# Evaluations of Dominant Leadership in Workplaces Are Associated with Paranoia

**Yutaka Horita* and Kotone Kawada**

Department of Psychology, Teikyo University, 359 Otsuka, Hachioji City, Tokyo 192-0395, Japan

*Author for correspondence (horita@main.teikyo-u.ac.jp)

Lower social status is one of the social factors associated with paranoia—the belief that others have harmful intentions. From an evolutionary perspective, paranoia is an adaptive psychological mechanism for coping with social threats. Two types of social status have been theorized based on differences in the social influence of superiors on subordinates: prestige and dominance. Dominant superiors force their subordinates to obey them through threats, and subordinates are motivated to avoid these superiors. Conversely, subordinates voluntarily approach prestigious superiors to gain beneficial expertise. If paranoia functions as a response to social threats, it is strongly associated with evaluations of superiors' dominance in an immediate environment. A web-based survey of full-time workers ($N = 300$) examined the correlations between paranoia, evaluations of dominance and prestige toward leaders, and willingness to learn from leaders. We distinguished between a familiar leader (a workplace supervisor) and a distant leader (a leader in the broader community). In support of our hypothesis, paranoia was positively associated with the evaluation of a familiar leader's dominance, but not with that of a distant leader's dominance. However, contrary to our prediction, paranoia was positively associated with willingness to learn from leaders regardless of the type of leader.

## Keywords

paranoia, leadership, prestige, dominance, social learning, workplace

## Introduction

Paranoia is defined as the idea that harm intended by others will occur (Freeman & Garety, 2000) and includes subcomponents such as persecutory delusion and mistrust (Bebbington et al., 2013). Paranoia is considered a continuum, and mild paranoia can be observed in the general population (Bebbington et al., 2013; Freeman et al., 2005, 2011). From an evolutionary perspective (Bell et al., 2021; Gilbert, 2001; Green & Phillips, 2004; Raihani & Bell, 2019), paranoia is hypothesized to function as a psychological mechanism for coping with social threats— harm caused by others, such as aggression, criticism, and ostracism. Mild paranoia can help individuals detect and avoid social threats. In particular, individuals' subjective lower social status may cause them to be vulnerable to mild paranoia because of exposure to social threats (Freeman et al., 2005). This study focused on the function of paranoia (i.e., persecutory ideation) as an adaptive response to others with higher social status.

From an evolutionary perspective, social status can be divided into two types: *prestige* and *dominance* (Henrich & Gil-White, 2001). Dominance reflects a means of threatening and coercing others aggressively, whereas prestige involves demonstrating competence and being admired by others. Consequently, prestige and dominance influence subordinates in different ways (Jiménez & Mesoudi, 2019). In a prestige-based social hierarchy, subordinates voluntarily approach their superiors to gain beneficial expertise. However, in dominance-based social groups, subordinates are reluctant to approach the dominant leader to avoid aggression.

This study tested the hypothesis that paranoia serves an adaptive function in detecting social threats, by examining the relationship between persecutory ideation and the evaluation of dominant traits in leaders. If paranoia is a psychological by-product of adaptation to social threats, it should be common among subordinates exposed to threats from a dominant leader. We also examined the correlations of persecutory ideation with dominance and prestige ratings for direct workplace supervisors and distant leaders. If paranoia reflects adaptation to a social environment rather than general beliefs about others, it would be more strongly associated with evaluations of others in a familiar environment (i.e., the workplace) than in a broader society.

Further, this study examined the diffusion effect of paranoia on the willingness to learn from leaders. The theoretical importance of distinguishing between prestige and dominance is that each affects social learning— learning knowledge, skills, and behaviors by observation and imitation (Henrich & Gil-White, 2001). If paranoia is associated with dominance of leaders in familiar environments, it may be associated with lower motivation for social learning from them. The empirical evidence that paranoia reflects distrust of others (Bell & O'Driscoll, 2018; Bebbington et al., 2013; Fett et al., 2012; Hertz et al., 2021) provides a rationale for predicting an association between paranoia and a tendency to avoid social learning from dominant leaders in familiar environments.

We made the following predictions and tested whether assumptions regarding the influence of prestige and dominance on social learning (Henrich & Gil-White, 2001) are supported.

- Prediction 1: Individuals' evaluations of their

leader's (a workplace supervisor or a distant leader) dominance is negatively correlated with individuals' willingness to learn from them.

- Prediction 2: Individuals' evaluations of their leader's (a workplace supervisor or a distant leader) prestige is positively correlated with individuals' willingness to learn from them.

We further tested whether paranoia was associated with the evaluation of a leader's dominance, especially in a familiar environment.

- Prediction 3: The evaluation of a workplace supervisor's dominance is positively correlated with the intensity of an individual's paranoid thinking.
- Prediction 4: There is no significant correlation between the evaluation of a distant leader's dominance and the intensity of an individual's paranoid thinking.
- Prediction 5: There is no significant correlation between the evaluation of a leader's prestige and the intensity of an individual's paranoid thinking.

Given that paranoia reflects mistrust of others (Bebbington et al., 2013), we tested whether paranoia was related to less willingness to learn from leaders and whether this tendency was more pronounced in familiar environments than in a broader community.

- Prediction 6: The intensity of an individual's paranoid thinking is negatively correlated with their willingness to learn from their workplace supervisor.
- Prediction 7: There is no significant correlation between the intensity of an individual's paranoid thinking and their willingness to learn from a distant leader.

Prior to data collection, predictions and analysis plans were pre-registered (available at https://osf.io/uj2x4).

## Methods
### Participants
Three hundred participants (179 female, 120 male, and one unreported; mean age = 38.19, standard deviation = 11.04) completed a web-based survey via Prolific (www. prolific.com). Using the screening function provided by Prolific, we recruited United Kingdom and United States residents who were fluent in English, worked full-time, were part of a workgroup, and had a direct supervisor at their workplace. All participants were paid 1.20 GBP for participation. Data were collected in October 2022. The survey form was developed using Qualtrics. The questionnaire is available in Supplementary Information.

### Measures
Following Brand and Mesoudi's (2019) method, participants' beliefs about leaders' prestige and dominance were measured using a dominance-prestige scale (Cheng et al., 2010), which contained 17 items describing dominance- and prestige-related traits. We asked participants to think about their supervisor at work and a leader in their community or country (distant leader; e.g., prime minister, politician, or local celebrity). Then, they rated the extent to which other people (i.e., members of the workplace/community) recognized each leader as dominant (e.g., "Members of

your workplace [community] are afraid of them") and prestigious (e.g., "Members of your workplace [community] respect and admire them"), on a 7-point scale (1 = Not at all/Not TRUE, 4 = Somewhat, 7 = Very much/TRUE). The order of ratings was randomized for each participant. Mean scores were used in the analysis. When the participants rated each leader, we included an attention-check item that asked the participants to select a particular score.

Immediately after rating their beliefs about leaders' prestige and dominance, participants rated their willingness to learn from the leader with a single 7-point Likert scale item: "Please indicate the extent to which you would like to learn from or be like your direct supervisor / this leader (i.e., distant leader) (e.g., learn a skill of theirs or gain knowledge/advice from them)" (1 = Not at all, 4 = Somewhat, 7 = Very much).

Subsequently, participants completed the Revised Green et al.'s Paranoid Thoughts Scale (R-GPTS) (Freeman et al., 2021). The R-GPTS consists of a social reference subscale (8 items; e.g., "I often heard people referring to me") and a persecution subscale (10 items; e.g., "I was sure someone wanted to hurt me"). Participants rated each item on a 5-point Likert scale (0 = Not at all, 4 = Totally). We used the summed persecution subscale scores for the analysis. A higher score indicates a greater degree of persecutory ideation.

Finally, the participants reported their gender and age.

## Results
All participants passed the attention-check items. The observations with missing values were excluded from the analysis. All analyses were conducted using R version 4.3.1 (R Core Team, 2023). The descriptive statistics, reliability coefficients, and distributions for each measure are summarized in Supplementary Information (Supplementary Figures S1–S4 and Table S1).

### Statistical models
We estimated a multivariate model using three regression formulae. We conducted two regression models to predict the scores for willingness-to-learn from the workplace supervisors and distant leaders. Additionally, we ran a regression model to predict the paranoia score. For each model, we included the participants' gender (0 = female, 1 = male), age, and rating order (distant leader first = 0, supervisor first = 1) as control variables. Continuous variables (i.e., dominance-prestige scale and participants' ages) were standardized. Binary variables (i.e., gender and rating order) were centered.

We applied ordinal regression models to the models using the willingness-to-learn scale as the response variable because this was an ordinal variable. Because the paranoia score was skewed and deviated from a normal distribution (Shapiro–Wilk test: $W = 0.744$, $p < .001$), we also used an ordinal regression model when analyzing the paranoia score. We classified paranoia scores into five categories according to Freeman et al. (2021): average, 0–5; elevated, 6–10; moderately severe, 11–17; severe, 18–27; and very severe, $\geq 28$. We found only one participant whose paranoia score was classified as "very severe"; levels above "severe" have been proposed as the recommended cutoff for persecutory delusions (Freeman

et al., 2021). Therefore, we grouped the "very severe" level into the "severe" category for analysis (215 average [71.9%], 34 elevated [11.4%], 29 moderately severe [9.7%], 21 severe [7.0%], and one missing value). When we added the paranoia level as a predictor, we considered that it had a monotonic effect: the amount of change differed between adjacent categories (Bürkner & Charpentier, 2020). We also conducted the model with the paranoia score as a continuous variable (Supplementary Table S3); however, the model using the ordinal paranoia level fit the data well (Supplementary Figure S5).

We estimated parameters in regression models using the "brms" package in R (Bürkner, 2017). This package runs Markov Chain and Monte Carlo simulations to estimate the posterior distributions of parameters. We ran four chains of 2,000 iterations with 1,000 warmups. We used the default prior distributions implemented in the "brm" function: uniform distributions for each slope, Student's $t$ distribution with 3 degrees of freedom and 2.5 standard deviations for the intercepts, and a Dirichlet distribution with equal probability for the monotonic effect. The estimated parameters converged well ($\hat{R} < 1.01$). Supplementary Table S2 presents a numerical summary of all estimated parameters.

## Predictions 1 and 2: The relationship between willingness to learn from leaders and evaluations of prestige and dominance
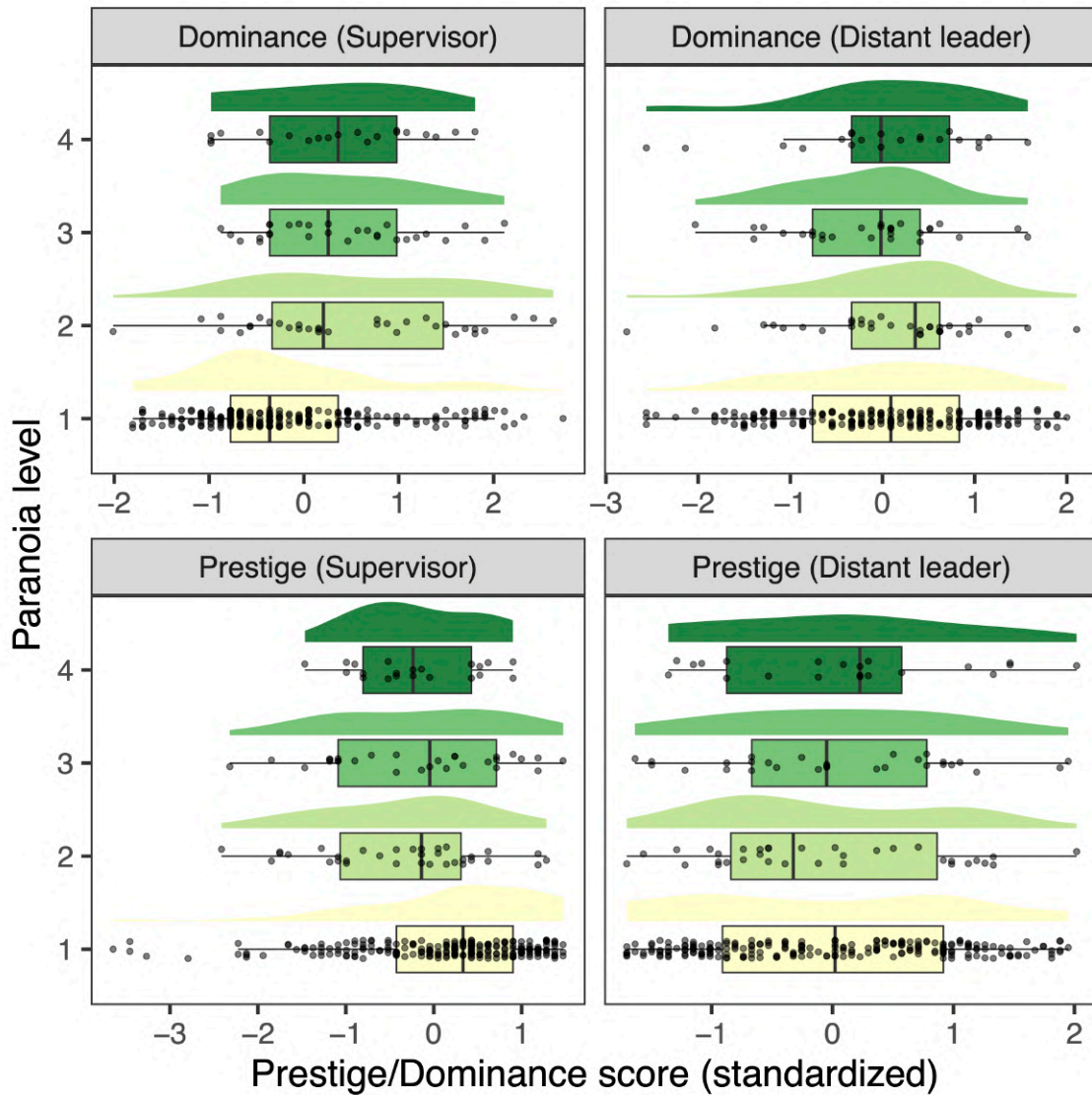
Figure 1 illustrates the distributions of prestige and dominance scores by willingness-to-learn scores for workplace supervisors and distant leaders. The dominance score for workplace supervisors did not predict a decrease in willingness to learn from them (estimate = −0.205, 95% credible interval = [−0.485, 0.069]). In contrast, the dominance score for distant leaders was negatively related to willingness to learn from them (estimate = −0.690, 95% credible interval = [−1.024, −0.374]). Thus, Prediction 1 was supported for distant leaders but not for familiar leaders.

Prestige scores for workplace supervisors and distant leaders were positively correlated with participants' willingness to learn from each of them (supervisor: estimate = 2.406, 95% credible interval = [2.029, 2.806]; distant leader: estimate = 2.340, 95% credible interval = [1.947, 2.759]). Thus, Prediction 2 was supported for both types of leaders.
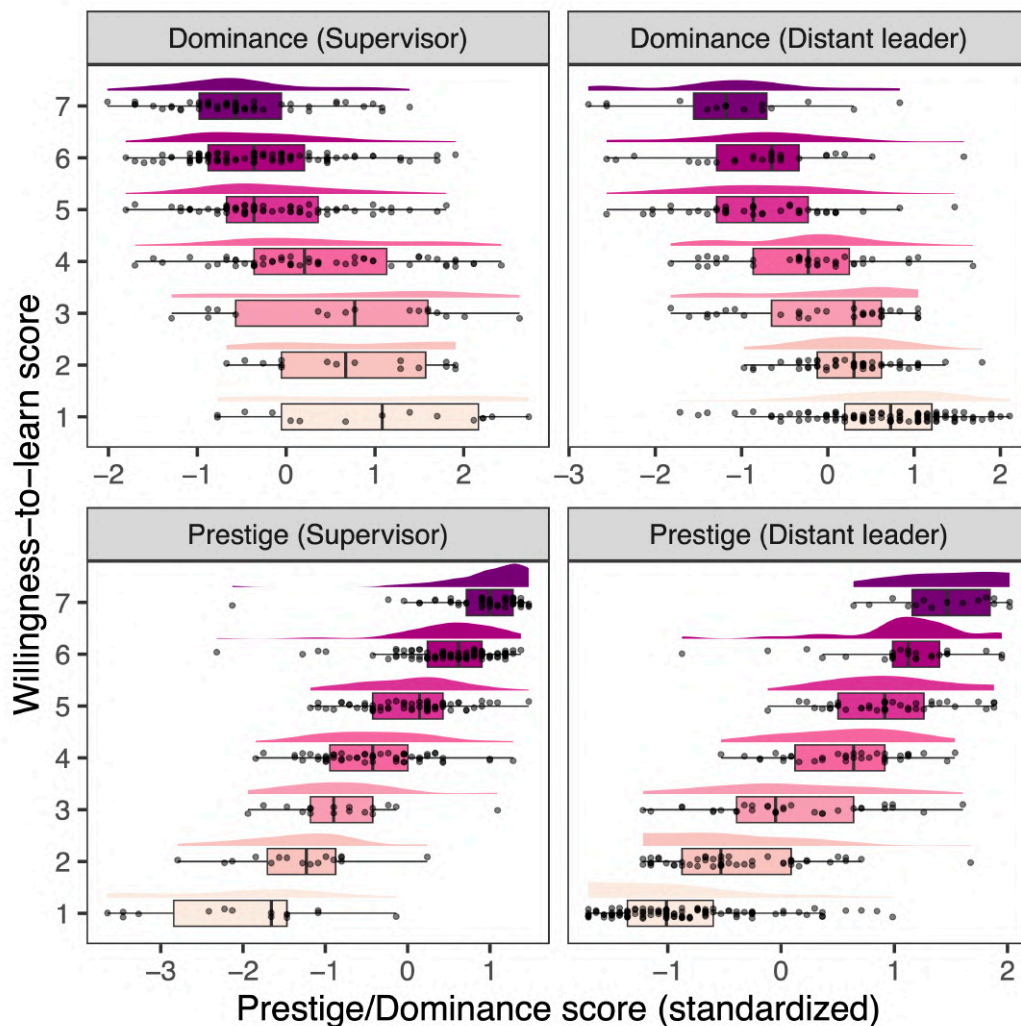


**Figure 1**. Distributions of prestige and dominance scores according to willingness to learn from a leader.

*Note*: Each point represents a participant, and random vertical jitter was added to each point to facilitate visibility.

**Figure 2**. Distributions of prestige and dominance scores according to paranoia levels.

*Note*: Each point represents a participant, and random vertical jitter was added to each point to facilitate visibility. Paranoia scores were categorized into four levels (1: 0–5; 2: 6–10; 3: 11–17; 4: 18+).

### Predictions 3, 4, and 5: The relationship between willingness to learn and paranoia

Figure 2 illustrates the distributions of prestige and dominance scores according to paranoia level. In support of Predictions 3 and 4, evaluations of dominance for workplace supervisors were positively associated with paranoia levels (estimate = 0.552, 95% credible interval = [0.256, 0.874]); however, paranoia levels were not associated with the dominance score for distant leaders (estimate = −0.241, 95% credible interval = [−0.625, 0.121]). Evaluations of prestige for both workplace supervisors and distant leaders were not associated with paranoia levels (supervisor: estimate = −0.058, 95% credible interval = [−0.353, 0.244]; distant leader: estimate = −0.006, 95% credible interval = [−0.358, 0.328]). Thus, Prediction 5 was also supported.

### Predictions 6 and 7: The relationship between willingness to learn from leaders and paranoia

Figure 3 shows the cumulative proportion of ratings for each willingness-to-learn score according to paranoia levels. Contrary to Predictions 6 and 7, the paranoia score was positively related to willingness to learn from both workplace supervisors (estimate = 0.329, 95% credible interval = [0.108, 0.560]) and distant leaders (estimate = 0.297, 95% credible interval = [0.051, 0.560]).

### Unplanned exploratory analysis

We conducted linear regression models with the dominance and prestige scores as response variables (Supplementary Table S4). We examined whether the paranoia and willingness-to-learn scores were associated with the dominance and prestige scores in the same way as in the above models, even after controlling for other variables. The conclusion did not change.
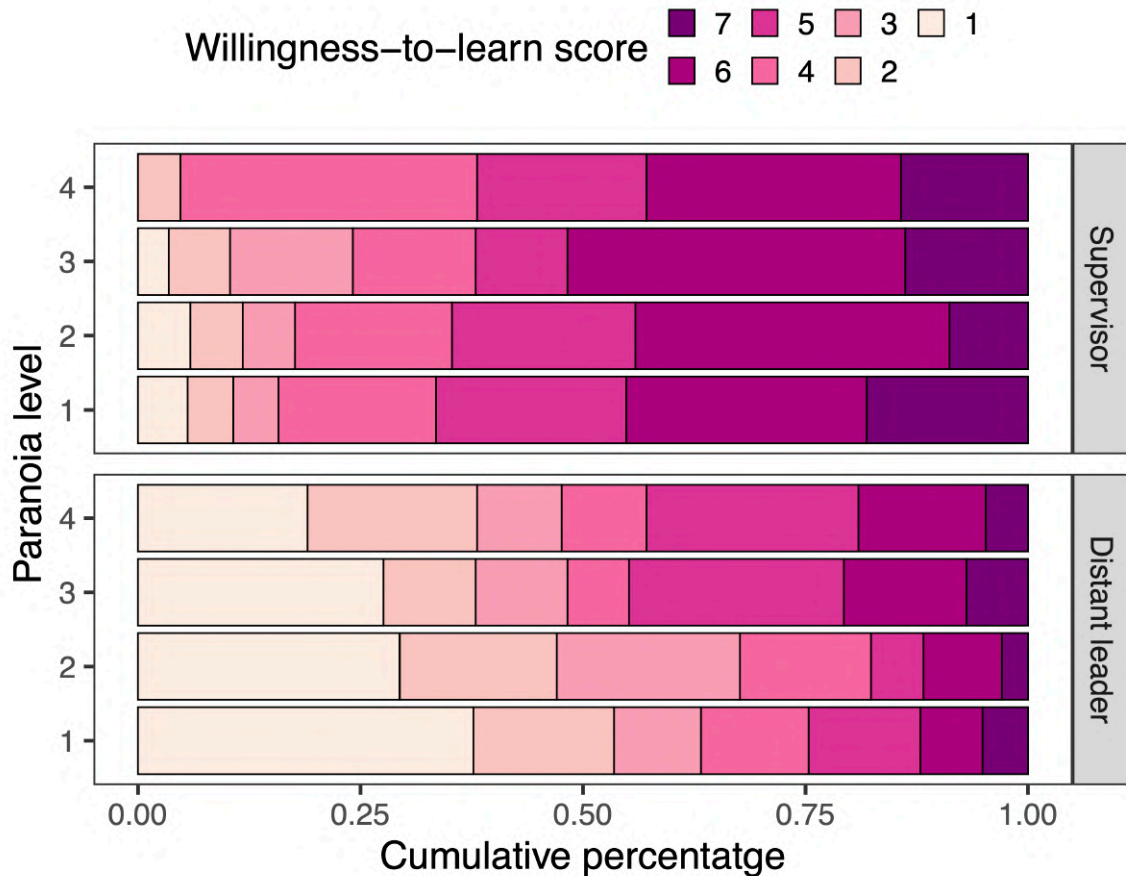
**Figure 3**. Cumulative percentage of willingness-to-learn scores according to paranoia levels.

*Note*: Paranoia scores were categorized into four levels (1: 0–5; 2: 6–10; 3: 11–17; 4: 18+).

## Discussion

Based on the assumption that paranoia is an adaptive function that helps detect social threats, this study examined the relationship between paranoia and evaluations of dominant leadership in a familiar environment. As predicted, the results revealed a strong relationship between paranoia and evaluations of dominance for familiar leaders (i.e., workplace supervisors) rather than distant leaders (i.e., leaders in the broader community).

Contrary to the prediction, we found positive associations between paranoia and willingness to learn from leaders. This correlation may reflect submission to authorities in individuals with high levels of paranoia. Recognition of a social threat induces individuals to cope with subjective harm; submission to threats can be a strategy for paranoid individuals (Freeman et al., 2005; Gilbert et al., 2005). Previous experimental studies reported that paranoia does not necessarily predict avoidance behavior toward social threats (Horita, 2023). While these speculations are subject to further investigation, this study indicates that the pathway stimulating social learning is not limited to the influence of prestige and that learning through submission to superiors plays a role in human society.

In support of the argument that prestige models promote social learning in human society (Henrich & Gil-White, 2001), we confirmed that evaluations of prestige toward leaders were associated with willingness to learn from them, regardless of the type of leader. Furthermore,

dominance was associated with unwillingness to learn socially from a distant leader; however, this association was not found for familiar leaders. Although there was a significant negative correlation between the dominance scores for supervisors and willingness to learn from them ($r = -.435$, $p < .001$), this significant correlation disappeared when controlling for the effect of the prestige scores (partial correlation: $r = -.078$, $p = .180$). Therefore, this correlation was spurious due to the influence of the supervisors' prestige evaluation (i.e., participants who believed their supervisor was prestigious were more likely to be motivated to learn from them and believed their supervisor was less dominant). Furthermore, these results implied that leaders' dominance does not independently influence social learning in familiar environments. Even if employees recognize their supervisors as dominant, it may not be easy to avoid engagement with supervisors at work—employees need to refer to their supervisors for guidance on dealing with their work. Thus, the prospective continuity of the leader-follower relationship alters the social influence of a dominant leader. Future studies should consider the proximity to leaders to better understand their social influence.

This study revealed a correlation between paranoia and dominant leadership but did not demonstrate a causal relationship. Instead of interpreting that a dominance-based environment shapes persecutory ideation, we could speculate that people with higher paranoia

levels are more likely to recognize others as dominant. However, if paranoia is simply a general belief that people are dominant, paranoia would also correlate with the evaluation of dominance toward distant leaders. Nevertheless, this study showed that paranoia is strongly related to perceptions of dominance for leaders in familiar environments. Causal relationships should be rigorously investigated by experimentally manipulating subjective social rank (e.g., Freeman et al., 2014; Saalfeld et al., 2018). However, a study found that manipulating social rank did not affect paranoid thinking (Ascone et al., 2017). Thus, a short-term experience of low social status may not be sufficient to strengthen paranoia, and persecutory ideation may be shaped through longer-term experiences of low social status. Integrating the findings from experimental and observational studies will provide a comprehensive understanding of the adaptive basis of paranoia from an evolutionary perspective.

## Author contribution
YH conceptualized the study. YH and KK performed the design, material preparation, data collection, and analysis. YH wrote the first draft of the manuscript, and all authors commented on the previous versions of the manuscript. All authors have read and approved the final manuscript.

## Ethical statement
This study was approved by the Ethics Committee for Human Psychological Research at Teikyo University (No. 683). Before participating in the study, all participants read the consent form and provided informed consent. Participants were informed that their participation in the study was voluntary. They were allowed to withdraw from the study by closing the webpage even after agreeing to participate.

## Data accessibility & program code
Data, code for analyses, and supplementary information are available in the Open Science Framework repository (https://osf.io/2wsje).

## Supplementary material
Electronic supplementary materials are available online.

## References
Ascone, L., Jaya, E. S., & Lincoln, T. M. (2017). The effect of unfavourable and favourable social comparisons on paranoid ideation: An experimental study. *Journal of Behavior Therapy and Experimental Psychiatry*, *56*, 97–105. https://doi.org/10.1016/j.jbtep.2016.08.002

Bebbington, P. E., McBride, O., Steel, C., Kuipers, E., Radovanoviĉ, M., Brugha, T., Jenkins, R., Meltzer, H. I., & Freeman, D. (2013). The structure of paranoia in the general population. *The British Journal of Psychiatry*, *202*(6), 419–427. https://doi.org/10.1192/bjp.bp.112.119032

Bell, V., & O'Driscoll, C. (2018). The network structure of paranoia in the general population. *Social Psychiatry and Psychiatric Epidemiology*, *53*(7), 737–744. https://doi.org/10.1007/s00127-018-1487-0

Bell, V., Raihani, N., & Wilkinson, S. (2021). Derationalizing delusions. *Clinical Psychological Science*, *9*(1), 24–37. https://doi.org/10.1177/2167702620951553

Brand, C. O., & Mesoudi, A. (2019). Prestige and dominance-based hierarchies exist in naturally occurring human groups, but are unrelated to task-specific knowledge. *Royal Society Open Science*, *6*(5), Article 181621. https://doi.org/10.1098/rsos.181621

Bürkner, P.-C. (2017). brms: an R package for Bayesian multilevel models using Stan. *Journal of Statistical Software*, *80*(1), 1–28. http://doi.org/10.18637/jss.v080.i01

Bürkner, P.-C., & Charpentier, E. (2020). Modelling monotonic effects of ordinal predictors in Bayesian regression models. *British Journal of Mathematical and Statistical Psychology*, *73*(3), 420–451. https://doi.org/10.1111/bmsp.12195

Cheng, J. T., Tracy, J. L., & Henrich, J. (2010). Pride, personality, and the evolutionary foundations of human social status. *Evolution and Human Behavior*, *31*(5), 334–347. https://doi.org/10.1016/j.evolhumbehav.2010.02.004

Fett, A.-K., Shergill, S. S., Joyce, D. W., Riedl, A., Strobel, M., Gromann, P. M., & Krabbendam, L. (2012). To trust or not to trust: The dynamics of social interaction in psychosis. *Brain*, *135*(3), 976–984. https://doi.org/10.1093/brain/awr359

Freeman, D., Evans, N., Lister, R., Antley, A., Dunn, G., & Slater, M. (2014). Height, social comparison, and paranoia: An immersive virtual reality experimental study. *Psychiatry Research*, *218*(3), 348–352. https://doi.org/10.1016/j.psychres.2013.12.014

Freeman, D., & Garety, P. A. (2000). Comments on the content of persecutory delusions: Does the definition need clarification? *British Journal of Clinical Psychology*, *39*(4), 407–414. https://doi.org/10.1348/014466500163400

Freeman, D., Garety, P. A., Bebbington, P. E., Smith, B., Rollinson, R., Fowler, D., Kuipers, E., Ray, K., & Dunn, G. (2005). Psychological investigation of the structure of paranoia in a non-clinical population. *The British Journal of Psychiatry*, *186*(5), 427–435. https://doi.org/10.1192/bjp.186.5.427

Freeman, D., Loe, B. S., Kingdon, D., Startup, H., Molodynski, A., Rosebrock, L., Brown, P., Sheaves, B., Waite, F., & Bird, J. C. (2021). The revised Green et al., Paranoid Thoughts Scale (R-GPTS): Psychometric properties, severity ranges, and clinical cut-offs. *Psychological Medicine*, *51*(2), 244–253. https://doi.org/10.1017/S0033291719003155

Freeman, D., McManus, S., Brugha, T., Meltzer, H., Jenkins, R., & Bebbington, P. (2011). Concomitants of paranoia in the general population. *Psychological Medicine*, *41*(5), 923–936. https://doi.org/10.1017/S0033291710001546

Gilbert, P. (2001). Evolutionary approaches to psychopathology: The role of natural defences. *Australian and New*

*Zealand Journal of Psychiatry*, *35*(1), 17–27. https://doi.org/10.1046/j.1440-1614.2001.00856.x

Gilbert, P., Boxall, M., Cheung, M., & Irons, C. (2005). The relation of paranoid ideation and social anxiety in a mixed clinical population. *Clinical Psychology and Psychotherapy*, *12*(2), 124–133. https://doi.org/10.1002/cpp.438

Green, M. J., & Phillips, M. L. (2004). Social threat perception and the evolution of paranoia. *Neuroscience and Biobehavioral Reviews*, *28*(3), 333–342. https://doi.org/10.1016/j.neubiorev.2004.03.006

Henrich, J., & Gil-White, F. J. (2001). The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior*, *22*(3), 165–196. https://doi.org/10.1016/S1090-5138(00)00071-4

Hertz, U., Bell, V., & Raihani, N. (2021). Trusting and learning from others: Immediate and long-term effects of learning from observation and advice. *Proceedings of the Royal Society B: Biological Sciences*, *288*(1961), Article 20211414. https://doi.org/10.1098/rspb.2021.1414

Horita Y. (2023). Paranoid thinking and perceived competitive intention. *PeerJ*, *11*, Article e15003. https://doi.org/10.7717/peerj.15003

Jiménez, Á. V., & Mesoudi, A. (2019). Prestige-biased social learning: Current evidence and outstanding questions. *Palgrave Communications*, *5*, Article 20. https://doi.org/10.1057/s41599-019-0228-7

Raihani, N. J., & Bell, V. (2019). An evolutionary perspective on paranoia. *Nature Human Behaviour*, *3*(2), 114–121. https://doi.org/10.1038/s41562-018-0495-0

R Core Team (2023). *R: A Language and Environment for Statistical Computing.* R Foundation for Statistical Computing. https://www.R-project.org/

Saalfeld, V., Ramadan, Z., Bell, V., & Raihani, N. J. (2018). Experimentally induced social threat increases paranoid thinking. *Royal Society Open Science*, *5*(8), Article 180569. https://doi.org/10.1098/rsos.180569