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Eye gaze and visual attention as a window into leadership and followership: A review of empirical insights and future directions

Joey T. Cheng^{a,*}, Fabiola H. Gerpott^b, Alex J. Benson^c, Berno Buckner^d, Tom Foulsham^e, Tessa A.M. Lansu^f, Oliver Schülke^{g,i}, Keiko Tsuchiya^h

^a Department of Psychology, York University, Canada

^b Management Group, WHU – Otto Beisheim School of Management, Germany

^c Department of Psychology, Western University, Canada

^d Department of Experimental and Applied Psychology, Institute of Brain and Behavior Amsterdam (iBBA), Vrije Universiteit Amsterdam, the Netherlands

^e Department of Psychology, University of Essex, United Kingdom

^f Behavioural Science Institute, Developmental Psychology, Radboud University, the Netherlands

^g Department of Behavioral Ecology, JFB Institute for Zoology and Anthropology, Georg-August University Göttingen, Germany

^h Graduate School of Urban, Social and Cultural Studies, Yokohama City University, Japan

ⁱ Social Evolution in Primates Group, Deutsches Primatenzentrum, Leibniz INstitute for Primate Research, Göttingen, Germany

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ABSTRACT

Illuminating the nature of leadership and followership requires insights into not only how leaders and followers behave, but also the different cognitions that underpin these social relationships. We argue that the roots of leader and follower roles and status asymmetries often lie in basic mental processes such as attention and visual perception. To understand not only *how* but also *why* leaders' and followers' behavioral patterns vary, we focus here on underpinning attentional processes that often drive rank-based behaviors. Methodologically, this focus on basic attentional and perceptual processes lessens the reliance on self-report and questionnaire-based data, and expands our scientific understanding to actual, real-world leadership dynamics. Here, we review the available evidence indicating that leaders and followers differ in whether and how they receive, direct, and pay visual attention. Our review brings together diverse empirical evidence from organization science, primatology, and social, developmental, and cognitive psychology on eye gaze, attention, and status in adults, children, and non-human primates. Based on this review of the cross-disciplinary literature, we propose future directions and research questions that this attention-based approach can generate for illuminating the puzzle of leadership and followership.

Introduction

In his now classic treatise, *Attention Structure as the Basis of Primate Rank Orders*, primatologist Michael R. A. Chance proposed that the attention structure within a group expresses the relative rank-ordering of individuals. The rank relationship between individuals, so he argues, can be revealed by tracing the direction of attention and identifying which individuals become the predominant focus of attention (Chance, 1967). In the years that followed, similar theorizing has resurfaced in other disciplines. Ethologist and developmental psy-

chologist Barbara Hold-Cavell described social attention as the best framework for understanding social rank, given that all leaders, regardless of their specific leadership style, receive attention (Hold et al., 1976). Social psychologist Susan Fiske argued more recently that, in adult humans, social rank operates through the direction and nature of attention, such that the powerful, who do not attend to others, are attended to by the powerless (Fiske, 1993).

While early conjectures were based largely on ethnographic observations, empirical evidence from diverse scientific fields—including some based on meticulous monitoring of gaze patterns using sophisti-

* Corresponding author at: Department of Psychology, York University, 4700 Keele Street, Toronto, Ontario M3J 1P3, Canada.

E-mail addresses: chengjt@yorku.ca (J.T. Cheng), fabiola.gerpott@whu.edu (F.H. Gerpott), abenson3@uwo.ca (A.J. Benson), berno.buckner@vu.nl (B. Buckner), foulsham@essex.ac.uk (T. Foulsham), t.lansu@psych.ru.nl (T.A.M. Lansu), oliver.schuelke@biologie.uni-goettingen.de (O. Schülke), ktsuchi@yokohama-cu.ac.jp (K. Tsuchiya).

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cated eye-tracking devices—has begun to unravel how social attention structures provide a window into the rank-ordering of individuals within a group.¹

Despite empirical advances on gaze and leadership over several decades, however, this fragmented literature spans disciplines and has rarely been brought together under one intellectual roof. Here, we organize and synthesize the diverse lines of research revealing that leaders and followers differ in whether and how they receive, direct, and pay visual attention, and propose an agenda for future research based on this integration of literature.

Our article is organized into three sections. First, we begin with a review of the cross-disciplinary evidence on visual attention and leadership or social rank that has amassed over the last several decades—including work ranging from organizational behavior and primatology to social, developmental, and cognitive psychology. This literature review suggests three key insights about attention and leadership: (a) Attention flows up a social hierarchy resulting generally in leaders receiving more attention from, but they themselves paying less attention to, lower-ranking followers; (b) Leaders' gazes lead and shape the visual attention of others, whereas non-leaders tend to follow the gaze of others; and (c) Leaders sustain gaze (signaling control), whereas followers avert gaze (signaling submissiveness), when responding to other-initiated eye contact. As we argue below, emerging from these empirical insights is a broader, yet underappreciated, conceptual notion about leadership: A core aspect of leadership is the ability to effectively direct the attention of conspecifics; this includes both directing attention toward the self as a leader, and toward a focal object of the leader's interest. Put simply, visual attention both shapes and reflects leadership, followership, and group dynamics.

Second, we propose an agenda for future research that flows out of our synthesis and insights on attentional differences between leaders and their followers. We outline six major opportunities and directions in the study of leadership and followership: (1) eye gaze provides an objective proxy for emergent leadership that does not rely on subjective assessments; (2) gaze patterns offer an avenue for identifying various leadership styles; (3) gaze patterns present a means for assessing team² coordination and effectiveness; (4) the effects of eye gaze on shaping group dynamics can be leveraged to design workplace interventions, such as those aimed at increasing the status and power of traditionally and stereotypically marginalized employees (e.g., women, racial minorities); (5) how visual attention varies across different contexts, situations, and professional spheres; and (6) methodological advances in eye-tracking.

Third, studying and understanding leadership through visual attention and eye gaze is characterized by multiple caveats and challenges. We discuss the conceptual challenges in defining attention, feasibility challenges posed by the relatively high costs of equipment, and methodological challenges to obtaining ecologically valid evidence. For each, we offer practical advice on overcoming these challenges to researchers interested in the intersection between visual attention and leadership.

¹ By social attention, we mean the act of paying attention to another person (or persons). In this article, our primary focus is on the allocation of attention by observable changes in gaze (i.e., looking at another person with eye and head movements), and thus we use the terms 'gaze' and 'attention' interchangeably. We return to this issue in our concluding section on caveats, limitations, and challenges.

² A distinction is sometimes made between 'groups' and 'teams' (Cook, Hunsaker, & Coffey, 1997). Although there is some variation and lack of clarity around these terminologies, a 'team' generally refers to a collection (i.e., a 'group') of individuals who actively work together toward a common goal, whereas members in a 'group' may not share well-defined goals. In this article, however, we use these terms interchangeably, to refer to a group of people with some common identity and who share at least some degree of commitment to a common task.

Why Study Visual Attention?

Before commencing with our review, it may be fruitful to briefly consider how eye gaze and visual attention offer a promising, yet under-utilized, means of studying leadership through actual, objective behaviors that extend beyond the use of questionnaires. While self- and other-reports of attitudes, feelings, and behaviors on questionnaires—which have come to dominate many areas of management and psychology research—can provide broad insights into the subjective views that people hold, they come with key limitations. These limitations include demand effects or social desirability biases, and noise introduced by the subjective and idiosyncratic interpretation of questionnaire items (i.e., within- and between-person differences). Moreover, there exists much difficulty in incentivizing accurate and truthful responses (Antonakis, 2017; Banks et al., in press; Baumeister, Vohs, & Funder, 2007; Hemshorn de Sanchez et al., 2022), which further raises questions about the external validity of conclusions when they are based almost entirely on hypothetical scenarios and non-consequential outcomes.

Although a focus on visual attention by no means resolves all these issues that stem from the heavy reliance on questionnaire-based methodologies in current leadership scholarship, it can nevertheless help overcome several shortcomings. First, visual attention is more difficult to strategically control on the part of participants, especially over longer periods of investigation, thus alleviating concerns about demand effects. Second, any temporal or longitudinal changes in a variable of interest are more easily approximated by eye movements. Because visual attention can be tracked continuously over longer time periods, without resorting to repeated presentation of identical scale items (as often done in questionnaire-based research), measuring gaze enables the investigation of within-person changes without the risk of biased responding due to repeated measurement. In contrast to questionnaire responses, eye movement is an unambiguously operationalized and measurable behavior that is less biased by subjective interpretations across different researchers and participants (Rahal & Fiedler, 2019). As such, although not without limitations (an issue we turn to at the end of this paper), measuring gaze can reduce noise in measurement compared to questionnaire-based approaches.

Third, using gaze as a proxy for leadership is consistent with the *relative* nature of social influence within a group context—agent A's greater influence over collective decision-making inherently means that agent B has less influence. When gaze towards several targets is compared to establish relative influence, because a person can only fixate on a single stimulus (or, more precisely, a region of that stimulus) at a given time, greater fixation on one individual necessarily results in less fixation on others, producing a relative measure of leadership. This overcomes a response pattern that is not uncommon in questionnaire-based measures of leadership, in which a participant may rate *all* team members as equally leader-like. Using gaze to approximate the degree of leadership exercised, by contrast, more consistently captures the zero-sum nature of leadership wherein as some people lead more, others lead less.

Although a detailed primer of how to conduct a visual attention study is beyond the scope of this review (interested readers can consult: Duchowski, 2017; Holmqvist et al., 2011; Lahey & Oxley, 2016), we provide a brief primer on how researchers currently approach the scientific study of eye gaze in the Supplemental Material.

Existing Empirical Evidence on Visual Attention: Three Key Insights for Leadership

What robust insights on leadership have emerged thus far from the study of visual attention? In the following, we briefly review the empirical evidence on how visual attention both structures and reflects leadership and followership. Our review is organized into three primary areas in which the study of eye gaze has generated robust insights into leadership. These insights address how (a) attention flows from followers to leaders; (b) leaders lead the gaze of others; and (c)

Table 1

Key research insights on visual attention and leadership and followership from existing evidence.

Empirical insight	Key references	Primary research field/sub-discipline
Attention flows up a social hierarchy: Leaders are gaze recipients (but pay less attention to others), whereas followers are gaze providers	Capozzi et al., 2019 Cheng et al., 2013 Foulsham et al., 2010 Gerpott et al., 2018 Kawase, 2014 la Freniere & Charlesworth, 1983 Schülke et al., 2020	Life, Physical, and Earth Sciences Social Psychology Cognitive Science Industrial and Organizational Psychology Ecological Psychology Developmental Psychology Biology
Leaders' gaze leads and shapes the visual attention of others, whereas followers' gaze follows	Hernik & Broesch, 2019 Liuzza et al., 2011 Richardson & Dale, 2005 Shepherd, 2010 Shim et al., 2021	Developmental Psychology Political Science Cognitive Science Biology Management Studies
Leaders maintain and reciprocate gaze, whereas non-leaders avert gaze, in response to other-initiated eye contact	Gobel et al., 2015 Holland et al., 2017 Maran et al., 2019 Terburg et al., 2016	Cognitive Science Social Psychology Industrial and Organizational Psychology Psychoneuroendocrinology

leaders sustain, rather than avert, gaze. Table 1 summarizes these three core insights on which we focus.³

Of note, while some existing papers have also broadly reviewed work on the links between attention and leadership or rank (Dalmaso et al., 2020; Koski et al., 2015; Mattan et al., 2017; Meißner and Oll, 2019) or behavioral correlates of leadership more broadly (Banks et al., in press; Hemshorn de Sanchez et al., 2022), these articles often restrict their review to work from one primary discipline (e.g., Fiedler & Glöckner, 2015; Lewis & Krupenye, in press; Rahal & Fiedler, 2019). We extend these existing papers in several key ways. First, we review studies from a range of fields, including developmental, cognitive, and social psychology, primatology, and organizational behavior, with a specific focus on how attention shapes leadership (rather than a descriptive overview of questions that have been answered using behavioral measures; (Hemshorn de Sanchez et al., 2022). Second, we integrate work on diverse forms of social rank, including concepts of leadership, dominance, social status, and power. Third, we propose new research directions for future work by identifying key areas where these insights on eye gaze and attention can best address existing challenges in the study of leadership and followership.

Attention flows up a social hierarchy: Leaders are gaze recipients (but pay less attention to others), whereas followers are gaze providers

A first major robust insight from work on visual attention is that, compared to non-leaders, leaders spontaneously receive disproportionately more visual attention and (as observers themselves) look less at

³ In constructing this review, we searched for published articles, dissertations, and theses that address visual attention. The search keyword stems include a term that refers to eye gaze and a term that refers to leadership (and related concepts), using the AND Boolean operator. The gaze-related keywords used include: *gaze*, *eye gaz**, *eye move**, *attention*, *visual attention*, *social attention*, *eye contact*, *gaze aver**, and *eye track**. The leadership-related keywords used include: *leader**, *status*, *influen**, *dominan**, *prestig**, *hierarch**, *power**, *rank*, *persuas**, *assert**, *follower**, *team*, and *group*. To expand our focus beyond searchable databases, two other steps were taken. First, we performed a citation search in those papers identified in our initial database search to identify non-duplicate papers. Second, to increase the cross-disciplinary focus of our review, all authors on our team—whose expertise span disciplines from organizational behavior, social, developmental, and cognitive psychology, to primatology—identified articles in their primary discipline that have yet to be identified through the former search methods. We included empirical studies that use either (or both) experimental or correlational designs.

others. This body of evidence comes primarily from three disparate literatures and includes work on teams with different forms of hierarchical structures, children's status hierarchies, and non-human primates.

Evidence from teams with and without formal leaders

The finding that attention flows up the hierarchy applies to both formal leaders (i.e., individuals who hold organizational or institutional power, such as CEO or manager) and informal leaders (i.e., individuals who lack formal authority but instead informally gain emergent leadership, such as informal team leaders). To illustrate, Capozzi et al. (2016) deployed advanced computer vision methods to determine “who looked at whom” in a team of four individuals by tracking their visual focus of attention. Each team, which was composed of one designated leader and three followers, all seated in a circle, collaborated in person over a 30-minute hypothetical survival task. Results show that leaders were looked at more by other members (compared to followers) and (as perceivers) looked less at others. In fact, differential visual attention received was the single most robust feature that discriminated between leaders and non-leaders. Speaking to the robustness of results, this pattern was observed regardless of the leadership style of the designated leader (e.g., democratic or autocratic), degree of time pressure in the task, and held even after accounting for inter-individual differences in speaking time (which tends to be higher among leaders; MacLaren et al., 2020).

The tendency to privilege high-status individuals with visual attention extends not only to leaders with formal authority but also to informal leaders who emerge as particularly influential individuals in groups despite lacking any formal rank or authority. Gerpott and colleagues (2018) presented eye-tracked naïve observers with video recordings of business professionals working on a consulting project and tested whether differential amounts of attention are paid to emergent leaders relative to non-leaders. Emergent leaders were gazed at more often (i.e., they received a higher number of fixations) and for longer durations (i.e., each fixation they received was, on average, longer).⁴ Using a similar methodology, Foulsham and colleagues (2010) found converging evidence that individuals who emerged as leaders—operationalized as those who were deemed by other group members as having led the task or influenced the group—were fixated on more often, for longer on each gaze, and for a longer total time by naïve eye-tracked observers, compared to their non-leader counterparts. Similar to other studies (e.g., Capozzi et al., 2019; Cheng et al., 2013), this effect of status on the distribution of observer gaze cannot be explained by disparities in speaking time, as these gaze patterns held even in moments when nobody or somebody else than the emergent leader was speaking, and when speaking time was statistically controlled for in the analyses. These patterns are consistent with early work on how much eye contact was directed at a confederate who was widely endorsed as a leader (Burroughs et al., 1973).

More recent work offers complementary evidence that regardless of the specific means via which they rise to influence, emergent leaders are privileged gaze recipients. Theoretical work on the evolution of status hierarchies underscores two distinct avenues to status in humans—dominance (inducing fear and using coercion) and prestige (earning respect and exercising persuasion; Henrich & Gil-White, 2001). Much empirical evidence confirms that these two forms of status influence who is deferred to (whether to avoid harm or to gain some benefit) and how decisions are made within a group (Anderson et al., 2020; Cheng et al., 2010; Cheng, 2020; Cheng et al., 2021; Garfield & Hagen, 2020; McClanahan et al., 2021; Redhead et al., 2019; Zeng et al., 2022; van Vugt & Smith, 2019). This indicates that dominance and prestige are fundamental means by which informal

⁴ Their subsequent analyses reveal tentatively that, proximately, our tendency to pay greater attention to leaders may be partly driven by their greater use of dynamic non-verbal postures and facial expressions (Gerpott et al., 2018).

leaders emerge and formal leaders wield their influence. In support of this notion that leaders who emerge via either avenue receive greater disproportionate attention, Cheng and colleagues (2013) brought a few hundred participants to the laboratory and assigned them into small, 'minimal' groups of 4–6 individuals to observe how informal leadership emerges 'in real time'. Their results showed that, consistent with theory, individuals who managed to cultivate fear (dominance) or earn respect (prestige) emerged as informal leaders who steered the course of group discussions and wielded exceptional influence over group collective decisions. Analyses of how visual attention was allocated reveal that dominant and prestigious group members receive greater attention from naïve eye-tracked observers (relative to group members who achieve little of either form of status), both in terms of the proportion of fixations and fixation duration. This finding highlights an important insight: Received eye gaze provides a general marker of leadership (Chance, 1967; Hold, 1976; Capozzi et al., 2019).

These correlational studies discussed so far leave unaddressed the causal possibilities that drive the observed association between leadership and attention conferral. Do group members infer who is the leader from the distribution of eye gaze (that is, gaze patterns shape perceptions of leadership)? Do group members shower (consciously or unconsciously) the person they identify as leader with visual attention (that is, perceived leadership invites gaze)? Or does attaining power and status change how much one looks at others (that is, acquiring leadership changes gaze)?

While all these causal possibilities may operate in real life (separately or together) to create an association between leadership and visual attention, there is growing evidence that acquiring power and leadership can *causally* suppress paying attention to (lower-ranked) others. In a naturalistic collaborative context, Kawase (2014) assigned pairs of professional pianists to play a piano duet together to test how gaze is altered by experimentally assigned leader–follower roles. The pianists each played from a separate sound-proofed room in which they could see each other through a glass window as well as hear the piano sounds from their own piano and from their co-performer but could not hear their partner's voice (or any other forms of vocal communication). Analyses of the performers' gaze frame by frame showed that gaze is altered by leader and non-leader role assignments in a manner consistent with the studies reviewed above. In the control condition that lacked any hierarchical arrangement, performers gazed at their partner for 0.91 s (s), on average. In the hierarchical condition in which one performer was designated leader and their partner designated follower, the follower's gaze at their partner lengthened, tripling to 1.59 s, whereas the leader's gaze at their partner shortened to 0.73 s. Thus, leaders in this music performance setting paid less attention to others, whereas followers paid more attention to others. Numerous other studies on gaze in everyday decision-making collaborative contexts similarly reveal that leaders attend less to others (Argyle & Ingham, 1972; Argyle et al., 1974; Breton et al., 2018; Exline et al., 1965; Exline et al., 1975; Dovidio & Ellyson, 1982; Hung et al., 2008; Sanchez-Cortes et al., 2013).

Evidence from children

The developmental literature supplies much evidence of status-biased attention patterns similar to that observed in adults. This work suggests that the cognitive foundations of these attention biases are acquired early in human development.

For most children, the primary social context in which status hierarchies exist—and thus informal leadership emerges—is the peer group. Whereas there is no formal rank or leadership in contexts such as the classroom or playground, informal leadership nevertheless emerges for those who achieve higher peer status. Peer status research suggests that the two most consistent and strongest predictors of obtaining influential leadership positions across ages are either being *liked* or regarded as '*popular*' by classmates (e.g., Parkhurst &

Hopmeyer, 1998), though dominance or coercive capacity plays a non-negligible role, especially in younger years and when norms and contexts permit (e.g., absence of adult supervision; Hawley, 2002; Hawley, 2014; Zeng et al., 2022). A recent meta-analysis shows that the two types of status—liked and popular—overlap only moderately and become increasingly distinct from childhood to adolescence (van den Berg et al., 2020).

Conceptually, peer status in the form of *likeability* or preference is similar to prestige, as children high in likeability tend to be prosocial, cooperative, and excel academically (e.g., (Cheng et al., 2010; Engels et al., 2017; Hawley, 2014; Newcomb et al., 1993). Peer status in children in the form of *popularity*, as commonly studied in the developmental literature, overlaps to some degree with dominance, as youth high in popularity tend to engage in aggressive strategies such as bullying and relational aggression (de Bruyn et al., 2010; Cillessen & Mayeux, 2004). Associations between likeability, popularity, and behavioral profiles that appear to overlap with prestige- and dominance-based status are also found in young adults, with likeability being associated with being successful, helping others, and being respected (i.e., prestige), whereas popularity is linked to being central, powerful, and using verbal intimidation, (i.e., dominance; Lansu & Cillessen, 2012). Research in adults shows that individuals rated as prestigious by their peers are also well-liked and socially accepted, whereas those rated as dominant are not particularly liked (Brand & Mesoudi, 2019; Cheng et al., 2010; Cheng et al., 2013; McClanahan et al., 2021).⁵

Turning to the developmental data on gaze and status, a synthesis of evidence across developmental stages indicates that status indeed matters in shaping how social attention is allocated. In the classic work of la Freniere and Charlesworth (1983), experimenters conducted ethological observations in a class of preschoolers engaging in free play, noting the amount of visual regard each child received from peers over a 50-hour observational period. Their results indicate that dominant children (who initiated more verbal and non-verbal attacks and threats) as well as socially well-liked children (who received an above-average number of nominations as 'liked' from classmates) receive disproportionate visual attention from classmates (also see Vaughn & Waters, 1981).

In an investigation of gaze allocation among early adolescents (who were in the last few years of elementary school), Lansu and colleagues (2014) examined the gaze of adolescent participants as they looked at classmates either high or low in popularity. In each trial, participants were presented with picture pairs of a popular and an unpopular classroom peer (measured with peer nominations). Results of eye-tracking data show that popular peers were attended to more than unpopular peers, both in terms of receiving the very first gaze in the trial and total looking time. The attention bias towards the popular male classmate pictured was stronger among female participants than male participants. Interestingly, participants who were themselves more popular exhibited a stronger attentional bias towards popular peers (both in terms of the first fixation and total looking time). These results converge with research that assesses the distribution of social attention using peer nominations, which indicates that socially popular youth are identified by peers as those who receive greater attention from members of the group (Laniga-Wijnen et al., 2020; Lansu & Cillessen, 2012; Lansu et al., 2014; Lease et al., 2002).

Taken together, the patterns from the available data on the social attention of children and adolescents suggest that, from as young as

⁵ Despite this initial evidence, more research across different developmental stages is needed to further understand how different forms of status as studied in disparate (sub) disciplines (e.g., popularity and likeability vs dominance and prestige), which are often studied in isolation and lack a unifying framework, map onto each other. In fact, studying how visual attention and gaze operate in these status relations may contribute to efforts to unify these frameworks for understanding the foundations of social status and leadership across the lifespan.

four years of age, high-status children—either in the form of peer liking (a component that reflects prestige) or popularity (a component that appears to overlap with dominance)—already begin to receive more visual attention than their lower-status peers, a pattern that extends into the adolescent and adult years.

Evidence from non-human primates

The attentional bias towards high-status others seen in our species is likely inherited from our primate ancestors. Comparative studies on non-human primates in the laboratory and in the field provide insight into the evolutionary basis of selective attention. In many non-human primate species, the relationships among group members can be structured into linear dominance hierarchies based on the outcomes of dyadic agonistic conflicts and the exchange of submissive behaviors. Thus, dominance is an emergent property that results from variation in physical formidability, coercive capacity, and social capital in the form of agonistic support from others. Evidence indicates that, like in humans, visual attention is directed up the social hierarchy in non-human primates (Hold, 1976; Shepherd et al., 2006; Yamagiwa, 1992; van Vugt et al., 2014). In naturalistic observational studies, individuals gaze more at higher-ranking group members than at those who they dominate (Keverne et al., 1978; Gaynor & Cords, 2012; Schino & Sciarretta, 2016; Schülke et al., 2020).

Despite evidence of attentional bias towards high-ranking individuals across diverse primate species (including humans), rank is not the only driver of visual attention. Visual attention is also structured by relational properties such as previous encounters or individual characteristics. It makes sense, for instance, to vigilantly monitor the movement and behavior of an individual (who might not be particularly high-ranked) with whom you have a history of aggressive conflict, to facilitate defence and avoid costly physical injuries. This explains why a number of primate studies have found that, in certain contexts, visual monitoring can be simultaneously guided by drivers other than dominance rank and is selectively directed to individuals who are aggressive or predators (McNelis & Boatright-Horowitz, 1998; Pannoza et al., 2007; Roth & Sterck 2020), kin, infants, or close affiliates (Gaynor & Cords, 2012; Lewis and Krupenye, in press; Roth & Sterck, 2020; Schino & Scerbo, 2020; Schülke et al., 2020), potential mates (Keverne et al., 1978; Deaner et al., 2005), or particularly skilled and competent individuals (Coelho et al., 2015; Kulahci et al., 2018). These findings from diverse species suggest that humans have likely inherited some disposition for attentional biases from our shared ancestors, with status being one of several classes of social relationships that heighten social vigilance due to their potential to provide benefits or avoid harm (Emery, 2000).

Overall, these empirical patterns from studies of children and adults as well as from non-human primates indicate that social status structures attention within groups, such that high-status individuals become the focus of attention of those holding lower status. This attention pattern often emerges spontaneously in the absence of any attention-drawing action.

Leaders' gaze leads and shapes the visual attention of followers, whereas followers follow the gaze of their leaders

The preferential attention to high-status individuals also extends to the direction of their gaze. A second robust insight into status and leadership is that leaders are privileged in their ability to direct the gaze of others (especially lower-ranking group members). Many species (including humans) reflexively shift their attention in the direction gazed at by conspecifics—a phenomenon labeled gaze cueing or gaze following (Deaner & Platt, 2003; Frischen et al., 2007; Shepherd, 2010; Zuberbühler, 2008). By mimicking another's gaze and acquiring information on the location of key objects, gaze-following is thought to have evolved to promote swift communication of inner states, facili-

tate shared understanding and coordination, and support diverse forms of social cognition from social learning and empathy to theory of mind (Emery, 2000; Tomasello et al., 2005; Whiten et al., 1998). Ample evidence confirms that eye gaze is used alongside pointing and other means of communication to direct another individual's attention toward an object of interest in both adults and children from diverse populations (Hernik & Broesch, 2019), as well as in non-human primates (Krause & Fouts, 1997; Povinelli & Eddy, 1996; Rosati & Hare, 2009; Tomasello et al., 1998).

Some individuals, however, wield more influence over the gaze of others, thereby differentially directing and shaping the social attention of group members. Evidence for this comes primarily from studies that test how the status of the cueing stimulus modulates gaze-following in participants observing the cueing stimulus (Shepherd et al., 2006). In one such line of work, which operationalizes status using facial dominance, observers look longer in the direction gazed at by a masculinized target compared to a feminized target, and this pattern is obtained for both male and female observers and across both target genders (Jones et al., 2010; Jones et al., 2011; Ohlsen et al., 2013). Because masculinized faces are perceived as more dominant and physically stronger than feminized faces, this highlights that the gaze-cueing effect is more strongly induced when cued by high status targets. Converging findings similarly indicate stronger gaze-cueing as induced by a variety of other operationalizations of high-status, including occupational prestige (Dalmaso et al., 2012, 2014) and dominance signals such as anger (Adams & Kleck, 2003; Pecchinenda & Petrucci, 2016, 2021) and the maintenance (vs avoidance) of eye contact (Dalmaso et al., 2020).

To document the causal effect of status on gaze-cueing, Capozzi et al. (2016) experimentally manipulated the leader and follower status of the gaze-cueing target through their behavioral history. In the learning phase, participants observed that certain targets were consistently followed by others (the leaders), whereas other targets consistently failed to influence others (the followers). In the test phase, the experimenters presented the faces of these leaders and followers in a gaze-cueing paradigm. Reaction times in response to the target's gaze reveal that the gaze of targets who previously acted as leaders produced reliable gaze cueing, consistent with past findings. By contrast, targets who previously acted as followers produced no reliable gaze-cueing and were largely ignored.

As this body of work highlights, a defining feature of leadership is the ability to generate followership by influencing the behavior of group members, including shaping their attention such as via gaze-leading. The ability to direct the gaze of others can thus be considered a marker of leadership. Supporting this, some evidence from political psychology links gaze-cueing to enhanced follower support and within-group cooperation. For example, voters follow the gaze of an in-group political leader to a greater extent than do out-group voters, who show a suppressed gaze-following pattern (Liuzza et al., 2011). This differential gaze following of political candidates even predicts explicitly reported voting intentions as well as implicit attitudes towards the politician (Liuzza et al., 2013).

How does a leader's ability to direct the gaze of group members affect group functioning? As we have discussed, while gaze sharing is important for diverse social interactions from facilitating shared understanding and empathy to social learning, in group contexts it plays a critical role in supplying the basic cognitive means for coordination. In task-based collaboration, gaze-mimicry directs group members' attention to the same task-relevant information, thus facilitating efficient and effective coordination (Argyle & Cook, 1976; Kendon, 1967). Supporting this, emerging evidence demonstrates that shared gaze among task partners facilitates cooperation and confers a performance advantage (Brennan et al., 2008; Hanna and Brennan, 2007; Litchfield & Ball, 2011; Neider et al., 2010; Neider et al., 2008). The sharing of gaze may thus be part of a broader suite of synchronization tendencies that emerges between leaders and followers across their

cognitive, behavioral, physiological, and neural states (Anderson et al., 2003; Gregory & Webster, 1996; Kraus & Mendes, 2014).

Leaders maintain and reciprocate gaze, whereas non-leaders avert gaze, in response to other-initiated eye contact

There is a key notable exception to this patterning of greater attentional focus on high-status individuals—when *responding* to gaze initiated by others, which effectively results in either maintaining or breaking eye contact. When gazing at others without their awareness—a context that characterizes much of the studies reviewed—gaze may be considered strictly a vehicle for perceiving or information-gathering. By sharp contrast, however, when the target of gaze becomes aware that they are stared at, whether they gaze back (or not) takes on an additional, different communicative function. Reciprocating gaze when gazed at signals something about the responder's internal state (Gobel et al., 2015; Gobel et al., 2017; Gobel et al., 2018; Laidlaw et al., 2011), particularly the degree of competitive inclination.

In stable dominance hierarchies, agonistic encounters are rare and ritualized. Opponents exchange signals about who is likely to win a fight, and then the presumed loser retreats. By reducing actual bouts of aggression between rivals, ritualized and recognizable behaviors that clearly signify the acceptance of submission are thus integral to the conflict management strategies of many animal species (Darwin, 1872). One ritual response by an individual ready to submit in a dominance hierarchy is to avert eye contact when gazed at by a rival to signal a reluctance to attack. By averting gaze, the responder functionally decreases the likelihood of landing a successful physical blow (which would be aided by direct gaze), and thus gaze aversion in effect results in defeat (Mazur & Booth, 1998). To stare back is to challenge—a ritualized display by the stronger or higher rank participant to signal dominance, threat, and non-submission (Eibl-Eibesfeldt, 1974; Ginsburg et al., 1980; Harrod et al., 2020; Maslow, 1936).

Based on this logic, a third insight on human status and leadership is that although followers spontaneously gaze more at leaders (who are not gazing back), the pattern reverses when the other party is staring, or directly gazing, back: leaders stare back and seek out eye contact and maintain gaze, while followers break or avert gaze. In most primates, including humans, the stare or direct gaze invites antithetical expressions from higher- and lower-ranked individuals. In a study that establishes the causal effect of reciprocated gaze, Gobel and colleagues (2015) recorded eye-tracked participants' gaze as they watched videos of higher- or lower-ranked targets while their eye movements were visually recorded, and the researchers experimentally manipulated participants' beliefs of whether this footage would be viewed by the targets in the video. That is, targets later either could view the participant's gaze, thus creating the impression that targets would be made aware of the participant's gaze (the target looks back condition) or not (the target does not look back condition). Results showed that, consistent with theories proposing that eye contact signals threat, when the target can look back at the observer, participants gazed *less* into the eyes of the high-ranking targets than low-ranking targets. Conversely, in the absence of any opportunity to make eye contact, the opposite pattern is obtained. When the target did not look back, participants gazed *more* at high-ranking than low-ranking targets. This pattern coheres with the work reviewed under our first insight that subordinates pay more attention to high-status individuals (who are not looking back).

Additional evidence comes from studies that assess eye contact among observers who themselves vary in status. This work suggests that, in humans (including children; Eibl-Eibesfeldt, 1974; Ginsburg et al., 1980) and other primates such as various monkeys or gorillas (Maslow, 1936), low-status individuals or subordinates refrain from establishing eye contact and report substantial mental discomfort with direct gaze (Fromme & Beam, 1974; Snyder & Sutker, 1977). This evi-

dence converges with studies that directly assess the gaze avoidance response among observers who vary in traits that dispose them to differential degrees of status in their everyday social ties. Although most people readily avert gaze from the faces (and upper bodies) of dominant others (Holland et al., 2017), presumably to avoid sending signals of threat or challenge, this gaze avoidance response is particularly pronounced among people with greater dispositional submissiveness (Terburg et al., 2012) or social anxiety (Banner et al., 2019; Enter et al., 2016; Terburg et al., 2016). By contrast, individuals with more dominant personalities hold a more prolonged gaze at stimuli that depict dominance, including angry faces (Terburg et al., 2011) and dominant body postures (Hortensius et al., 2014), lending support to the idea that to stare back is to challenge.

To summarize, synthesizing across these diverse lines of investigation, compared to non-leaders, leaders generally receive more visual attention, direct the attention of others through their greater ability to gaze-lead, and (when stared at) maintain rather than break eye contact. These rank-based gaze patterns are part of a broader suite of deference patterns that establish and maintain status differences. More broadly, these patterns of deference can be understood along three inter-related domains (i.e., cognition, behavior, and neurobiology) that jointly create leader–follower relations (see Supplemental Material for further discussion).

Leveraging Insights on Attention: Opportunities and Directions for Future Research on Leadership

Despite the insights that a focus on eye gaze and attention has generated for leadership, followership, and within-group dynamics, diverse novel and interesting research questions are yet to be explored. In the next section, we outline an agenda for future research that flows out of our synthesis and review of existing work. Our proposed research agenda is organized into six illustrative research opportunities and directions in the study of leadership and followership. Despite their non-exhaustive nature, these proposed research directions (outlined in Table 2) identify what we view as an illustrative sample of key research questions for building a deeper, broader, and cognitively informed understanding of leadership.

Eye gaze as a proxy for emergent leadership

Who exercises informal leadership? A central line of inquiry in leadership research involves identifying the factors that contribute to informal leadership emergence, or naturally arising patterns of interpersonal influence and deference in groups that lack a formal leader (Badura et al., *in press*; Hanna et al., 2021; Hogan et al., 1994; Luria et al., 2019; Wolfram Cox et al., 2022; Yukl, 1989). Decades of research have sought to identify the traits, attributes, and qualities that predict the ability to rise to a leader-like position in leaderless or self-managing (otherwise known as autonomous) teams (for a review, see Judge et al., 2002; Paunova, 2015). This work points to a robust role of person-level attributes including gender and age (Neubert & Taggar, 2004); physical attributes including height, strength, physical size, and athletic prowess (Blaker et al., 2013; Blaker & van Vugt, 2014; Cheng & Tracy, 2014; Lukaszewski et al., 2016); personality traits including narcissism, extraversion, conscientiousness, and trait dominance (Anderson & Cowan, 2014; Anderson & Kilduff, 2009; Anderson et al., 2001; Anderson et al., 2020; Bendersky & Shah, 2013; Brunell et al., 2008; Judge et al., 2002); task-relevant skill or expert knowledge and cognitive abilities (Cheng & Tracy, 2014; Henrich & Gil-White, 2001; Lord et al., 1986; Reichard et al., 2011; Thomas & Hirschfeld, 2015); and relational capital including alliance formation and centrality in the social network (Anderson et al., 2020; Mullen et al., 1991; von Rueden et al., 2014).

Table 2

How studying eye gaze can advance the understanding of leadership: Directions and questions for future research.

Research direction	Research questions	Recommended readings
Emergent leadership	<ul style="list-style-type: none"> Who exercises the most influence and informal leadership, irrespective of formal ranks and titles? Which traits, attributes, or qualities predict emergent leadership? How does the decision-making power of informal leaders compare to that of formal leaders? How stable is informal leadership, and how does it change over time? Which traits, attributes, or qualities predict gaining or losing influence and informal leadership over time? 	Anderson et al., 2001; Anderson et al., 2020; Bendersky & Shah, 2013; Cheng et al., 2013; Gerpott et al., 2018; Judge et al., 2002; Maran et al., 2019
Leadership styles and leader–follower relations	<ul style="list-style-type: none"> Do followers gaze differently at leaders with different leadership styles (e.g., steal furtive glances at dominant leaders, but shower prestigious leaders with sustained gaze)? Does direct gaze (i.e., eye contact) from dominant or prestigious leaders evoke differential arousal or distinct emotions? Do followers gaze-follow the gaze of prestigious leaders more than they gaze-follow the gaze of dominant leaders? How do different leadership styles or models overlap conceptually, based on gaze differences? 	Chudek et al., 2012 Deaner & Platt, 2003 Dovidio & Ellyson, 1985 Gobel et al., 2015; Henrich & Gil-White, 2001; Mazur et al., 1980; Van Vugt & Smith, 2019
Team coordination and effectiveness	<ul style="list-style-type: none"> Does gaze synchrony across group members reflect or contribute to effective team coordination? How do virtual meetings alter gaze patterns, and how well do these eye movements indicate task engagement (or lack thereof)? Do teams that allocate more attention to non-leaders achieve greater coordination? Does shared leadership—operationalized by a more equal distribution of attention within a group—promote team performance? 	Avolio et al., 1996; Carson et al., 2007; Foulsham et al., 2010 Gronn, 2002 Jarick & Kingstone, 2015 Pearce, 2004 Wu et al., 2013
Workplace interventions	<ul style="list-style-type: none"> Is visual attention a form of prestige cue—one that we utilize to infer who is worthy of respect and emulation? Do people use the visual attention of others to figure out who warrants prestige and leadership? Can allocating visual attention more equally across group members lead to the emergence of egalitarianism? 	Bain et al., in press Foulsham & Lock, 2015 Henrich, 2016 Levitt & List, 2009 Oakman et al., 2018; Shim et al., 2021
Variation and uniqueness in different contexts, situations, and professional spheres	<ul style="list-style-type: none"> What role does visual attention play in healthcare leadership? How can the tracking of eye movements facilitate the training of medical practitioners? What does gaze tell us about the leadership of teachers in classrooms? 	Ashrafa et al., 2018; Exline et al., 1975; Härgestam et al., 2016; Mesinioti et al., 2020; Stahnke & Blömeke, 2021; Tsuchiya et al., 2021
Methodological advances	<ul style="list-style-type: none"> How to simultaneously capture the gaze of <i>all</i> group members in a live social interaction? How to integrate eye-tracking with machine learning? What other non-verbal behaviors (and methodological tools) can be leveraged in conjunction with visual attention to understand leadership? 	Capozzi et al., 2019; Fasold et al., 2021; Laidlaw et al., 2011; Macdonald & Tatler, 2018; Zemblyns et al., 2018

In the bulk of these studies, leader emergence is operationalized using self- or group member-ratings on three related dimensions: status, influence, or leadership. Analytically, relative differences on these constructs are then regressed onto various traits and attributes to ascertain the degree to which each contributes to leader emergence. This approach, however, is vulnerable to at least two kinds of problems. First, common method variance can result in artificially inflated or deflated associations (Antonakis et al., 2010; Antonakis et al., 2014). Second, conclusions may be skewed because of the reliance on perceptual measures. For example, rater perceptions of the distribution of leadership within a group may be biased by inter-individual rater cognitive and personality differences, contextual factors such as culture and length of working relationship among group members, or familiarity (or lack of naiveté) with the scale items deployed (Bono et al., 2012; Hansbrough et al., 2015; Hunter et al., 2007; Yammarino & Atwater, 1993). Consider, for example, findings revealing that observers who like or trust their leader provide systematically biased (i.e., overly positive) ratings of leader effectiveness and behavior (Brown & Keeping, 2005). Such evidence has led researchers to conclude that “the first and most straightforward remedy... is to stop relying so heavily on subordinates [ratings] as a primary source of information” (Hunter et al., 2007).

As visual attention can be considered a general marker of informal leadership (Capozzi et al., 2019; Gerpott et al., 2018; Hold, 1976; Maran et al., 2019), tracking group members’ eye movements provides a promising avenue for overcoming these challenges. Our literature

review suggests that eye gaze received from other group members or one’s ability to induce gaze-following each provides a measure of relative emergent leadership. Through relating these indices of emergent leadership to a diverse set of traits and attributes, we can isolate the qualities that uniquely contribute to informal leadership emergence. Comparing findings of key predictors of leadership emergence obtained using this (novel) attention-based proxy of rank with existing findings based on self- or group member-ratings of leadership represents an important future direction.

How does the decision-making power of informal leaders compare to that of formal leaders? There are good reasons to believe that the attention measure of leadership can inform, or in some cases even revise, our existing understanding of leadership. In groups with designated formal and hierarchical leaders, certain individuals with no formal leader title can nevertheless rise to disproportionate influence with their above-average skills, knowledge, or contributions, and perhaps even out-influence formal leaders. However, despite topping the rest of the group (including the formal leader) in decision-making influence, informal leaders’ true influence is likely underestimated when assessed via group member ratings. Under the influence of either social desirability concerns or implicit leadership schemas (such as any belief that those in a follower role do not fit our stereotype of an influential person, which only fits those with formal positions of leadership; Phillips & Lord, 1986; Thomas & Kilmann, 1975), group members might be reluctant to report paying little deference to formal leaders or deferring more (or ‘too much’) to non-

leaders. These biasing effects of perceptual-based judgments in groups characterized by non-overlapping formal and informal leadership hierarchies are important to explore in future work, such as through comparative studies that incorporate both perception- and eye gaze-based proxies of influence.

How stable is informal leadership? How does it change over time? Who is more likely to gain or lose status? Research on how people gain or lose status over time also stands to benefit from the assessment of eye movements. Evidence suggests that the risk of status loss is greater for some individuals than others and is especially pronounced in certain contexts (Bendersky & Pai, 2018; Bendersky & Shah, 2013; Marr & Thau, 2014; Marr et al., 2019; Neeley, 2013; Pettit et al., 2010; Pettit & Marr, 2020; Redhead et al., 2019; Stamkou et al., 2019, 2020). In a vignette-based experiment by Brescoll et al. (2010), for example, professional mistakes committed by women leaders (whose powerful professional position is considered incongruent with their gender) led participants to call into question these women's competence, which in turn led to a greater loss of prestige than for their male counterparts.

One potential methodological concern in studies of status change—or more generally in investigations that present participants with the same set of items repeatedly across multiple timepoints—is the possibility of biased ratings motivated by a desire to remain consistent in judgments. It is possible that these repeated ratings of status underestimate true change. Testing changes in status and leadership over time using eye movements could overcome this potential issue (Hemshorn de Sanchez et al., 2022). Loss in status and leadership may be proxied using, for example, diminishing gaze received from group members. Future studies should examine how leader roles and personality traits relate to receiving more or less attention over time.

Identifying leadership styles and leader–follower relations from gaze patterns

Although our review reveals some similarities between different kinds of leaders (such as their disproportionate reception of gaze), some key differences also exist both in how different kinds of leaders gaze at others and how followers gaze at different kinds of leaders. Thus, investigating leader gaze or follower gaze patterns would generate insights into, and permit us to identify, different leadership styles and the nature of these leader–follower relations within a team.

Evolutionary approaches to status and leadership argue that humans have evolved two distinct pathways to gain influence over others (Henrich & Gil-White, 2001), namely dominance (coercive compliance that results from the capacity to inflict costs and impose fear) and prestige (benefitting others through skills, attributes, or locally valued knowledge, and inspire respect). These two processes are thought to represent the psychological foundations that underlie asymmetries of deference and explain why some individuals are conferred influence that is denied to others. In this view, dominance and prestige describe not only how leaders emerge but also how leadership—which rests most fundamentally on the capacity to effectively influence others—is exercised (Cheng & Tracy, 2020). Leadership scholarship is increasingly focusing on dominant and prestigious leaders, addressing how they rise to influence (Cheng et al., 2013; Garfield & Hagen, 2020; Jiménez et al., 2021; Kakkar & Sivanathan, 2017; McClanahan, 2019; van Vugt & Smith, 2019), their distinguishing behavioral (or ethological) and biological patterns (Cheng et al., 2016; Cheng et al., 2018; Körner & Schütz, 2020; Witkower et al., 2020), and their distinct effects on followers and group dynamics (Case & Maner, 2014; Case et al., 2018; Chen et al., 2021; Kakkar et al., 2020; Maner, 2017).

This theoretical work makes several predictions about consistent cognitive and behavioral patterns that distinguish between dominant and prestigious leaders. We next highlight several illustrative predic-

tions that address follower or leader attention ripe for testing in future work.

Do followers initiate furtive gaze toward dominant leaders but sustain their gaze on prestigious leaders? Although both dominant and prestigious leaders receive more attention from lower-status subordinates (Cheng et al., 2013), the *kind* of attention each receives will likely differ. Theory explains prestige as a product of psychological adaptations that evolved to improve the quality of information (including skills, knowledge, and behaviors) acquired from cultural transmission (Henrich, 2016; Jiménez & Mesoudi, 2020). Carefully attending to, and learning from, successful and prestigious others is key to improving a follower's success. By contrast, in dominance relationships, subordinates comply out of fear and the goal of avoiding harm; they pay attention to dominant individuals to monitor or track any imminent threat or aggression they direct at others, but not with the goal of watching or listening in order to emulate or learn socially (as is the case in prestige relationships).

A key prediction then is that whereas follower-initiated attention involves furtive glances at dominant individuals (from a distance), marked by avoidance of eye contact and staring (which signals challenge), attention paid to prestigious individuals involves prolonged gazing and sustained direct attention (Henrich & Gil-White, 2001). Both behavioral patterns result in greater attention paid to leaders (consistent with the evidence reviewed on how attention flows up the social hierarchy), but how that attention accrues likely differs in key ways. Moreover, these differences are expected to be clearest when higher-ups are cognizant of followers' gaze, as the hypothesized furtive glances directed at them are rooted in avoiding the appearance of confrontation. As reviewed above, evidence supports this notion that gaze changes when the target of your gaze becomes aware of your gaze (Gobel et al., 2015; Gobel et al., 2017; Gobel et al., 2018; Laidlaw et al., 2011). A methodological challenge in testing these hypotheses is therefore to allow both low- and high-status individuals to see the gaze of their partner, such as in the context of a live social interaction in which the eye movements of all parties are simultaneously tracked (in sharp contrast to many existing eye-tracking studies with passive observation of video-recordings where participants cannot interact with their 'partner'; e.g., (Roberts et al., 2019).

Does eye contact initiated by dominant or prestigious leaders evoke distinct gaze reaction, emotion, and arousal in followers? In contrast to the previous section, which addresses follower-initiated gaze, next we consider leader-initiated gaze. Followers are expected to respond in markedly distinct ways when directly gazed at by a dominant or prestigious leader. Key avenues for future research involve examining followers' behavioral responses to the direct gaze of prestigious or dominant leaders, as well as their corresponding physiological states and emotions. First, theory predicts that subordinates in a dominance hierarchy will readily avert their gaze when attended to by dominant leaders, as part of their characteristic submissive display (Dovidio & Ellyson, 1985; Ellyson et al., 1992). Dominant leaders themselves, who are keen to assert their coercive capacity and instill a sense of fear and threat, will continue to gaze directly at subordinates until they are cowed into submission. In contrast, despite displaying deference and respect, subordinates in a prestige hierarchy who admire rather than fear their leaders and feel little threat will be more at ease in reciprocating gaze.

Second, direct gaze from leaders, which serves as a reminder of status differential, may evoke different levels of arousal and heighten distinct emotions depending on the leader's influence strategy. Physiological arousal generally increases when eye contact is made with others (Jarick & Bencic, 2019), but different arousal patterns are elicited when interacting with different kinds of leaders (Pastor et al., 2007). Direct gaze from a dominant leader, which can signal threat and coercion, is thus expected to result in greater physiological arousal (Mazur et al., 1980; Nichols & Champness, 1971) relative to gaze from a prestigious leader. In terms of emotions, submission in a

dominance hierarchy is mediated by emotions of shame and fear, which contrasts with the emotions of respect, admiration, and awe among prestige subordinates (Algoe & Haidt, 2009; Cheng et al., 2010; Fessler, 1999; Henrich & Gil-White, 2001; Tracy & Matsumoto, 2008; Tracy et al., 2020).

Do followers gaze-follow the gaze of prestigious (but not of dominant) leaders? Followers preferentially attend to and imitate and learn from prestigious individuals, but not dominant individuals. Consistent with this, evidence indicates that the prestige of a person increases learners' automatic and unconscious imitation. In a clever experiment with young children, Chudek and colleagues (2012) presented preschoolers with a video in which they saw two potential models who were manipulated to differ in prestige cued by the visual attention of bystanders. Both models were initially looked at by two bystanders, but only the prestigious model was subsequently watched intently by the bystanders, who largely ignored the less prestigious model. In the test phase that followed, children were 13 times more likely to play with a toy in the same manner as the prestige-cued model compared to the ignored model. They were also four times more likely to choose the food or beverage shown as preferred by the prestige-cued model. This study, along with a large body of other evidence, reveals that (like adults), young children automatically and unconsciously imitate prestigious individuals who are deemed to possess useful, adaptive information.

This unconscious emulation and mimicking of prestigious individuals may also lead to a greater reflexive shift in attention in the direction gazed at by prestigious individuals relative to dominant individuals. Thus, although a general tendency to mimic another's gaze exists (Deaner & Platt, 2003; Frischen et al., 2007; Shepherd, 2010; Zuberbühler, 2008), the attentional and imitative biases we have evolved to preferentially learn from prestigious others mean that prestigious leaders will wield more influence over our gaze than dominant leaders. Future work should therefore seek to carefully disentangle the status or leadership styles of targets, ideally experimentally varying both prestige- and dominance-based leadership, and test whether subordinates differentially gaze-follow each kind of leader.

Assessing parallels and distinctions between different leadership styles and leadership theories. A key future direction in leadership science, which is replete with a proliferation of diverse leadership models and theories (Hackman & Wageman, 2007; Shaffer et al., 2016), involves assessing conceptual overlaps between leadership constructs and unifying these disparate efforts into a cumulative program of research. Distinctions parallel to our focus on dominance and prestige forms of leadership are found in labels such as authoritarian versus laissez-faire, autocratic versus democratic, transactional versus transformational, and task-focused versus person-focused leadership styles, as well as in constructs such as coercive versus reward power. This large array, which substantially overlaps with dominance-prestige (and with each other), hinders theoretical clarity and parsimony in the study of leadership (Anderson & Sun, 2017; Latham, 2014; Yukl, 1999; van Vugt & Smith, 2019). Considering the evolutionary basis of these dimensions of status and leadership behavior would help in connecting data from human and non-human societies and synthesizing these disparate models into a single theoretical framework that unifies the cross-disciplinary study of leadership. Investigations into how these types of leadership can be distinguished by the attentional patterns between followers and leaders who vary in their leadership styles, along the lines previously discussed, offer an objective, ethologically based approach to this broader effort to clarify the theoretical interconnections within leadership scholarship.

How eye gaze reflects and shapes team coordination and effectiveness

Gaze patterns can also be leveraged to assess other emergent team processes that are central to any group: team coordination and effectiveness. As team processes refer to the cumulative expression of

how members relate and interact with one another while working toward individual and team goals, it is challenging for researchers to study such dynamic processes in a way that coheres with theory (Humphrey & Aime, 2014). Questionnaire-based methods that rely on retrospective recall or subjective impressions of past behavior fall short of providing a high-resolution account of the social behaviors that constitute coordination between members and how they relate to the actions of a leader (Klonek et al., 2019). Although mapping the visual attention patterns exhibited by leaders and their followers does not offer a panacea for such concerns, integrating social gaze into existing lines of inquiry can generate insights into the effects of different leaders on actual (rather than perceived) team coordination and effectiveness.

Does gaze synchrony across group members reflect or contribute to effective team coordination? The timing and synchrony of social gaze patterns may reveal the degree of coordination between leaders and members within their teams. The ability to coordinate visual attention emerges early in infancy due to its fundamental role in development. For example, shared gaze between infants and caregivers facilitates nonverbal communication (Stem, 1977) and language acquisition (Brooks & Meltzoff, 2008). Following and reciprocally responding to others' gaze patterns serves an important sensemaking function and helps individuals to synchronize their behavior with others in time and space. Research with adults similarly alludes to how shared gaze may facilitate teammate coordination and performance (Schneider & Pea, 2017; Kawase, 2014). Altogether, this work suggests that gaze synchrony may serve as both a marker and driver of team coordination and warrants future research attention.

How do virtual meetings alter gaze patterns, and how well do these eye movements indicate task engagement (or lack thereof)? The nature and function of gaze are sensitive to social context (Jarick & Kingstone, 2015; Wu et al., 2013), and thus it is important to understand the conditions under which specific gaze patterns may help or hinder leaders and their teams. For example, over the course of the COVID-19 pandemic, leaders have been increasingly tasked with managing team member interactions through virtual mediums. Integrating eye-tracking with video-conferencing software may offer insight into the unique leadership challenges of managing a team in virtual versus face-to-face settings. Although companies have begun to offer attention-tracking software for video conferencing (such as the 'attention tracking' feature in Zoom; Spathis & Dey, 2020) to ostensibly identify disengaged employees and improve team meetings, there is a need to assess the accuracy of these attention identification measure, as well as to gain insight into optimal and suboptimal gazing patterns in meetings and the role of leaders in such settings. Relatedly, however, an important consideration is to weigh privacy concerns and the amount or degree of surveillance. Against the backdrop of employee and corporation's drive to improve efficiency, team coordination, and success, surveilling employees (and collecting 'big data' more generally) raises important ethical considerations (Mason et al., 2002; Moore, 2000; Rahman, 2021). While there are likely no easy answers or solutions, companies should be obligated to make known to employees the use of any surveillance.

Do teams that allocate more attention to non-leaders achieve greater coordination? As leadership is a group process, exploring how social gaze patterns are distributed across lower-ranking members may also reveal important insights into the social rank dynamics of a group. Leaders tend to have disproportionate levels of social influence and receive more visual attention than non-leaders (Foulsham et al., 2010; Gerpott et al., 2018), but rarely are all other group members equally subordinate. Lower-ranking members may not necessarily allocate their attention based on the absolute rank of other members. In a study that varied the hierarchical rank of faces depicted on a computer screen, people tended to allocate more visual attention to those occupying the highest or lowest hierarchical position, but not necessarily the person immediately higher or lower than themselves in the hierar-

chy (Breton et al., 2018). Examining how visual attention is distributed across non-leaders may offer diagnostic information about the state of a team. Teams experiencing disputes over rank, for example, may show lower levels of synchrony. In contrast, visual attention patterns may look quite different in teams experiencing legitimized shifts in power occurring in response to changing task and leadership demands (Aime et al., 2014; Bendersky & Hays, 2012).

Does shared leadership—operationalized by a more equal distribution of attention within a group—promote team performance? Although power and decision-making influence may be highly hierarchically organized and concentrated in the hands of a single emergent or formal leader, there are numerous contexts in which multiple individuals within a team share disproportionate influence and jointly direct fellow members. This notion that deference and influence may be distributed across several group members, commonly termed shared or distributed leadership (Gronn, 2000, 2002), has received much research attention over the last decades (Ensley et al., 2003; Pearce, 2004; Pearce & Conger, 2002; Pearce et al., 2007; Pearce et al., 2008; Wang et al., 2014). Although definitions vary, shared leadership can be characterized as a group's ability to dynamically and actively shift leadership roles to align with situational and task demands, which overlaps with the concept of a power 'heterarchy' (Aime et al., 2014), but can also reflect patterns of mutual influence (D'Innocenzo et al., 2016; Pearce & Sims, 2000).

In the bulk of studies within this program of research, the extent to which leadership is 'shared' is typically assessed by soliciting subjective evaluations of the degree to which the team as a whole has engaged in leadership behaviors (Avolio et al., 1996; Wang et al., 2014), or by quantifying through teammate ratings how leadership is distributed throughout a group using social network analysis techniques such as network centralization indices (Mayo et al., 2003; Small & Rentsch, 2010). Although these studies contribute to exploring the antecedents and consequences of how leadership is shared in teams, they are limited by the shortcomings associated with self- or peer-reports.

As gaze can serve as a behavioral proxy for relative influence, the study of eye movements can be leveraged to quantify shared leadership. To illustrate, future work can register the gaze patterns (e.g., individual and mutual gaze) of all group members using mobile, wearable eye trackers in live social interactions and operationalize shared leadership as the degree to which total gaze within a team is allocated to a single individual (low distribution of leadership) or evenly distributed across members (high distribution of leadership across teammates). A key question that awaits future work is whether deploying this objective, non-questionnaire-based measure of shared leadership will generate the same conclusions as prior work based on surveys. One important research question is whether shared leadership contributes positively to team performance (as has been found in previous studies using survey data; Avolio et al., 1996; Bowers & Seashore, 1966; Carson et al., 2007; Mehra et al., 2006; Pearce, 2004; Wang et al., 2014) when shared leadership is more objectively assessed via gaze distribution within a team.

Designing workplace interventions that capitalize on the effects of eye gaze

Given the potentially causal effect that eye gaze can have on shaping status asymmetries and group functioning, a particularly exciting opportunity is to design workplace interventions that deploy the dynamics of eye gaze to address diverse issues that currently hinder employee performance and well-being. Although implementing interventions in any setting and assessing their effectiveness is not without difficulties (Hauser et al., 2017; Levitt & List, 2009; Paluck & Cialdini, 2014), recent evidence demonstrates the effectiveness of certain work-based interventions (Kelloway et al., 2008; Oakman et al., 2018; Tan et al., 2014; Vargas-Prada et al., 2016).

Can eye gaze be deployed to promote greater female workplace power and career advancement? One promising and impactful series of intervention efforts are those directed at reducing gender disparities in hiring, evaluation, and promotion (e.g., Boneva et al., 2021; Cundiff et al., 2018; Day & Nielsen, 2017; Kalev et al., 2006; He et al., 2021). While the benefits of greater gender diversity in organizations are manifold, including gains in equity and fairness, the evidence also indicates its positive effects on occupational well-being, innovation, team and firm performance, and corporate governance (Badal & Harter, 2014; Díaz-García et al., 2013; Dwyer et al., 2003; Fine et al., 2020; Jones et al., 2018; Kelemen et al., 2020).

A multitude of factors contribute to women's under-representation in leadership positions and high-status roles—including disadvantaged access to social networks or alliances and the backlash they face for demonstrating agentic behavior necessary for leadership (Bongiorno et al., 2014; Jamieson, 1995; Timberlake, 2005; Williams & Tiedens, 2016). One of these factors is the prejudicial implicit and explicit biases in attributing lower competence and legitimacy in leading to women compared to men (Carli, 2001; Eagly & Carli, 2007; Eagly & Karau, 2002; Ridgeway, 2001). Countering these perceptions and increasing women's perceived ability, competence, and contribution is key to increasing women's access to power and leadership, and attention allocation interventions may prove to be helpful towards achieving this goal.

Consider an intervention in which managers are instructed to strategically allocate greater attention to female employees during company meetings in efforts to affirm and amplify their perceived prestige-based status. Although the feasibility of an intervention along these lines would require extensive testing in both the laboratory and the field, it presents an avenue for promoting women's power and status in offices. As a non-verbal 'prestige cue', visual attention may 'work' to increase prestige-based status by indicating that the target of gaze is recognized, valued, and deemed worthy of respect by others (Bain et al., in press; Chudek et al., 2012; Henrich, 2016; Henrich & Gil-White, 2001). For example, evidence suggests that observers spontaneously use the eye movements of others, which were presented through a video replay of their actual fixations, to infer what they like or dislike (Foulsham & Lock, 2015; van Wermeskerken et al., 2018). In a workplace meeting, greater prestige may be inferred in a junior or lower status female employee if she is regularly gazed at by a peer or manager.

Can allocating visual attention more equally across group members lead to the emergence of egalitarianism? Of course, this strategic use of gaze to reduce workplace disparities is not limited to addressing gender inequality, and can be extended to employees from other under-represented backgrounds (e.g., visible minorities, people with disabilities) or any employee considered to be under-recognized. Broadly speaking, such a "strategic gaze" approach can be applied to equalize the playing field for members with demographic characteristics stereotypically associated with lower status. These gaze changes could even produce changes in the social evaluations of the person whose gaze is altered. Indeed, merely experimentally manipulating participants' gaze patterns, which often reflect the course of reasoning in diverse tasks, can alter their decisions and preferences in diverse domains from arbitrary food choices and problem-solving to moral decision-making (Ghaffari & Fiedler, 2018; Grant & Spivey, 2003; Gwinn et al., 2019; Pärnamets et al., 2015).

Consistent with this leveling effect of gaze, an intervention study showed that in diverse work teams with substantial disparities in members' influence, asymmetric influence was attenuated when a leader gave increased visual attention to low-status members in the group (Shim et al., 2021). Interestingly, in addition to these equity gains, the leader's greater visual attention toward low-status members also led to greater group information elaboration, which in turn enhanced group performance in a collective decision-making task. Nevertheless, deploying such an intervention is not without difficulties. Efforts to

train team members and managers to alter their natural gaze patterns and consistently shift their attention toward certain identified employees may prove to be challenging. Moreover, employees who are in the theory 'benefitting' from the greater visual attention received (than they would otherwise in the absence of intervention) may nevertheless experience this increased attention as unwelcomed surveillance and scrutiny, thus leading to lowered perceived trust and fairness (Holland et al., 2015; Schweitzer et al., 2018). Another consideration is whether team members will continue to utilize the manager's gaze as a prestige cue should they increasingly figure out (even if not directly informed) that the manager's visual attention may not reflect true deference or interest but is instead consciously guided.⁶

Variation and uniqueness in different contexts, situations, and professional spheres

Does gaze operate differently in different contexts and professional spheres? Despite the generalities that appear to exist with regard to visual attention across many contexts and situations, future work should nevertheless anticipate and explore context-specific patterns. To illustrate, we consider two very different professional spheres that have been the focus of much recent leadership research: high-stakes medical surgical teams and children and post-secondary classroom education. Although effective leadership in each of these contexts takes different forms (Fernandez et al., 2008; Hughes & Salas, 2013; Klein et al., 2006; Janss et al., 2012; Lambert, 2003; Taplin et al., 2013), leaders in both settings share the common goal of cultivating a sense of engagement and efficacy as well as on teaching, instruction, and the developmental growth and skill-building of group members.

What role does visual attention play in healthcare leadership? Similar to many other professional teams, leaders and followers in healthcare teams negotiate and reinforce their relative power and prestige using gaze cues. Consider, for example, Tsuchiya and colleagues' (2021) detailed study of the diverse modalities that trauma surgery leaders and their followers use to communicate, including speech, gesture, gaze, and posture (Adolphs & Carter, 2013; Bezemer et al., 2011; Tsuchiya, 2013). Integrating the medical team's behavior from video, audio, and eye-tracking methods, the researchers found that senior doctors leading a trauma team tend to couple their verbal requests with direct gaze at the team member they were addressing; their directives appear 'instructive'. By contrast, when junior doctors lead, their directives to team members tend to be primarily gaze-based, absent of addressing others verbally, and when (rarely) verbalized they appear more support-seeking in framing. These patterns are consistent with the evidence that eye contact while speaking, which marks confidence, is a characteristically high-status display (Dovidio & Ellyson, 1982; Exline et al., 1965; Exline et al., 1975). Despite these converging patterns, however, these findings should remain tentative and require further replication given the small medical team sampled in this study. An interesting direction for future work is to develop and assess programs for training medical professionals on how best to coordinate gaze, eye contact, pointing, and other gestures with verbal directives to effectively manage and control the floor in surgical teams (Härgestam et al., 2016; Mondada, 2013).

What does gaze tell us about the leadership of teachers in classrooms? Educational contexts—in which a teacher must manage and direct the activities and learning of a group of students—are yet another context ripe for exploring leadership (Cheng, 1994; Khany & Ghasemi, 2019). Several studies of teachers' visual attention during instruction (assessed using mobile eye-tracking glasses) show a stark

difference in the gaze patterns of expert versus non-expert teachers. Whereas expert teachers—who have presumably acquired, through their experience, more effective classroom management techniques (among other things)—look more at their students, novice teachers, by contrast, allocate less attention to students and more to objects in the classroom (McIntyre & Foulsham, 2018; McIntyre et al., 2017, 2019). Moreover, expert teachers distribute their visual attention more equally among different students, which implies a greater ability to monitor the activities of a larger group of students (Cortina et al., 2015; Stahnke & Blömeke, 2021). The available data therefore hint at the possibility that eye gaze can distinguish effective classroom leaders from their less effective counterparts. Interesting questions for future research include identifying the drivers of teacher gaze, such as testing whether and how the institutional culture of a school affects how teachers distribute their gaze in a classroom, as well as addressing the effects of teacher gaze on student learning engagement and academic success (e.g., Goodwin & Fisher, 2011).

If leadership differs in different organizations and sectors (Omilion-Hodges & Ptacek, 2021), then the cognitive and behavioral patterns underlying them may differ as well. Beyond the medical and education sector, future work should examine how gaze relates to leadership and group dynamics in diverse sectors, perhaps beginning with those of greatest interest to leadership scholars. This includes, to name a few, sports (Chelladurai, 1990), music and music performance (Chang et al., 2017), law enforcement (Cowper, 2000), the military (Wong et al., 2003), and high-technology start-up firms (Peterson et al., 2009).

Methodological advances

Addressing these (and other) future questions will require overcoming several methodological challenges that have thus far limited our ability to draw firm conclusions about visual attention and leadership. Below we discuss three of these key methodological challenges.

How to simultaneously capture the gaze of all group members *in situ*? Due to the confines of the available technology, the bulk of this existing work (even among those studies that offer greater ecological validity) has been limited to measuring the eye movements of third-party observers as they watch a previously video-recorded group interaction. However, now widely commercially available lightweight and self-calibrating glasses—a key piece of the latest eye-tracking technology—can be worn by *all* participants in a live group discussion. Such devices can fully integrate and synchronize eye-tracked data across multiple group members, making it feasible to study the social gaze of leaders and followers as they occur within moment-by-moment exchanges, addressing phenomena such as mutual gaze and shared gaze (Fasold et al., 2021; Macdonald & Tatler, 2018). Deploying multiple eye-tracking devices simultaneously during a live interaction also opens up the possibility of testing new research questions, such as how leaders allocate their gaze between members across time and in response to team dynamics, and how gaze is distributed across multiple dyad groupings within a larger team. Beyond enabling new directions, studying gaze in live social interactions with these latest tools will generate more ecologically valid insights compared to earlier studies based on third-party observations of either static images or dynamic videos. Indeed, evidence indicates that findings of visual attention from face-to-face eye-tracking studies can diverge from those based on passive third-party observations (Freeth et al., 2013; Heerey, 2015; Laidlaw et al., 2011; Risko et al., 2012).

How to integrate eye-tracking with machine learning? An important methodological advance in recent work is the application of machine learning techniques to eye-tracking data (Dalrymple et al., 2019; Krol & Krol, 2017; Parra et al., 2021; Pfeiffer et al., 2020; Zemblyns et al., 2018). As the evidence in this article makes clear, leadership is one source of inter-individual variability in human social gaze patterns. In existing work (of the kinds we surveyed in our

⁶ This proposed research question overlaps somewhat with Meißner and Oll's (2019) call for future research into how nonverbal behavior cues such as facial expressions and gestures, as well as physical characteristics such as gender, affect personnel selection decisions and discrimination.

review), these status-based differences are traditionally revealed using some measure of leadership, often based on human observer ratings (whether from self, peer, or trained observers). Alternatively, however, machine learning models can be constructed to classify leaders and followers within a team based on gaze patterns alone with a high degree of reliability and accuracy. These techniques can generate insights into which specific features of visual attention distinguish leaders from non-leaders. In other words, they can elucidate the cognitive behaviors that contribute to status-linked variability in gaze patterns.

In fact, many of the research questions and predictions that flow from our review can be directly tested using rich moment-by-moment data analyzed via machine learning techniques. This includes the prediction that leaders maintain (rather than break) gaze when stared at by followers and practice less gaze aversion. Recent studies attest to the power of using machine learning to distinctively identify group leaders from gaze behavior in live group interactions (Capozzi et al., 2019). A major advantage of taking a data-driven machine learning approach to gaze is that it can contribute to the kind of much-needed non-questionnaire-based evidence on which we would hope to base (or at least seriously incorporate into) our understanding of leadership (Banks et al., in press).

These advantages notwithstanding, machine learning methods (particularly when deployed alone) have key shortcomings, foremost among them is the ability to provide *meaningful* explanations of phenomena (Grimmer et al., 2021). While the algorithms generated by machine learning are optimized for pattern detection, as an atheoretical technique it lends little help to explaining why these patterns occur and to generating hypotheses among constructs beyond the data examined. Thus, although machine learning affords unique opportunities to the scientific study of leadership, it should be recognized that its strength and utility primarily lie in description and prediction, rather than in explanation. A key challenge for future work deploying machine learning techniques is to integrate this relatively novel yet powerful tool with *good* theory and theory development (Leavitt et al., 2021; Yarkoni & Westfall, 2017).

Caveats, Limitations, and Challenges

As our literature review and outline of future directions reveal, exploring the visual attention basis of social relationships will likely yield fruitful insights into leadership and followership. Nevertheless, it should not come as a surprise that studying eye gaze and attention, particularly in the context of hierarchical relationships, is not without its challenges. Moreover, despite its promises, the measurement of gaze is certainly no silver bullet against all problems of studying leadership and followership.

First, one important issue concerns the relationship between eye gaze and the psychological construct of attention. While in this article (and the scientific enterprise at large) these terms are used interchangeably, people do not always point their gaze towards the things that they are paying attention to. Most of the time, and particularly in complex tasks such as reading, the direction of gaze reflects what is currently being attended to and processed (this is the “eye-mind assumption”; Just & Carpenter, 1980). Nonetheless, there are situations where this assumption does not hold, and gaze and attention (and cognitive processing) become decoupled (Underwood & Everatt, 1992; Anderson et al., 2004). To illustrate, in cognitive psychology, visual attention is often studied in the absence of eye movements, in which case it is known as “covert” attention and is inferred from faster or prioritized responses to locations or stimuli (Posner, 1980, 2016). Interestingly, social interactions with a high degree of interdependence may often represent situations where there are good reasons for humans to use their covert attention. This is because gazing at another individual can send a powerful social signal, which may not

always be desirable. Although it is not possible to directly measure covert attention, several studies have indicated that gaze is deployed differently in interactive settings, such as attending in a covert manner to avoid detection by the other person (Laidlaw et al., 2016; Dosso et al., 2020; Foulsham & Lock, 2015; Hausfeld et al., 2021). This raises the possibility that participants will selectively engage in covert monitoring depending on the leadership context (for example, while averting gaze from a dominant leader). Such forms of attention cannot be easily detected using current eye-tracking equipment.

Second, measuring gaze behavior can be costly in terms of equipment and time. Regarding the latter, capturing eye gaze via third-party observers (i.e., non-verbal behavior coding) is certainly very time-consuming (something which is also true in most mobile eye-tracking studies) as it requires coding by hand. The cost of electronic eye-tracking equipment has been gradually decreasing, and several consumer-grade models are available which can be used for research at a low cost (Dalmaijer, 2014). Of note, as mentioned, mobile eye-trackers can be made or bought quite inexpensively, and they can allow the recording of gaze in naturalistic interactions between multiple people (Babcock & Pelz, 2004; Kassner et al., 2014). Glasses-based mobile eye trackers are also becoming less obtrusive, which means that data can be recorded without the equipment itself becoming the main focus of attention. Although there remain concerns that participants behave differently when being eye-tracked (e.g., because they are self-conscious), recent evidence suggests that people habituate after several minutes of wearing the equipment (Nasiopoulos et al., 2015). Using eye trackers can therefore still capture natural behavior at least in some contexts (Kee et al., 2021). Furthermore, the interest in eye-tracking technology via webcams has been growing, and many start-up companies have emerged that may make such tools more easily accessible (Funke et al., 2016). However, the data quality from webcams still lags behind that of mobile eye trackers, and both generally yield lower-quality data than traditional stationary eye-trackers used in static testing situations in front of a computer screen. Further, problems caused by head movement and other participant factors remain, as do challenges for data analysis (Niehorster et al., 2020; Yang & Krajbich, 2021). Despite this, modern equipment is generally more than sufficiently able to answer the question of who is being looked at during an interaction.

Third and relatedly, automatic eye-tracking data analysis methods, which rely on detecting faces and individuals in videos, are slowly becoming feasible. However, although automatically detecting gaze and classifying social roles in this way holds great promise, the collection of these gaze data also raises important ethical issues regarding personal data and privacy, not least because they would be considered biometric data and subject to strict data protection regulations. Recordings made in natural environments might also capture bystanders (for whom obtaining research consent is less feasible), and thus the consent and privacy of not just the eye-tracked individual but also other potential interactants require consideration. Lastly, some software solutions incorporated into video conferencing software can now also use artificial intelligence capabilities to automatically adjust eye-gaze so that, for example, it may appear (deceptively) that a speaker is making consistent eye contact with the conversation partner (termed ‘artificial eye contact’ or ‘eye correction’; Morton, 2020; O’Hara, 2019). Such software strips the altered gaze data of diagnostic meaning and researchers should be aware that gaze patterns may be technologically manipulated.

Fourth, although measuring attention during interactions is a way of collecting fine-grained measurements in real time during natural behavior, many of the theoretical questions posed in this review will require controlled experiments that strike an appropriate balance between experimental control and ecological validity. Measurements of gaze, and potentially also experimental manipulations that directly alter attentional hierarchies, can be applied in the field in so-called ‘lab in the field’ paradigms (Gneezy & Imas, 2017; Harrison & List, 2004),

which may offer a setting with the greatest internal and external validity (Eden, 2021). As we have outlined, a challenge here will be to assess gaze in concert with all the other verbal and non-verbal behaviors that reflect social hierarchies. Critically, any experimental manipulations of gaze, such as in the aforementioned studies of workplace interventions to allocate greater gaze to marginalized group members, must fit into natural behavioral repertoires to avoid forced or artificial actions which could have adverse effects.

Finally, while studying attention in leadership, scholars need to be aware of cultural differences which are critical and often under-researched in behavioral science (Apicella et al., 2020; Henrich et al., 2010). Patterns of direct eye contact and gaze avoidance are likely based in part on norms which are learned over time and may be culturally specific. For example, in East Asian cultures gaze avoidance may be particularly important as a sign of respect, and thus some experiments have found increased gaze avoidance in East Asian participants (Argyle & Cook, 1976; McCarthy et al., 2008; but see (Haensal et al., 2021), who find *more* mutual gaze in Japanese and Chinese participants than in Western participants). Leadership styles may also vary between cultures (Hofstede, 2001; House et al., 2002; Schwartz, 1999), and the ways in which gaze and leadership roles may interact thus provide fertile ground for future research.

Conclusion

Understanding the psychological foundations of leadership is a theoretically and practically important and fascinating research enterprise. As the evidence we have compiled here makes clear, leaders and followers differ systematically in whether and how they receive, direct, and pay visual attention. Also revealed by this evidence is that eye gaze provides a reliable, behavioral, and under-utilized source of information about the hierarchical structure and functioning of a team. The summarized empirical patterns span decades of interdisciplinary work in organizational behavior, primatology, and social, developmental, and cognitive psychology, and come with a number of new research directions for testing new theories about both leadership and followership. This means that, for a full understanding of the nature of interpersonal relationships in (and outside of) the workplace, research programs cannot ignore the profound influence of basic cognitive processes such as visual attention on leadership, teamwork, and organizational dynamics. We hope that scholars engaging with these topics of inquiry will be encouraged to incorporate both social and visual attention into their thinking and, by doing so, chart new territories in understanding leadership, followership, and group dynamics.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary material

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