being different. (R)

4. During this conversation I felt it was safe to take a risk with the other people in the group.

5. During this conversation I felt like it was difficult to ask the other players for help. (R)

6. During this conversation I felt like I felt like no one would deliberately act in a way that

    undermined me and my efforts.

7. During this conversation I felt like my unique skills and talents were valued and utilized

    while working with the other people in the group.

Study 1 Coding Example:

This table shows sample Rows from a transcript coded for voice. In this transcript, Person A has

spoken 4 times, Person C has spoken 3 times, and Person B has spoken once. Person A has

received gaze 7 times, and Persons B and C have each received gaze 3 times.

Speaker	Time Stamp	Text	Where Person A is looking?	Where Person B is looking?	Where Person C is looking?	Voice
A	1:07	I guess we can just kind of discuss each candidate	At Person C	At Person A	At Person A	0

		and their strengths and weaknesses?				
C	1:30	Sounds good. So candidate A speaks five languages fluently so that feels important. I	Down at their sheet	Down at their sheet	At Person A	0
A	1:43	Person A speaks five languages? Wait, are you sure? I don't have that	Down at their sheet	Down at their sheet	Down at their sheet	1
C	1:46	Interesting. Do we all have different candidates?	At Person C	Down at their sheet	At Person A	0
B	1:52	I didn't see that. My candidate can fly a MIG, born in Cleveland had a burnout in the past.	At Person B	At Person A	At Person B	0
C	1:54	I have that too	Down at their sheet	Down at their sheet	At Person B	0
A	1:58	I think we're just told different information	At Person C	Down at their sheet	At Person A	0
A	2:02	Ok I also see that Candidate A has black belt in Taekwondo	Down at their sheet	Down at their sheet	At Person A	0

Study 1 Additional Analyses

In order to understand causality, we also conducted a lagged analysis. We found that the amount of gaze received in the first half of the conversation significantly predicted the number of speaking time in the last half of the conversation, $b = .40$, $p < .001$. The amount of gaze received during the first half of the conversation also predicts the speaking time during the first half, but

the co-efficient smaller: $b = .25$, $p < .001$. This pattern demonstrates that gaze in T1 had a stronger effect on speaking time in T2 compared to the effect that gaze in T2 had on speaking in T1. We repeated this analysis varying the percentages of time compared and found the same pattern of a bigger effect size for T1 gaze predicting T2 speaking compared to T2 speaking predicting T1 gaze in the table below:

First 10%/ last 10%	b= .15, p<.001	b=.14, p<.001
First 20%/ last 20%	b= .23, p<.001	b=.17 p<.001
First 30%/ last 30%	b= .31, p<.001	b= .19, p<.001
First 40%/ last 40%	b= .33, p<.001	b= .25, p<.001
First 50%/ last 50%	b= .40, p<.001	b= .25, p<.001

In addition, we ran additional mediation models with leader gaze (as opposed to overall gaze) as the independent variable. In a bootstrap mediation model (10,000 iterations) with team members as participants, leader eye gaze as the independent variable, ratings of psychological safety as the mediator variable, and participation or voice as the outcome variable, a significant indirect effect emerged for psychological safety as a mediator on participation (*indirect effect* = .012, 95% CI [.001, .027], *p* =.040), and on voice (*indirect effect* = .036, 95% CI [.002, .085], *p* =.022).

Appendix C
Additional Measures from Study 2

Survey Items reported in the main text:

Ostracism survey items (adapted from Gerber et al., 2017)

1. During this conversation I felt poorly accepted by the other members of the group.

2. During this conversation I felt somewhat inadequate.

3. During this conversation I felt like an outsider.

4. During this conversation I felt that other people in the group did not perceive me as worthy and likable.

5. During this conversation I felt somewhat frustrated.

6. During this conversation I felt good about myself. (R)

7. During this conversation I felt in control. (R)

Voice survey items (adapted from LePine & Van Dyne, 1998)

1. During this conversation I felt I was able to express my views and feelings with the other people in the conversation.

2. During this conversation, I suggested new ideas which were beneficial to the team.

3. During this conversation, I felt comfortable speaking up.

4. During this conversation, I communicated my opinion even if my opinion was different and others disagreed with me.

Extraversion survey items (adapted from the MIES scale)

1. I don't mind being the center of attention.

2. I talk to a lot of different people at parties.

3. I prefer to socialize 1 on 1, than with a group. (R)

4. I don't like to draw attention to myself. (R)

Part 1. At the start of the meeting, all participants joined the Zoom meeting. Once at least

three participants and the confederate joined the Zoom meeting, the study could begin. The

researcher changed the Zoom names to reflect the role that each participant (and the confederate)

was assigned. Once assigned their roles, the participants were sent their individual task

instructions through private Zoom chat and instructed to read through these instructions

separately for 7 minutes. After seven minutes, the researcher then prompted the participants to do

a comprehension check, where participants were asked to think about and write down their role

and supporting evidence for their role. After two minutes of reflection, the researcher then

instructed the three participants and one confederate to begin their 15-minute discussion of the

task. After the conversation, participants were directed to Part 2, where they each completed a

Qualtrics survey that included individual questions.

At the end of 7 minutes, the researcher then instructed the participants and confederate to

return to the survey and complete the comprehension check. At the end of 2 minutes, the

researcher then instructed the participants to begin their 15-minute conversation surrounding the

task. At the end of 15 minutes, the researcher informed the participants and confederate that their

time was up and began Part 2.

These were the instructions that the researcher read for Part 1 of this study:

> Part 1 Task Instructions: "Thank you for participating today. Before getting started,
> please turn on your videos. On the top of your screen, please make sure that you are in
> 'gallery' view. Great! You will now have 7 minutes to read the task instructions. These
> will be sent to you via private message in the chat. Then you will have 15 minutes to
> discuss the task with the three other people.
>
> I will send you a document via Zoom chat in a moment. This has the task instructions on
> it. Please read the whole task and try to remember it. You can refer to the document again
> if you need to or if you forget something, but please try your best to look at and engage
> with your other group members during the discussion, and try not refer to the document

too much during the conversation. Does this make sense? Did everybody receive their private message on Zoom chat? Please give me a thumbs up or say yes.

There is one more step before you can start reading. Please check the Zoom chat and follow the link there. Let me know when you are able to open the link. This has the consent form. Please pull up the form in another tab on your computer and sign it. Let me know if you have any questions.

Please pay close attention to the next few instructions that I will step you through. Your group number is ___. Please input your group number now. Each of you also has a participant role as your Zoom name. Please choose your participant role from the dropdown menu. And the next page also will ask you to input the email address that you would like to receive payment. Does everyone have these fields filled out? You should arrive at a page that tells you to STOP.

Great! Please do not close out of this survey. We ask you to keep this open because we will be asking you to return to it later. For now, please turn to the task instructions that I sent you. You will now have 7 minutes to read through the task."

Part 1 Comprehension Check: "Hi everyone! Your 7 minutes is up! At this time, please go back to the survey and answer the next two questions briefly. I will give you about 2 minutes to do so now."

Part 1 Conversation Instructions: "Once again, please do not close out of this survey. Now, you will have 15 minutes to discuss the task with the three other people. I understand that this is a lot of information to process, but please do your best to get creative and think on the spot in order to keep the conversation flowing. Please unmute yourselves and begin now."

Part 2. Finally, all participants were instructed to complete the rest of the Qualtrics survey that included individual questions. Once all participants signaled they were back to the survey, the researcher instructed participants to complete the survey. The final part of the survey included four demographic questions related to gender, age, degree, and race.