Mimicry eases prediction and thereby smoothens social interactions

Kret, M.E.; Akyüz, R.

Mimicry eases prediction and thereby smoothens social interactions

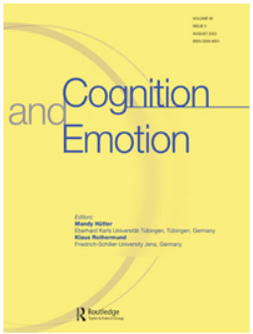
Article *in* Cognition and Emotion · August 2022

DOI: 10.1080/02699931.2022.2110452

2 authors:

Mariska E Kret
Leiden University
83 PUBLICATIONS **3,258** CITATIONS
SEE PROFILE

Roman Akyüz
Leiden University
1 PUBLICATION **0** CITATIONS
SEE PROFILE



Routledge
Taylor & Francis Group

Cognition and Emotion

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/pcem20

Mimicry eases prediction and thereby smoothens social interactions

M. E. Kret & R. Akyüz

To cite this article: M. E. Kret & R. Akyüz (2022) Mimicry eases prediction and thereby smoothens social interactions, Cognition and Emotion, 36:5, 794-798, DOI: 10.1080/02699931.2022.2110452

To link to this article: https://doi.org/10.1080/02699931.2022.2110452

Published online: 07 Sep 2022.

COGNITION AND EMOTION
2022, VOL. 36, NO. 5, 794–798
https://doi.org/10.1080/02699931.2022.2110452

Routledge
Taylor & Francis Group

COMMENTARY

Mimicry eases prediction and thereby smoothens social interactions

M. E. Kret [a,b] and R. Akyüz[a,b]

[a]Cognitive Psychology Unit, Leiden University, Leiden, the Netherlands; [b]Leiden Institute for Brain and Cognition (LIBC), Leiden, the Netherlands

ABSTRACT

In their "social contextual view" of emotional mimicry, authors Hess and Fischer (2022) put forward emotional mimicry as a social regulator, considering it a social act, bound to certain affiliative contexts or goals. In this commentary, we argue that the core function of mimicry is to ease predicting conspecifics' behaviours and the environment, and that as a consequence, this often smoothens social interactions. Accordingly, we make three main points. First, we argue that there is no good reason to believe that the mimicry of negative expressions is fundamentally different than the mimicry of positive or ambiguous or autonomic expressions. Second, we give examples of empirical evidence that mimicry is not always a social act. Third, we show that mimicry has primary benefits for the mimicker. As such, we will briefly summarise and elaborate on the relevant findings in these respects, and propose a comparative, multi-method and ecologically valid approach which can explain the multifaceted character of the phenomenon.

ARTICLE HISTORY
Received 9 July 2022
Accepted 22 July 2022

KEYWORDS
Comparative psychology; emotional mimicry; emotional contagion; physiological synchrony; evolution of mimicry

Background

That we, social animals, mimic emotional expressions is clear and supported by a wide literature covering a variety of species (e.g. humans: (Dimberg et al., 2000; Hatfield et al., 1992); great apes: (Anderson et al., 2004; Davila-Ross et al., 2010); dogs: (Palagi et al., 2015); horses: (Dalla Costa et al., 2014). That mimicry often smoothens or prolongs social interactions, has been reported across species as well (e.g. humans: (van Baaren et al., 2009; Guéguen et al., 2009); gorilla's: (Bresciani et al., 2021; Palagi et al., 2019); and dogs: (Palagi et al., 2015)).

But w*hy* we mimic, is a question that has been under-addressed in the scientific literature. Addressing this important issue, Hess and Fischer (2022) provide a novel perspective on the underlying function of mimicry. The authors see emotional mimicry as a social regulator and social act, bound to affiliative contexts or goals. This view has been supported by many studies including our own, showing that mimicry of nonverbal signals promotes trust (Maddux et al., 2008), liking (Stel et al., 2011) and attraction (Guéguen et al., 2009).

We agree that in many situations, for different species and for various forms of mimicry, mimicry increases group cohesion which has benefits in the here and now and most likely had similar effects in the evolutionary past. However, we see this as one major *outcome of mimicry*, not as its core function. There are several points that motivates us to propose a broader, more basic function of the phenomenon, namely: (1) negative expressions of emotion yield similar reactions in observers; (2) mimicry is not always a social act; (3) mimicry has primary benefits for the mimicker (see Keysers et al. (2022) for a 'selfish' perspective on emotional contagion).

As an alternative, underlying function of mimicry, we here propose "decreasing prediction error" (Hutchinson & Barrett, 2019). Through mimicry, one literally becomes more like the other, making the other easier to predict. This mainly benefits the self,

CONTACT M. E. Kret m.e.kret@fsw.leidenuniv.nl Cognitive Psychology Unit, Leiden University, Wassenaarseweg 52, Leiden 2333 AK, the Netherlands

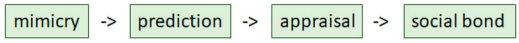


Figure 1. The function of mimicry that we propose is to ease the prediction of others' behaviours and the environment.

and often, also the social interaction or the relationship between individuals (see Figure 1). In the following, we elaborate on each of our three points, and conclude with addressing some open ends.

"The function of mimicry that we here propose is to ease the prediction of others' behaviours (e.g. he is going to approach me). Being able to make better predictions can facilitate appraisal (e.g. this is good for me) and subsequently social decisions that vary in complexity (e.g. I want to play with him longer/ I trust this person). These last two steps do not always take place and not in every species that mimics."

1. Mimicking negative expressions

Although Hess and Fischer (2022) argue for a sharp line between the mimicry of affiliative behaviours and other behaviours (e.g. negative facial expressions such as anger, calling the latter not mimicry but "reactions"), we doubt whether such hard lines exist in nature. From the authors' perspective, the primary function of mimicry is to affiliate and therefore the term mimicry should not include imitation of negative emotions. However, the mimicry of negative expressions is commonly observed. For example, during arguments or in a prelude to physical fights, both people and other animals frequently mimic each other's facial expressions, sounds and body postures (e.g. display threatening movements) (Nieuwburg et al., 2021). These signals are not inherently threatening by nature, however within a negative social context, raising a fist, lowering an eyebrow, or screaming can serve as an emotional trigger, which can result in emotional contagion and the mimicry of that signal.

The human emotion literature has a strong bias towards acted expressions of basic emotions. As a result, expressions dubbed emotional in the biological literature (e.g. yawning, scratching) have largely been overlooked in psychology (Kret et al., 2020). Like other great apes, people also yawn or scratch, especially in emotional situations, and these behaviours are mimicked (e.g. yawns in humans (Provine, 1989; 2005), chimpanzees (Anderson et al., 2004; Campbell & de Waal, 2011) and budgies (Gallup et al., 2015); scratches in humans (Holle et al., 2012) and orangutans (Laméris et al., 2020; Van Berlo et al., 2020)). Given this evidence, rather than subscribing to the term mimicry based on what one assumes to be the evolutionary outcome of that behaviour, we view mimicry as a broader mechanism, which demonstrates that two (or more) individuals share a common mental state. Therefore, we argue that whether mimicry occurs or not, is less dependent on the valence of the expression, but more on whether the observer is triggered enough to express the shared emotion – mimicking it.

2. Social regulation

Can emotional mimicry be seen as a social *act*? The term act, together with the author's emphasis on the role of appraisal and the social regulation goal that mimickers are said to have, implies that there is a large cognitive component to mimicry. But this conflicts with the speed at which facial mimicry can occur, and also with alternative types of mimicry including physiological synchrony (Procházková & Kret, 2017; Behrens et al., 2020). The line between what can be considered mimicry and what synchrony is still undefined, debated and it is unclear if these terms differ at all: all these different mimicry forms most likely interact and are no separate processes during dynamic dyadic interactions. One obvious difference between them, is that they vary in the amount of control we can possibly have over them. This is illustrated in a study by Procházková et al. (2022). In their study, the researchers showed that during a blind date, smile mimicry was highly prevalent, but did not predict dating success, in contrast to physiological synchrony, which was a strong predictor. In this context, smiles often reflected anxiety or an apology. People "put on" a smile but could not control their physiology.

Do mimickers have the goal to improve social relationships? We think that this is not necessarily the case. Not all expressions are directed to another individual, or to an individual that can see the expressor. This is evident in mimicry studies where stimuli are presented on computer screens, but it is also something that we directly observed in an observation study in orangutans, where mimickers mimicked expressions of individuals who were not looking at them (Laméris et al., 2020). Also, that latter study shows mimicry in non-group living species like the orangutan (for other evidence in sun bears, see Taylor et al. (2019)). Since these animals

do not live together in social groups, they have no good reason to smoothen social relationships.

A final point to consider when thinking about mimicry as a social act, is that mimicry is observed in species with limited cognitive capacities such as rats (e.g. Moyaho et al., 2015).

Although we do not deny that mimicry can help regulate social interactions, we see this as an outcome, but not its primary function.

3. Benefits for the mimicker

Many expressions serve the particular situation in which they occur. For instance, one type of bird species yawns when in danger (Gallup, 2022). Because yawning cools down the brain and makes the bird more alert, this benefits all individuals in the group being in the same dangerous situation, so the overall yawning rate increases (Gallup, 2022). Human research also shows that direct benefits may be at play. The disgust expression, for example, has a protective function: it closes off our senses (nose, eyes), we stick out our tongue or even vomit in order to expose poisonous material (Curtis et al., 2011). In different experiments, Susskind and colleagues also showed that the eye-widening in the expression of fear has direct benefits for perceiving the visual field (Susskind et al., 2008).

Research has consistently shown that the mimicry of negative or ambiguous expressions can lead to more aggression, decreased liking, or trust (e.g. angry faces: (Campellone & Kring, 2013); pupil mimicry: (Kret et al., 2015; Procházková et al., 2018; Wehebrink et al., 2018); yawns and scratches (Diana et al., 2022)). In our study in orangutans, we did not measure the behavioural consequences of mimicry, but we did find that scratch mimicry was particularly strong when that individual was socially distant and specifically in negative contexts (Laméris et al., 2020). In a social interaction, expressions such as yawns, frowns or scratches may signal the end of a social interaction and picking up those signals, especially from those we are not that closely bonded with, could have benefits for the mimicker (to not waste time and energy or worsening the interaction but simply terminate it).

Conclusion

Humans and other animals often mimic each other's emotional expressions, thereby smoothening the social bond. During social interactions, they often exchange social information about their emotional states via expressions through different modalities. Whether intentionally expressed or not, conspecifics perceive and mimic expressions. That being said, mimicry is not necessarily a social act. It is possible that emotional mimicry *can be* a crucial process in creating affiliative interactions and that it *can be* dependent on the goal to affiliate and to communicate to others that we understand them. This is an interesting viewpoint and often applies to the mimicry of positive expressions. Importantly, the fact that mimicry is regularly related to affiliation does not make it its primary function. Thus, while we agree that one important consequence of emotional mimicry is the regulation of social interactions, we would like to propose a deeper, underlying function. Easing predictions explains the existence of mimicry across positive and negative contexts through various modalities, and in species differing in sociality and cognitive capacity.

In order to advance mimicry research, a multimethod approach can give insight into the different mimicry types and to what extent they are related. Studying this in a variety of social and less social species and under ecologically valid conditions can clarify why certain phenomena evolved, and under which circumstances, and this also fosters further understanding of its current function.

Acknowledgements

The authors herewith thank Eliška Procházková for her feedback and comments.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This research was supported by the Netherlands Science Foundation (016.VIDI.185.036) from NWO (Nederlandse Organisatie voor Wetenschappelijk Onderzoek) and the European Research Council (ERC) (Starting Grant #802979) to Mariska E. Kret.

ORCID

M. E. Kret http://orcid.org/0000-0002-3197-5084

References

Anderson, J. R., Myowa-Yamakoshi, M., & Matsuzawa, T. (2004). Contagious yawning in chimpanzees. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, *271* (Suppl 6), S468–S470. https://doi.org/10.1098/rsbl.2004.0224

Behrens, F., Snijdewint, J. A., Moulder, R. G., Procházková, E., Sjak-Shie, E. E., Boker, S. M., & Kret, M. E. (2020). Physiological synchrony is associated with cooperative success in real-life interactions. *Scientific Reports*, *10*(1), 19609. https://doi.org/10.1038/s41598-020-76539-8

Bresciani, C., Cordoni, G., & Palagi, E. (2021). Playing together, laughing together: Rapid facial mimicry and social sensitivity in lowland gorillas. *Current Zoology*, https://doi.org/10.1093/cz/zoab092

Campbell, M. W., & de Waal, F. B. (2011). Ingroup-outgroup bias in contagious yawning by chimpanzees supports link to empathy. *PloS One*, *6*(4), e18283. https://doi.org/10.1371/journal.pone.0018283

Campellone, T. R., & Kring, A. M.. (2013). Who do you trust? The impact of facial emotion and behaviour on decision making. *Cognition and Emotion*, *27*(4), 603–620. https://doi.org/10.1080/02699931.2012.726608

Costa, D., Minero, E., Lebelt, M., Stucke, D., Canali, D., & Leach, E., & C, M. (2014). Development of the Horse Grimace Scale (HGS) as a pain assessment tool in horses undergoing routine castration. *PloS one*, *9*(3), 1–10. e92281. https://doi.org/10.1371/journal.pone.0092281

Curtis, V., De Barra, M., & Aunger, R. (2011). Disgust as an adaptive system for disease avoidance behaviour. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *366* (1563), 389–401. https://doi.org/10.1098/rstb.2010.0117

Diana, F., Juárez-Mora, O. E., Boekel, W., & Kret, M. (2022). When old meets new: how the mimicry of phylogenetically old behaviors influences trust during video calls. psyarxiv.com. Currently under review at an academic journal.

Dimberg, U., Thunberg, M., & Elmehed, K. (2000). Unconscious facial reactions to emotional facial expressions. *Psychological Science*, *11*(1), 86–89. https://doi.org/10.1111/1467-9280.00221

Gallup, A. (2022). The causes and consequences of yawning in animal groups. *Animal Behaviour*, *187*, 209–219. https://doi.org/10.1016/j.anbehav.2022.03.011

Gallup, A. C., Swartwood, L., Militello, J., & Sackett, S. (2015). Experimental evidence of contagious yawning in budgerigars (*melopsittacus undulatus*). *Animal Cognition*, *18*(5), 1051–1058. https://doi.org/10.1007/s10071-015-0873-1

Guéguen, N., Jacob, C., & Martin, A. (2009). Mimicry in social interaction: Its effect on human judgment and behavior. *European Journal of Social Sciences*, *8*(2), 253–259. https://doi.org/10.1007/978-1-4419-1428-6_1798

Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1992). Primitive emotional contagion. In M. S. Clark (Ed.), *Emotion and social behavior: Review of personality and social psychology* (pp. 151–177). Sage. https://doi.org/10.1017/CBO9781139174138.

Hess, U., & Fischer, A. (2022). Emotional mimicry as social regulator: theoretical considerations. *Cognition & Emotion*, *36*(5), 785–793. https://doi.org/10.1080/02699931.2022.2103522

Holle, H., Warne, K., Seth, A. K., Critchley, H. D., & Ward, J. (2012). Neural basis of contagious itch and why some people are more prone to it. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(48), 19816–19821. https://doi.org/10.1073/pnas.1216160109

Hutchinson, J. B., & Barrett, L. F. (2019). The power of predictions: An emerging paradigm for psychological research. *Current Directions in Psychological Science*, *28*(3), 280–291. https://doi.org/10.1177/0963721419831992

Keysers, C., Knapska, E., Moita, M. A., & Gazzola, V. (2022). Emotional contagion and prosocial behavior in rodents. *Trends in Cognitive Sciences*, *26*(8), 688–706.

Kret, M. E., Fischer, A. H., & De Dreu, C. K. (2015). Pupil mimicry correlates with trust in in-group partners with dilating pupils. *Psychological Science*, *26*(9), 1401–1410. https://doi.org/10.1177/0956797615588306

Kret, M. E., Prochazkova, E., Sterck, E. H., & Clay, Z. (2020). Emotional expressions in human and non-human great apes. *Neuroscience and Biobehavioral Reviews*, *115*, 378–395.

Laméris, D. W., van Berlo, E., Sterck, E., Bionda, T., & Kret, M. E. (2020). Low relationship quality predicts scratch contagion during tense situations in orangutans (*Pongo pygmaeus*). *American Journal of Primatology*, *82*(7), e23138. https://doi.org/10.1002/ajp.23138

Maddux, W. W., Mullen, E., & Galinsky, A. D. (2008). Chameleons bake bigger pies and take bigger pieces: Strategic behavioral mimicry facilitates negotiation outcomes. *Journal of Experimental Social Psychology*, *44*(2), 461–468. https://doi.org/10.1016/j.jesp.2007.02.003

Moyaho, A., Rivas-Zamudio, X., Ugarte, A., Eguibar, J. R., & Valencia, J. (2015). Smell facilitates auditory contagious yawning in stranger rats. *Animal Cognition*, *18*(1), 279–290. https://doi.org/10.1007/s10071-014-0798-0

Nieuwburg, E., Ploeger, A., & Kret, M. E. (2021). Emotion recognition in nonhuman primates: How experimental research can contribute to a better understanding of underlying mechanisms. *Neuroscience and Biobehavioral Reviews*, *123*, 24–47. https://doi.org/10.1016/j.neubiorev.2020.11.029

Palagi, E., Nicotra, V., & Cordoni, G. (2015). Rapid mimicry and emotional contagion in domestic dogs. *Royal Society Open Science*, *2*(12), 150505. https://doi.org/10.1098/rsos.150505

Palagi, E., Norscia, I., Pressi, S., & Cordoni, G. (2019). Facial mimicry and play: A comparative study in chimpanzees and gorillas. *Emotion*, *19*(4), 665–681. https://doi.org/10.1037/emo0000476

Procházková, E., & Kret, M. E. (2017). Connecting minds and sharing emotions through mimicry: A neurocognitive model of emotional contagion. *Neuroscience and Biobehavioral Reviews*, *80*, 99–114. https://doi.org/10.1016/j.neubiorev.2017.05.013

Procházková, E., Procházková, L., Giffin, M. R., Scholte, H. S., De Dreu, C. K., & Kret, M. E. (2018). Pupil mimicry promotes trust through the theory-of-mind network. *Proceedings of the National Academy of Sciences*, *115*(31), E7265–E7274. https://doi.org/10.1073/pnas.1803916115

Procházková, E., Sjak-Shie, E., Behrens, F., Lindh, D., & Kret, M. E. (2022). Physiological synchrony is associated with attraction in a blind date setting. *Nature Human Behavior*, *6*(2), 269–278. https://doi.org/10.1038/s41562-021-01197-3

Provine, R. R. (1989). Faces as releasers of contagious yawning: An approach to face perception using normal human subjects. *Bulletin of the Psychonomic Society*, *27*(3), 211–214. https://doi.org/10.3758/BF03334587

Provine, R. R. (2005). Yawning: The yawn is primal, unstoppable and contagious, revealing the evolutionary and neural basis of empathy and unconscious behavior. *American Scientist*, *93*(6), 532–539. https://doi.org/10.1511/2005.56.980

Ross, M. D., Owren, M. J., & Zimmermann, E. (2010). The evolution of laughter in great apes and humans. *Communicative & Integrative Biology*, *3*(2), 191–194. https://doi.org/10.4161/cib.3.2.10944

Stel, M., Rispens, S., Leliveld, M., & Lokhorst, A. M. (2011). The consequences of mimicry for prosocials and proselfs: Effects of social value orientation on the mimicry–liking link. *European Journal of Social Psychology*, *41*(3), 269–274. https://doi.org/10.1002/ejsp.790

Susskind, J. M., Lee, D. H., Cusi, A., Feiman, R., Grabski, W., & Anderson, A. K. (2008). Expressing fear enhances sensory acquisition. *Nature Neuroscience*, *11*(7), 843–850. https://doi.org/10.1038/nn.2138

Taylor, D., Hartmann, D., Dezecache, G., et al. (2019). Facial complexity in sun bears: Exact facial mimicry and social sensitivity. *Scientific Reports*, *9*(1), 4961. https://doi.org/10.1038/s41598-019-39932-6

van Baaren, R., Janssen, L., Chartrand, T. L., & Dijksterhuis, A. (2009). Where is the love? The social aspects of mimicry. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1528), 2381–2389. https://doi.org/10.1098/rstb.2009.0057

Van Berlo, E., Díaz-Loyo, A. P., Juárez-Mora, O. E., Kret, M. E., & Massen, J. J. (2020). Experimental evidence for yawn contagion in orangutans (*Pongo pygmaeus*). *Scientific Reports*, *10*(1), 1–11. https://doi.org/10.1038/s41598-020-79160-x

Wehebrink, K. S., Koelkebeck, K., Piest, S., de Dreu, C., & Kret, M. E. (2018). Pupil mimicry and trust - implication for depression. *Journal of Psychiatric Research*, *97*, 70–76. https://doi.org/10.1016/j.jpsychires.2017.11.007