



Public attitude influences actors' visual orientation: a pilot experimental study

Alban Lemasson, Daria Lippi, Laura Hamelin, Stéphane Louazon, Martine Hausberger

► To cite this version:

Alban Lemasson, Daria Lippi, Laura Hamelin, Stéphane Louazon, Martine Hausberger. Public attitude influences actors' visual orientation: a pilot experimental study. *Interaction Studies*, In press, 21 (3), pp.428-439. 10.1075/is.19009.lem . hal-02611648

HAL Id: hal-02611648

<https://univ-rennes.hal.science/hal-02611648v1>

Submitted on 18 May 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Lemasson et al. (in press) Public attitude influences actors' visual orientation: a pilot experimental study, Interaction Studies, John Benjamins Publishing Company

Author accepted manuscript

Article under copyright by the John Benjamins Publishing Company. The publisher should be contacted for permission to re-use or reprint the material in any form

Public attitude influences actors' visual orientation: a pilot experimental study

Lemasson Alban (Corresponding author)*

Univ Rennes, Normandie Univ, CNRS, EthoS (Ethologie animale et humaine) – UMR 6552, F-35000 Rennes, France.

alban.lemasson@univ-rennes1.fr

Lippi Daria*

Fabrique Autonome des Acteurs – F.A.A., Site Industriel Hellocourt, 57770, Moussey, France.

daria.lippi@fabriqueautonome.org

*** Equal contribution**

Hamelin Laura

Univ Rennes, Normandie Univ, CNRS, EthoS (Ethologie animale et humaine) – UMR 6552, F-35000 Rennes, France.

hamelin_laura@orange.fr

Louazon Stéphane

Univ Rennes, Normandie Univ, CNRS, EthoS (Ethologie animale et humaine) – UMR 6552, F-35000 Rennes, France.

stephane.louazon@univ-rennes1.fr

Hausberger Martine

Univ Rennes, Normandie Univ, CNRS, EthoS (Ethologie animale et humaine) – UMR 6552, F-35000 Rennes, France.

martine.hausberger@univ-rennes1.fr

ABSTRACT

Human emotions guide verbal and non-verbal behaviour during social encounters. During public performances, performers' emotions can be affected directly by an audience's attitude. The valence of the emotional state (positive or negative) of a broad range of animal species is known to be associated with a body and visual orientation laterality bias. Here, we evaluated the influence of an audience's attitude on professional actors' head orientation and gaze direction during two theatrical performances with controlled observers' reactions (Hostile vs Friendly audience). First, our speech fluency analysis confirmed that an audience's attitude influenced

actors' emotions. Second, we found that, whereas actors oriented more their head to the left (i.e. Right Hemisphere Bias) when the audience was hostile, they gazed more straight ahead at Friendly spectators. These results are in accordance with the Valence-Specific Hypothesis that proposes that processing stimuli with negative valences involves the right hemisphere (i.e. left eye) more than the left hemisphere.

KEYWORDS

Emotions; Public performance; Audience effect; Laterality; Theatre.

Author accepted manuscript

INTRODUCTION

Nonverbal behaviours, such as mutual gazes and proxemics, impact the regulation of social interactions (Herrera et al., 2011). Directed gazes and body postures play an important role in coordinating turn-taking by communicating information concerning interlocutors' intentions and emotions (Kendon, 1967; Herrera et al., 2011). Body posture affects an audience's perception (Huang et al., 2011), but an audience's characteristics can also influence performers' body posture (Mehrabian, 1969). Emotions and behaviours are intermingled (Feldman et al., 1999; Baumeister et al., 2007). Gaze avoidance is characteristic of unfriendly encounters, while more direct gazes are present during friendly interactions (Kendon, 1967). Interlocutors also tend to expose one hemiface more than the other to their partner (Nicholls et al., 2002). The choice of the hemiface exposed is linked to the subject's emotional state (i.e. presenting the left cheek when posing is considered to be more emotionally expressive, Nicholls et al., 1999 and 2002) or to the emotional valence (aggressive/friendly) of the context of social encounters (Basile et al., 2009).

A broad range of animal studies support the link between perceptual laterality and emotional state (Rogers et al., 2013; Versace & Vallortigara, 2015; Vallortigara & Versace, 2017). The Valence-Specific Hypothesis (VSH) posits that the left side of the brain is specialised for processing positive emotions and the right side for processing negative emotions (Ahern & Schwartz, 1979; Davidson, 1984; Wedding & Stalans, 1985; Hook-Costigan & Rogers, 1998). The predominance of the left visual field preference (i.e. suggesting a contralateral right hemisphere processing) varies with the level of negative emotions during social interactions and exposures to negative stimuli (nonhuman primates: Casperd & Dunbard, 1996; Baraud et al., 2009; Quaresmini et al., 2014; dogs: Quaranta et al., 2007; Siniscalchi et al., 2013; horses: Larose et al., 2006; De Boyer des Roches et al., 2008; Austin & Rogers, 2014; birds: Vallortigara et al., 1999; cetaceans: Chanvallon et al., 2017 and honeybees: Rogers & Vallortigara, 2019).

During public performances, characteristics of the audience influence performers' emotions and behaviours (Bode and Brutten, 1963; LeBlanc et al., 1997). For example, audience size, actors' emotions and lateralised positioning are inter-connected, and actors tend to use their left visual field (i.e. right hemisphere) in anxious and less preferred situations (Lemasson et al., 2018). The spatial disposition of an audience in a theatre layout is associated with different rates of galvanic skin responses and a quadri-frontal disposition (with spectators on all possible sides) increases actors' emotional scores (Lemasson et al., 2019).

The pleasantness, responsiveness and interest of an audience are known to affect performers' internal state (MacIntyre and Thivierge, 1995; MacIntyre et al., 1997). Negative responses from an audience typically

increase speakers' anxiety (Bassett et al., 1973; Gardiner, 1971; Pertaub et al., 2002). In contrast, supportive audiences have a positive impact on speakers' stress (Yokoyama et al., 1992; Taylor et al., 2010). We know that looking at angry/happy faces triggers more/less gaze avoidance especially when the observer is feeling anxious (Roelofs et al., 2010). However, to our knowledge, no study has evaluated the influence of an audience's attitude on performers' behavioural laterality.

We tested experimentally the impact of two contrasting controlled audience attitudes (Friendly/Hostile) on professional actors' spontaneous emotions and lateralised behaviour. Emotions were estimated by analysing their speech as stress is known to reduce speech fluency (Buchanan et al., 2014). Lateralised behaviours were evaluated by head orientations and gaze directions. We hypothesised that left-side orientations and direct gazes would be fewer in the negative situation than in the positive situation.

METHODS

Since our study was only observational, with informed consents from participants, no further ethical authorisations were requested according to the French law. Following the recommendations of the European General Data Protection Regulation, this study was registered under the certificate #2-17049\UMR6552 by the Data Protection Service.

- Experimental setup

The study was conducted during two theatrical representations by the "Fabrique Autonome des Acteurs" (Moussey City, France) on August 30th and the 31st 2017. Ten professional actors, 6 women and 4 men, between 24 and 47 years old, took part in a play including ten monologues, lasting about 4 minutes each. During a given monologue, only one actor spoke and sat on a chair placed in front of the spectators. Each actor had the leading role in one monologue only while all the other actors remained on stage, sitting silently on chairs but down-stage. All the monologues included a reference to animals and/or animal sciences. The ten monologues were delivered their lines consecutively and in the same order during the two representations. The actors and the spectators knew they were contributing to an ethological research project but were totally naive as to the scientific objectives, measurements and experimental variables. They were informed only that they had to remain sitting on the offered chair. Respectively 34 and 31 spectators attended the representations. The spectators differed between the two representations.

The two representations were identical so that the only experimental variable was the spectators' attitude. Just before the start of a representation, the spectators were informed that they had to contribute by being Friendly on

the first day (i.e. to over express all their positive feelings) and Hostile on the second day (i.e. to express their positive feelings discreetly and to exaggerate all their negative feelings). Each leading actor was filmed using a Sony DCR-SR35 camera, positioned centrally, behind the spectators.

- Selection of texts and direction of actors

The texts for the ten monologues were chosen based on two criteria. First, all texts talked about animals and were mainly descriptive in order to be dramaturgically coherent. Second, all texts had to be emotionally “neutral” for the actors, such as naturalistic descriptions (i.e. three extracts of Darwin’s “Voyage autour du monde à bord du Beagle”, two extracts of Maëterlinck’s “La vie des abeilles”, one extract of Lorenz’ “L’agression”) and extracts of novels (i.e. three extracts of Mac Carthy’s “La trilogie des plaines”, one extract of London’s “Construire un feu”) in French. Prior work with the actors focused on some specific parts of the text (like active verbs) but never concerned the characters played.

- Data collection

The videos of all the entire monologues were scored using Boris software v.6.0.5 © 2012-2018. Using continuous focal sampling, we scored indicators of change in emotional state through the leading actor’s speech: Mistakes (i.e. word omission, word addition, word error and word inversion, after comparing to the original text) and Silent pauses (total duration and number of occurrences) (Buchana et al., 2014; Lemasson et al., 2018). Durations were measured with a precision of 0.001s, and silences lasting more than 0.1s were considered a pause. In addition, using instantaneous scan sampling, every 5 seconds, we measured (independently from one another) head orientations and gaze directions of the leading actor. Head orientations were categorised either as “Front” (i.e. facing the spectators), “Right” (i.e. right side oriented towards the spectators at an angle of more than 45°) or “Left” (i.e. left side oriented towards the spectators at an angle of more than 45°). Gazes were also categorised either as “Front” (i.e. directed towards the centre of the audience), the “Periphery” (i.e. directed towards the farthest sides of the audience) or “Undirected” (i.e. not directed towards the audience).

- Data analyses

Given our small sample size ($N = 10$ actors), we only ran non-parametric statistical tests. Using Wilcoxon matched pair tests, we analysed the influence of the public’s attitude on the actors’ behaviours (speech, head orientation, gaze direction). We compared frequencies and durations for focal variables and percentages for scan variables. To run the data analysis, we used Rstudio software v.1.0.146 © 2009-2016 (package: coin) with the significance level set at 0.05.

RESULTS

1 - Influence of the audience's attitude on the actors' speech

Speech analyses revealed that a Hostile public was associated with longer silence durations ($V = 6$ and $p = 0.03$) and a greater number of silences (Wilcoxon test: $V = 5$ and $p = 0.04$) than a Friendly public (Fig. 1). However, the public's attitude had no effect on the number of mistakes made by the actors during their monologues (Median number of mistakes for each representation = 3.5, Wilcoxon test: $V = 17$ and $p = 0.67$).

FIGURE 1 ABOUT HERE

2 - Influence of the audience's attitude on the actors' positions and gazes

We found that the public's attitude influenced orientation of actors' head. Indeed, actors' head was directed more to the Left when the public was Hostile than when it was Friendly ($V = 6$ and $p = 0.027$, Fig. 2). However, the public's attitude did not influence other head orientations (Front: $V = 40$ and $p = 0.23$; Right: $V = 24$ and $p = 0.77$; Fig 2).

FIGURE 2 ABOUT HERE

These results also showed that gaze direction was influenced by the public's attitude. When the public was Friendly, actors gazed more towards the centre of the audience ($V = 53$ and $p = 0.006$, Fig. 3), and less towards the periphery of the audience ($V = 0$ and $p = 0.002$, Fig. 3) than when acting in front of a hostile audience. However, the audience's attitude did not influence the time spent with undirected gazes ($V = 29$ and $p = 0.92$).

FIGURE 3 ABOUT HERE

DISCUSSION

In line with our predictions, our data showed that actors presented spontaneously more often their left-hemiface to the public when the audience expressed a hostile rather than a friendly attitude. A hostile audience impaired actors' speech fluency. However, right-side orientations did not increase with a friendly public. Nevertheless, the actors gazed more at the public when the audience was friendly but more to the periphery when it was hostile.

Gaze avoidance is strongly related to emotional state and is a way for people to decrease their stress (Larsen & Shackelford, 1996). A vast majority of reports indicate that a higher percentage of eye contact between communicators is typically associated with more positive attitudes between the communicators (Mehrabian, 1969). People make significantly more eye contacts with liked addressees than with disliked addressees (Mehrabian, 1969). Perceiving direct/averted gazes activates the approach/avoidance motivational brain systems thus influencing the outcome of an interaction (Hietanen et al., 2008). The lack of responsiveness and pleasantness of hostile observers certainly affected actors' emotional states and motivation to engage in long-lasting exchanges. Binocular gazes by horses towards positive stimuli have been observed (de Boyer des Roches et al., 2018), suggesting flexibility in hemispheric specialisation for processing positive emotions.

The increase of left-hemiface (i.e. right brain hemisphere control) exposure in the hostile audience situation is consistent with the Valence Specific Hypothesis (e.g. Hook-Costigan & Rogers, 1998). Indeed, acting in front of a non-responsive audience certainly created an unpleasant atmosphere and thus a bias in favour of a right-hemisphere processing of negative emotions. Alternatively, this may have been a way actors spontaneously and unconsciously adapted to the situation by favouring the exposure of their left hemiface, which typically expresses emotions more intensively (Asthana & Mandal, 1998), possibly in order to increase the chances of eliciting more positive responses from the audience. Previous authors showed that, when photographers ask people to portray a variety of emotions, they present more often the left side of their face (Nicholls et al., 1999). Portraits of left side posers received higher emotional expressive rates (Nicholls et al., 2002). Finally, actors may have been more surprised and hence more attentive towards the hostile public, and this may also be reflected by their longer silences that would trigger a right-hemisphere bias (Hausberger et al., 2019).

Although this study would deserve replication with larger sample sizes and repeated trials in order to make these conclusions more solid, it brings new findings that consolidate an earlier study showing that left-hemiface exposure of actors increased in more anxiety-provoking theatrical situations (i.e. larger public) (Lemasson et al., 2018). It confirms the possibility to run social human laterality studies in naturalistic contexts.

ACKNOWLEDGEMENTS

We greatly appreciate the friendly participation of all actors and spectators in this study. We are grateful to Antoine L'Azou for his help in coordinating the project. We also thank Corinne Jola for her comments on the protocol. Finally, we thank Ann Cloarec for checking the English text. This study was funded by Rennes 1

191 University and C.N.R.S., as well as by the “Fabrique Autonome des Acteurs” with the support of the Fondation
192 Daniel & Nina Carasso and the French Ministry of Culture.

193

194

195

Author accepted manuscript

REFERENCES

- Ahern, G.L., Schwartz, G.E. (1979). Differential lateralization for positive versus negative emotion. *Neuropsychologia* 17, 693–698. [https://doi.org/10.1016/0028-3932\(79\)90045-9](https://doi.org/10.1016/0028-3932(79)90045-9)
- Asthana, H.S., Mandal, M.K. (1998). Hemifacial asymmetry in emotion expressions. *Behavior modifications*, 22, 177–183. <https://doi.org/10.1177/01454455980222005>
- Austin, N.P., Rogers, L.J. (2014). Lateralization of agonistic and vigilance responses in Przewalski horses (*Equus przewalskii*). *Applied Animal Behaviour Science*, 151, 43–50.
- Baraud, I., Buytet, B., Bec, P., Blois-Heulin, C. (2009). Social laterality and ‘transversality’ in two species of mangabeys: influences of rank and implication for hemispheric specialization. *Behavioral Brain Research*, 198, 449–458.
- Basile, M., Lemasson, A., Blois-Heulin, C. (2009). Social and Emotional Values of Sounds Influence Human (*Homo sapiens*) and Non-Human Primate (*Cercopithecus campbelli*) Auditory Laterality. *PloS ONE* 4, e6295. <https://doi.org/10.1371/journal.pone.0006295>
- Bassett, R., Behnke, R.R., Carlile, L.W., Rogers, J. (1973). The effects of positive and negative audience responses on the autonomic arousal of student speakers. *South. Speech Commun. J.* 38, 255–261. <https://doi.org/10.1080/10417947309372195>
- Baumeister, R.F., Vohs, K.D., Nathan DeWall, C., Zhang, L. (2007). How Emotion Shapes Behavior: Feedback, Anticipation, and Reflection, Rather Than Direct Causation. *Personal. Soc. Psychol. Rev.* 11, 167–203. <https://doi.org/10.1177/1088868307301033>
- Bode, D.L., Brutton, E.J. (1963). A palmar sweat investigation of the effect of audience variation upon stage fright. *Speech Monogr.* 30, 92–96. <https://doi.org/10.1080/03637756309375363>
- Buchanan, T.W., Laures-Gore, J.S., Duff, M.C. (2014). Acute stress reduces speech fluency. *Biol. Psychol.* 97, 60–66. <https://doi.org/10.1016/j.biopsycho.2014.02.005>
- Casperd, J.M., Dunbar, R.I.M. (1996). Asymmetries in the visual processing of emotional cues during agonistic interactions by gelada baboons. *Behav. Processes* 37, 57–65. [https://doi.org/10.1016/0376-6357\(95\)00075-5](https://doi.org/10.1016/0376-6357(95)00075-5)
- Chanvallon, S., Blois-Heulin, C., Robert de Latour P., Lemasson, A. (2017). Spontaneous approaches of divers by free-ranging orcas (*Orcinus orca*): age- and sex-differences in exploratory behaviours and visual laterality. *Scientific Reports*, 7, 10922.
- Davidson, R.J. (1984). Hemispheric asymmetry and emotion. In K. Scherer, & P. Ekman (Eds.), *Approaches to emotion* (pp. 320–365). Hillside, New Jersey: Erlbaum.

226 De Boyer Des Roches, A., Richard-Yris, M.-A., Henry, S., Ezzaoui, M., Hausberger, M. (2008). Laterality and
 227 emotions: Visual laterality in the domestic horse (*Equus caballus*) differs with objects' emotional value. *Physiol.*
 228 *Behav.* 94, 487–490. <https://doi.org/10.1016/j.physbeh.2008.03.002>

229 Feldman, P.J., Cohen, S., Lepore, S.J., Matthews, K.A., Kamarck, T.W., Marsland, A.L. (1999). Negative
 230 emotions and acute physiological responses to stress. *Ann. Behav. Med.* 21, 216–222.
 231 <https://doi.org/10.1007/BF02884836>

232 Gardiner, J.C. (1971). A Synthesis of Experimental Studies of Speech Communication Feedback. *J. Commun.* 21,
 233 17–35. <https://doi.org/10.1111/j.1460-2466.1971.tb00902.x>

234 Herrera, D., Novick, D., Jan, D., Traum, D. (2011). Dialog Behaviors across Culture and Group Size, in: *Universal*
 235 *Access in Human-Computer Interaction*. Users Diversity, Lecture Notes in Computer Science. Presented at the
 236 International Conference on Universal Access in Human-Computer Interaction, Springer, Berlin, Heidelberg, pp.
 237 450–459. https://doi.org/10.1007/978-3-642-21663-3_48

238 Hietanen, J.K., Leppänen, J.M., Peltola, M.J., Linna-aho, K., Ruuhiala, H.J. (2008). Seeing direct and averted gaze
 239 activates the approach–avoidance motivational brain systems. *Neuropsychologia* 46, 2423–2430.
 240 <https://doi.org/10.1016/j.neuropsychologia.2008.02.029>

241 Hook-Costigan, M.A., Rogers, L.J. (1998). Eye Preferences in Common Marmosets (*Callithrix jacchus*): Influence
 242 of age, stimulus, and hand preference. *Laterality Asymmetries Body Brain Cogn.* 3, 109–130.
 243 <https://doi.org/10.1080/713754297>

244 Huang, L., Galinsky, A.D., Gruenfeld, D.H., Guillory, L.E. (2011). Powerful Postures Versus Powerful Roles:
 245 Which Is the Proximate Correlate of Thought and Behavior? *Psychol. Sci.* 22, 95–102.
 246 <https://doi.org/10.1177/0956797610391912>

247 Kendon, A. (1967). Some functions of gaze-direction in social interaction. *Acta Psychol. (Amst.)* 26, 22–63.
 248 [https://doi.org/10.1016/0001-6918\(67\)90005-4](https://doi.org/10.1016/0001-6918(67)90005-4)

249 Larose, C., Richard-Yris, M.-A., , Rogers, L.J., Hausberger, M. (2006). Laterality of horses associated with
 250 emotionality in novel situations. *Laterality Asymmetries Body Brain Cogn.* 11, 355–367.
 251 <https://doi.org/10.1080/13576500600624221>

252 Larsen, R.J., Shackelford, T.K. (1996). Gaze avoidance: Personality and social judgments of people who avoid
 253 direct face-to-face contact. *Personal. Individ. Differ.* 21, 907–917. [https://doi.org/10.1016/S0191-8869\(96\)00148-](https://doi.org/10.1016/S0191-8869(96)00148-1)
 254 1

255 LeBlanc, A., Jin, Y.C., Obert, M., Siivola, C. (1997). Effect of Audience on Music Performance Anxiety. *J. Res.*
256 *Music Educ.* 45, 480–496. <https://doi.org/10.2307/3345541>

257 Lemasson, A., André, V., Boudard, M., Lippi, D., Hausberger, M. (2018). Audience size influences actors' anxiety
258 and associated postures on stage. *Behavioural Processes*, 157, 225-229.

259 Lemasson, A., André, V., Boudard, M., Lippi, D., Cousillas, H., Hausberger, M. (2019). Influence of theatre hall
260 layout on actors' and spectators' emotions. *Animal Cognition*, in press.

261 MacIntyre, P.D., Thivierge, K.A. (1995). The effects of audience pleasantness, audience familiarity, and speaking
262 contexts on public speaking anxiety and willingness to speak. *Commun. Q.* 43, 456–466.
263 <https://doi.org/10.1080/01463379509369992>

264 MacIntyre, P.D., Thivierge, K.A., MacDonald, J.R. (1997). The effects of audience interest, responsiveness, and
265 evaluation on public speaking anxiety and related variables. *Commun. Res. Rep.* 14, 157–168.
266 <https://doi.org/10.1080/08824099709388657>

267 Mehrabian, A. (1969). Significance of posture and position in the communication of attitude and status
268 relationships. *Psychological Bulletin*, 71(5), 359-372.

269 Nicholls, M. E., Clode, D., Wood, S. L., & Wood, A. G. (1999). Laterality of expression in portraiture: putting
270 your best cheek forward. *Proceedings of the Royal Society of London B*, 266 (1428), 1517–1522.

271 Nicholls, M.E.R., Wolfgang, B.J., Clode, D., Lindell, A.K. (2002). The effect of left and right poses on the
272 expression of facial emotion. *Neuropsychologia* 40, 1662–1665.

273 Pertaub, D.-P., Slater, M., Barker, C. (2002). An Experiment on Public Speaking Anxiety in Response to Three
274 Different Types of Virtual Audience. *Presence Teleoperators Virtual Environ.* 11, 68–78.
275 <https://doi.org/10.1162/105474602317343668>

276 Quaranta, A., Siniscalchi, M., Vallortigara, G. (2007). Asymmetric-tail-wagging responses by dogs to different
277 stimuli. *Current Biology*, 17(6), 199-201.

278 Quaresmini, C., Forrester, G. S., Spiezio, C., Vallortigara, G. (2014). Social environment elicits lateralized
279 behaviors in gorillas (*Gorilla gorilla gorilla*) and chimpanzees (*Pan troglodytes*). *Journal of Comparative*
280 *Psychology*, 128(3), 276-284.

281 Roelofs, K., Putman, P., Schouten, S., Lange, W.-G., Volman, I., Rinck, M. (2010). Gaze direction differentially
282 affects avoidance tendencies to happy and angry faces in socially anxious individuals. *Behav. Res. Ther.* 48, 290–
283 294. <https://doi.org/10.1016/j.brat.2009.11.008>

- Rogers, L. J., Vallortigara, G., Andrew, R. J. (2013). *Divided brains: The biology and behaviour of brain asymmetries*. Cambridge: Cambridge University Press.
- Rogers, L. J., Vallortigara, G. (2019). Complementary specializations of the left and right sides of the honeybee brain. *Front. Psychol.* 10, 280. <https://doi.org/10.3389/fpsyg.2019.00280>
- Siniscalchi, M., Lusito, R., Vallortigara, G., Quaranta, A. (2013). Seeing Left- or Right-asymmetric tail wagging produces different emotional responses in dogs. *Current Biology*, 23(22), 2279-2282.
- Taylor, S.E., Seeman, T.E., Eisenberger, N.I., Kozanian, T.A., Moore, A.N., Moons, W.G. (2010). Effects of a supportive or an unsupportive audience on biological and psychological responses to stress. *J. Pers. Soc. Psychol.* 98, 47–56. <https://doi.org/10.1037/a0016563>
- Vallortigara, G., Regolin, L., Pagni, P. (1999). Detour behaviour, imprinting and visual lateralization in the domestic chick. *Cogn. Brain Res.* 7, 307–320. [https://doi.org/10.1016/S0926-6410\(98\)00033-0](https://doi.org/10.1016/S0926-6410(98)00033-0)
- Vallortigara, G., Versace, E. (2017). Laterality at the neural, cognitive, and behavioral levels. In J. Call, G. M. Burghardt, I. M. Pepperberg, C. T. Snowdon, & T. Zentall (Eds.), *APA handbooks in psychology. APA handbook of comparative psychology: Basic concepts, methods, neural substrate, and behavior* (pp. 557-577). Washington: American Psychological Association.
- Versace, E., Vallortigara, G. (2015). Forelimb preferences in human beings and other species: multiple models for testing hypotheses on lateralization. *Frontiers in Psychology*, 6, 233.
- Wedding, D., Stalans, L. (1985). Hemispheric differences in the perception of positive and negative faces. *International Journal of Neuroscience*, 27, 277–281.
- Yokoyama, H., Kurokawa, M., Seiwa, H. (1992). Influence of the role of a partner on anxiety due to a physically threatening situation. *Anxiety Stress Coping* 5, 269–281. <https://doi.org/10.1080/10615809208249527>

307 **FIGURE CAPTIONS**

308 **Fig.1** Actors' silences in relation to the public's attitude (Friendly or Hostile). Left: Total duration; right: number
309 of occurrences. Wilcoxon tests: * $p < 0.05$.

310

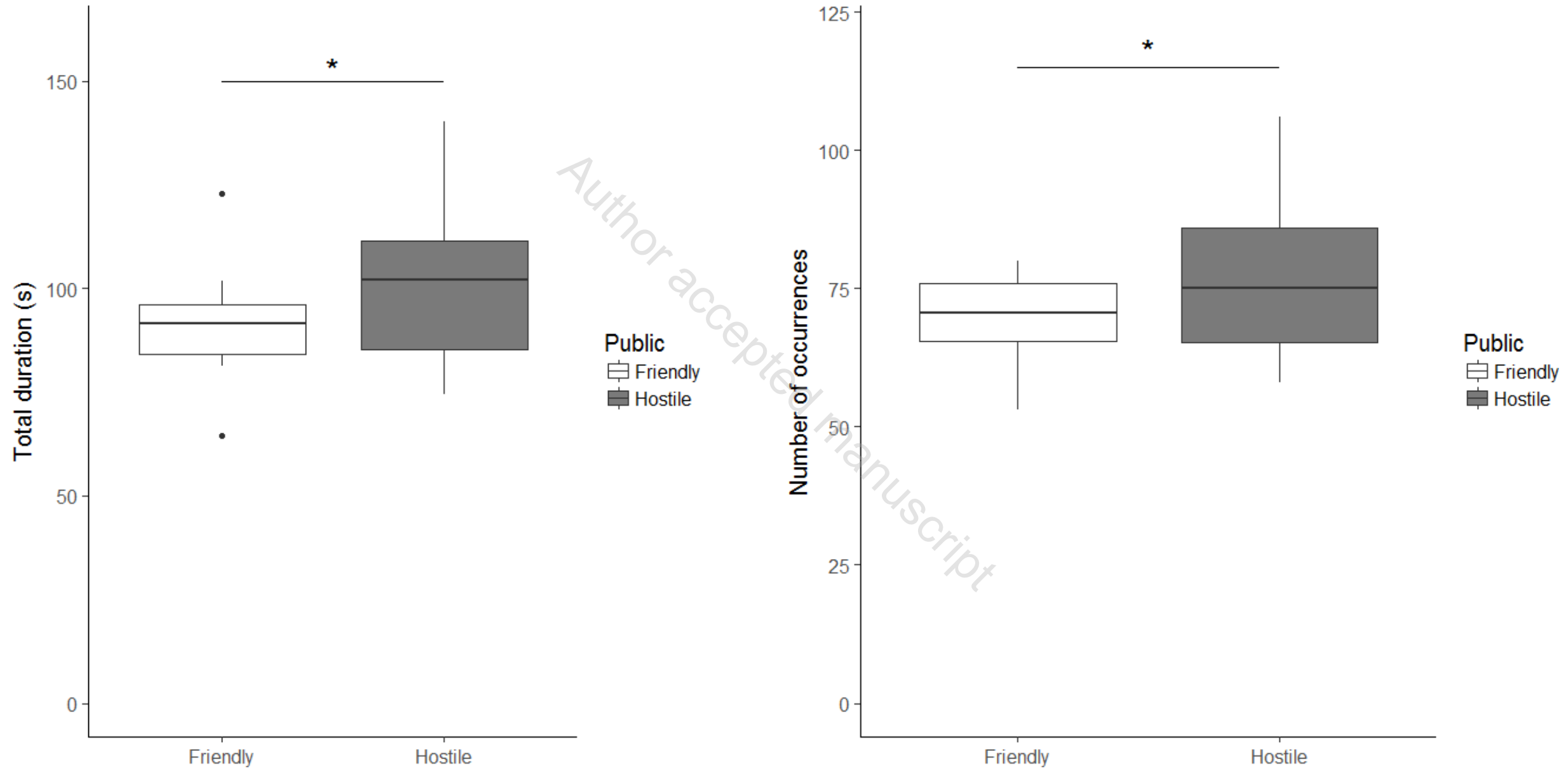
311 **Fig.2** Head orientation to the public's attitude. Times (in percent) spent by the actor in each orientation. Wilcoxon
312 tests: * $p < 0.05$.

313

314 **Fig.3** Eyes orientation in relation to the public's attitude. Times (in percent) spent by the actor in each orientation.
315 Wilcoxon tests: ** $p < 0.01$.

Author accepted manuscript

Fig.1 Actors' silences in relation to the public's attitude (Friendly or Hostile). Left: Total duration; right: number of occurrences. Wilcoxon tests: * $p < 0.05$.



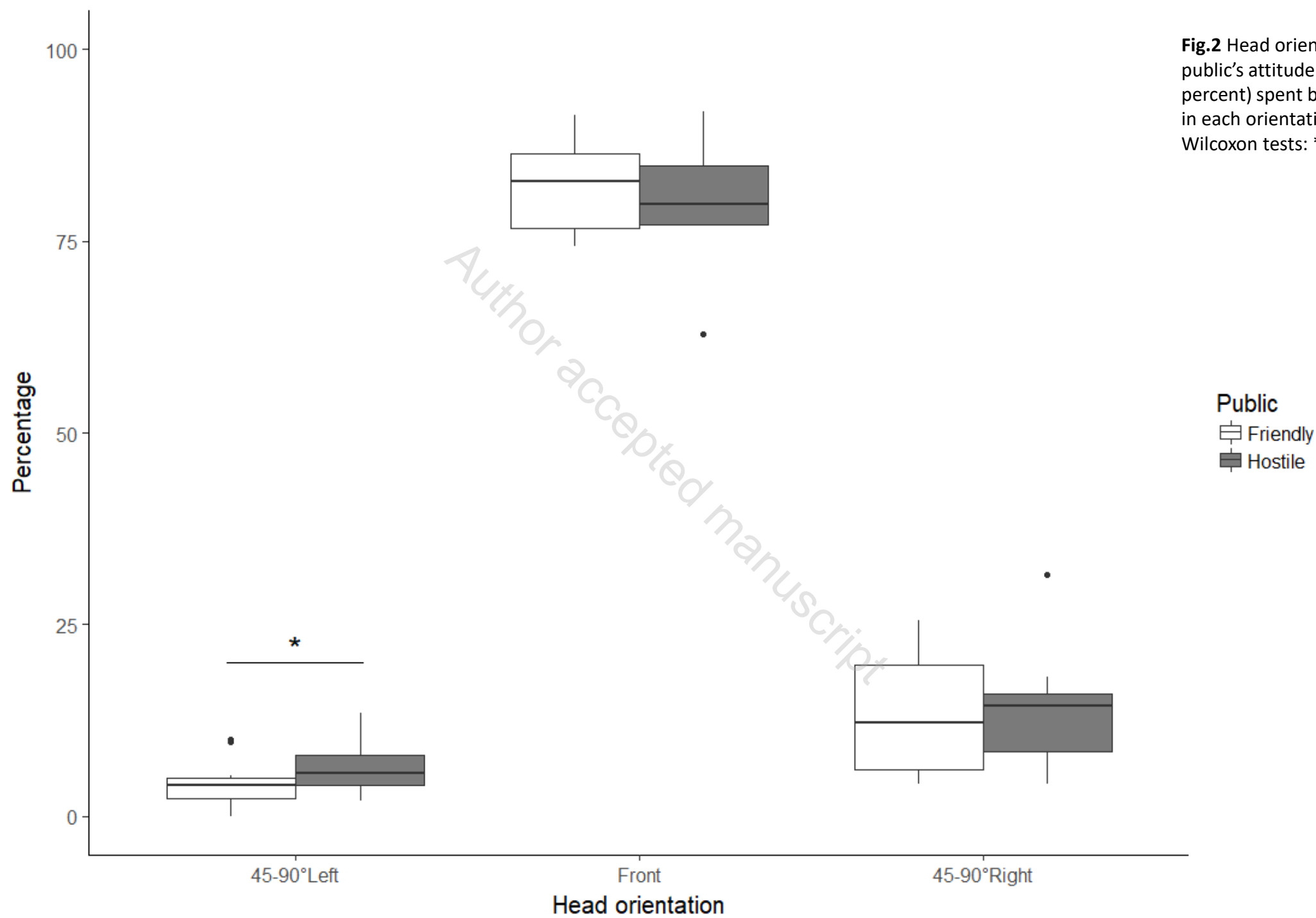


Fig.2 Head orientation to the public's attitude. Times (in percent) spent by the actor in each orientation. Wilcoxon tests: * $p < 0.05$.

Fig.3 Eyes orientation in relation to the public's attitude. Times (in percent) spent by the actor in each orientation. Wilcoxon tests: ** $p < 0.01$.

