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Interactional beings: the power of automatic mimicry and nonverbal cues in shaping human-human and human-robot naturalistic interactions

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Citation

Diana, F. (2026, March 20). *Interactional beings: the power of automatic mimicry and nonverbal cues in shaping human-human and human-robot naturalistic interactions*. Retrieved from <https://hdl.handle.net/1887/4297562>

Version: Publisher's Version

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Interactional Beings

The power of automatic mimicry and nonverbal cues in shaping
human-human and human-robot naturalistic interactions

Fabiola Diana

Colofon

ISBN/EAN: 978-90-836732-2-6

Cover design: Rubèn Darío Mainardi

Lay-out: Ferdinand van Nispen, *my-thesis.nl*

Printing: Proefschriftenprinten.nl, Ede, The Netherlands

The research featured in this thesis was funded by the European Research Council (ERC), in the form of a Starting Grant (#804581) awarded to Mariska E. Kret and by the Japanese Society for the Promotion of Science (JSPS) short-term postdoctoral fellowship awarded to Fabiola Diana (#PE22041).

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Proefschrift

ter verkrijging van
de graad van doctor aan de Universiteit Leiden,
op gezag van rector magnificus prof.dr. S. de Rijcke,
volgens besluit van het college voor promoties
te verdedigen op
vrijdag 20 maart 2026
klokke 10.00 uur
door

Fabiola Diana
geboren te Turin
in 1993

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Dr.ir. D.J. Broekens

Dr. V. Pallante (Nederlands Studiecentrum Criminaliteit en Rechtshandhaving)

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The background of the page is a collage of three distinct textures. The top-left portion features a fabric with a repeating pattern of stylized, multi-lobed floral or leaf motifs in a light color against a darker, vertically ribbed background. The bottom-left and bottom-right portions show a close-up of human hair, with the bottom-left showing a thick, wavy mass and the bottom-right showing a more textured, possibly braided or styled section. The central text is overlaid on a semi-transparent grey rectangular area that spans across the top two textures.

Acknowledgments

Acknowledgments

You never realize how lucky you are until you have to squeeze your thesis acknowledgments into eight hundred words. To call this journey a bumpy road would be an understatement but, like the best road trips, it led me to destinations and growth that proudly made me the person I am today. Unpredictable journeys like this require a vital mix of ingredients.

When the road is winding, one needs good directions, which I found in my extraordinary supervisors, Mariska Kret and Ruud Hortensius. You have been an inspiration from the start, as researchers and as human beings. You empowered me to think out of the box and venture curiously into different academic endeavors. Your guidance, trust, and encouragement have been invaluable to me both professionally and personally. I owe special gratitude also to my therapist, Federica, for helping me find the inner tools to overcome the toughest obstacles.

No epic journey succeeds without a co-pilot, and Julia Folz was mine through every scientific detour and life's unexpected quest. Having you as a paranymp and friend fills me with gratefulness and love beyond words.

A roadtrip can be infinitely rougher without skilled mechanics reviving the engine after every stall. Endless thanks to Elio Sjak-Shie for his wizardry, out-of-the-box thinking, and friendship; and to Evert Dekker, for your patience amid our chaotic labs. Special thanks also to Akihiro Tanaka and Misako Kawahara, who welcomed me during my sidequest in Japan.

The best part of a roadtrip is meeting fellow travelers on the road. In my inspiring lab mates – Chris, Iliana, Yena, Anouschka, Ruya, Evania, Tonko, Juan, Diego, Maarten, Evy, Eliska, Karlijn, and Kia – and my lab+ ladies – Ann, Aline, Hester, Fleur, and Dorka – I found the perfect crew to navigate every twist ahead. Thank you for your bottomless encouragement. I thank Roy, Roderick and Alessandro for the many nights of debauchery; Witty, Beth, Mario, and Jeshua for being lovely officemates; and the rest of my wonderful colleagues, Josi, Zsuzi, Manon, Sebo, Francesco, Chenxiao, Wen-Yu, Rouchella, Arko, Sander, Henk, and everyone else for your support. Special mention to all my amazing students, particularly Masha, Ronja and Agata, for making the journey much easier.

Yet, a roadtrip is meaningless without loved companions to share adventures with, and I have many to thank. Isa and Ange, the family I have chosen. Your love and acceptance taught me more than you could ever imagine. The rest of the

pirates – Matte, Jacopo, Gianmaria, Dade, Giangiacomo, Rapha and Boji– for being a cheerful and caring crew the whole way. Ciullina, my soulmate: our bond has always spoken louder than words ever could. Piter, everlasting resident in my head, for inspiring me every step of the way; and Pelle and Cammi, for your rare blend of depth and playfulness. Marione, my rock and my absolute certainty since always and forever. Giulia, Paola, and Marta, for always believing in and seeing the beauty in me, even when I could not see it in myself. Umbe, my ka-tet, no more words are needed. My lifelong comrades – Naz, Fra, Frusta, Gianba, Simo, Gent, Ale, Raf, Sere, Michi, Erika, Giorgio, and Gianluk – you are, and always will be, home to me. Laura and Hola, your constant understanding and love mean the world. Ruben, for being a loving presence and designing the most wonderful thesis cover. Ludo and Leo, my old friends and quasi-flatmates, for keeping growing with me. Bebe, for being a multifaceted, inspiring woman. Mati, for witnessing each other’s catharsis. And last but not least, thank you to my Leiden gang – Julian, Auro, Ele, Louw, Arthur, Sinja, Nicci, Jeroen, Chris, Carola, Juul, Mo – for the endless playful, dancing evening and deep conversations that brought light to the darkest moments.

Above all, a road trip cannot even start without a family to watch your back. I thank my cousins, Serena and Giorgia, for being inspiring and curious women. Silvana and Gino, my loving step-parents. Matte, an exceptional and inspirational step-brother. My grandparents, Lina and Pino, for teaching me life and loving me more than possible. My parents, the reason why I am here today. My mum Rosanna, for filling me with love and curiosity, and for being the most inspiring woman I know; and my dad Antonio, my pillar and constant presence. You are the best and most loving father I could ever imagine. Lastly, I thank my brother Gabriele, my favorite person, the one I can always count on. Growing together is my deepest fortune, and I would choose you as my brother every single day.

Finally, to Xaver, my paranymp, my best friend, the love of my life. You are life’s greatest gift. Your off-the-chart intelligence, optimism, care, and motivation were the fuel that made this journey breezier. Every moment with you makes me a better person and scientist, and I love you from the bottom of my heart.

Pretending I nearly forgot him in these acknowledgments, I save the last words for Albe: making a gag is the best way to thank you for the light and darkness we shared throughout the journey.

With deep gratitude,
Fabiola Diana





Preface

A bit more than a year ago, when I was lost in the work of finishing this dissertation, I participated in a blacksmithing workshop in a big warehouse in the far outskirts of Amsterdam. There, in the dancing lights of the forge, I found something that I did not expect. And that, unsurprisingly in hindsight, made me a better scientist.

I entered the forge with the aim of pursuing knowledge, my scientific brain ready to pay attention to every detail of the procedure described by the blacksmiths, to accumulate information, to learn all the tricks. Yet when I started beating the hammer, and for the following hour, very little happened. When I asked the blacksmith how much strength he was using to make the iron melt so easily under his hammer, he looked at me with a smile. “Strength is not the secret, miss”, he said. “You have to hammer with intention. Not *the* iron, but *through* the iron. It will not bend otherwise, no matter how hard you try. Stop thinking about it, and try to sense what you’re doing”. So I did, and the iron, still not without effort, finally started bending at my will. The next five hours flew by on the wings of that wholesome sensorial experience: touching the iron, staring in the fire of the forge while waiting for it to melt, feeling the humidity and warmth of the steam when cooling it down, the soreness of lifting that hammer again and again. That day, in the dancing lights of the forge and in the sharp eyes of the blacksmith, I found a truth that I had nearly forgotten during these years venturing through the academic world, which I had long wished to be part of: knowledge and wisdom can be reached not only by attending, studying and remembering facts, but also by opening oneself to sensations. Perhaps not a startling revelation, but rather a reconnection with a familiar state that is easy to bury under the weight of thousands of scientific papers; the state of *sensing*, a blend of wonder and intuition, like the openness of childhood when the world is learned through exploration rather than explanation.

It is no wonder, then, that many of history’s brilliant minds placed sensations at the center of their pursuit of knowledge. From Aristotle, insisting that all understanding begins with the senses, to the biologist Alexander von Humboldt, who remarked that awe before the experience of nature is inseparable from the rigor of scientific observation. The philosopher Ralph Waldo Emerson celebrated the interplay of perception and insight, urging us to trust the senses as gateways to intuitions that cannot be grasped by reason alone. Rachel Carson, too, reminded us that “if facts are the seeds that later produce knowledge and wisdom, then the emotions and

the impressions of the senses are the fertile soil in which the seeds must grow," warning against a science that forgets its grounding in sensations. The words of these thinkers, across centuries, remind me that what I had glimpsed in the forge was not incidental, but perhaps part of a larger truth: that scientific reasoning is sharpened, not dulled, when it is guided by sensation and presence.

If sensations play such a vital role in the process of knowledge, then their place in science should be spoken of openly, which is my intention with this preface. What sparked my passion in this field was a genuine interest in people: simply watching them communicate, laugh, argue, or sit quietly on a bench. Which then, inspired by my biologist colleagues, became an interest in creatures. Every piece of this dissertation was inspired, first and foremost, by sensing the world around me. Even if we choose not to formally ground our scientific reasoning in sensation, we cannot exclude it from the products of our work, especially in the social sciences, where we are often the prime actors in the very questions we ought to answer. The interpretations of the data we acquire are never neutral; they are filtered through our own perception, our own attention to detail, our own curiosity. I, quite unexpectedly, grew to find beauty in the way data speak about life or, in psychology, the way they speak about the way we speak. Yet data cannot tell the whole story, and I believe it is all too easy to fall into the trap of assuming that they can. The lived experiences of my participants, the immersion in different cultures, the moments of observation and reflection, all of this was as essential to this dissertation as the numbers, measurements, and coded behaviors you will find in its pages. I see factual knowledge and sensations as a continuous loop, each feeding into the other: sensing the world ignites the spark to seek knowledge, and knowledge, in turn, equips us to sense and appreciate the world with greater depth. Since I so easily forgot it when swallowed by numbers and codes, I want to carve out some space for this personal truth here, mostly for myself, as a mental note to carry with me in both science and life, and perhaps it will give another reader a small thought worth holding onto.

