

## References

- Chadia Abras, Diane Maloney-Krichmar, and Jenny Preece. User-centered design. In William Sims Bainbridge, editor, *Berkshire encyclopedia of human-computer interaction*, volume 2, pages 763–767. Sage, Great Barrington, MA, 2004. ISBN 9780974309125. URL <http://www.worldcat.org/oclc/635690108>.
- Henny Admoni and Brian Scassellati. Social eye gaze in human-robot interaction: A review. *Journal of Human-Robot Interaction*, 6(1):25–63, 2017. doi: 10.5898/JHRI.6.1.Admoni. URL <https://doi.org/10.5898/JHRI.6.1.Admoni>.
- Kaat Alaerts, Evelien Nackaerts, Pieter Meyns, Stephan P. Swinnen, and Nicole Wenderoth. Action and emotion recognition from point light displays: An investigation of gender differences. *PloS One*, 6(6):e20989, 2011. doi: 10.1371/journal.pone.0020989. URL <https://doi.org/10.1371/journal.pone.0020989>.
- Brian Wilson Aldiss. *Supertoys last all summer long: And other stories of future time*. St. Martin’s Griffin, New York, NY, 2001. ISBN 978-0312280611. URL <http://www.worldcat.org/oclc/956323493>.
- Minoo Alemi, Ali Meghdari, and Maryam Ghazisaedy. Employing humanoid robots for teaching English language in Iranian junior high-schools. *International Journal of Humanoid Robotics*, 11(03):1450022, 2014. doi: 10.1142/S0219843614500224. URL <https://doi.org/10.1142/S0219843614500224>.
- Christopher Alexander. *A pattern language: Towns, buildings, construction*. Oxford University Press, Oxford, UK, 1977. ISBN 978-0195019193. URL <http://www.worldcat.org/oclc/961298119>.
- Philipp Althaus, Hiroshi Ishiguro, Takayuki Kanda, Takahiro Miyashita, and Henrik I. Christensen. Navigation for human-robot interaction tasks. In *IEEE International Conference on Robotics and Automation*, volume 2, pages 1894–1900. IEEE, 2004. ISBN 0-7803-8232-3. doi: 10.1109/ROBOT.2004.1308100. URL <https://doi.org/10.1109/ROBOT.2004.1308100>.
- Amir Aly and Adriana Tapus. A model for synthesizing a combined verbal and nonverbal behavior based on personality traits in human-robot interaction. In *Proceedings of the 8th ACM/IEEE International Conference on Human-Robot Interaction*, HRI ’13, pages 325–332, Piscataway, NJ, USA, 2013. IEEE Press. ISBN 978-1-4673-3055-8. doi: 10.1109/HRI.2013.6483606. URL <https://doi.org/10.1109/HRI.2013.6483606>.
- American Osteopathic Association. Survey finds nearly three-quarters (72%) of Americans feel lonely, 2016. URL <https://www.osteopathic.org/inside-aoa/news-and-publications/media-center/2016-news-releases/Pages/10-11-survey-finds-nearly-three-quarters-of-americans-feel-lonely.aspx>.
- Peter A. Andersen and Laura K. Guerrero. Principles of communication and emotion in social interaction. In Peter A. Andersen and Laura K. Guerrero, editors, *Handbook of communication and emotion: Research, theory, applications*,

- and contexts*, chapter 3, pages 49–96. Academic Press, 1998. ISBN 0-12-057770-4. doi: 10.1016/B978-012057770-5/50005-9. URL <https://doi.org/10.1016/B978-012057770-5/50005-9>.
- Sean Andrist, Xiang Zhi Tan, Michael Gleicher, and Bilge Mutlu. Conversational gaze aversion for humanlike robots. In *ACM/IEEE International Conference on Human-Robot Interaction*, pages 25–32. ACM, 2014. ISBN 978-1-4503-2658-2. doi: 10.1145/2559636.2559666. URL <https://doi.org/10.1145/2559636.2559666>.
- Brenna D. Argall, Sonia Chernova, Manuela Veloso, and Brett Browning. A survey of robot learning from demonstration. *Robotics and Autonomous Systems*, 57(5):469–483, 2009. doi: 10.1016/j.robot.2008.10.024. URL <https://doi.org/10.1016/j.robot.2008.10.024>.
- S. E. Asch. *Effects of group pressure upon the modification and distortion of judgments*, pages 177–190. Carnegie Press, Oxford, England, 1951. doi: psycinfo/1952-00803-001. URL <http://doi.apa.org/psycinfo/1952-00803-001>.
- Isaac Asimov. *The Bicentennial man and other stories*. Doubleday science fiction. Doubleday, Garden City, NY, [Book Club edition, 1976. ISBN 978-0385121989. URL <http://www.worldcat.org/oclc/85069299>.
- Isaac Asimov. *Prelude to foundation*. Grafton, London, UK, 1988. ISBN 9780008117481. URL <http://www.worldcat.org/oclc/987248670>.
- Isaac Asimov. *I, robot*. Bantam spectra book. Bantam Books, New York, NY, 1991. ISBN 0553294385. URL <http://www.worldcat.org/oclc/586089717>.
- Hillel Aviezer, Yaacov Trope, and Alexander Todorov. Body cues, not facial expressions, discriminate between intense positive and negative emotions. *Science*, 338(6111):1225–1229, 2012. doi: 10.1126/science.1224313. URL <https://doi.org/10.1126/science.1224313>.
- Edmond Awad, Sohan Dsouza, Richard Kim, Jonathan Schulz, Joseph Henrich, Azim Shariff, Jean-François Bonnefon, and Iyad Rahwan. The moral machine experiment. *Nature*, 2018. ISSN 1476-4687. doi: 10.1038/s41586-018-0637-6. URL <https://doi.org/10.1038/s41586-018-0637-6>.
- Wilma A. Bainbridge, Justin W. Hart, Elizabeth S. Kim, and Brian Scassellati. The benefits of interactions with physically present robots over video-displayed agents. *International Journal of Social Robotics*, 3(1):41–52, Jan 2011. ISSN 1875-4805. doi: 10.1007/s12369-010-0082-7. URL <https://doi.org/10.1007/s12369-010-0082-7>.
- Simon Baron-Cohen, Alan M. Leslie, and Uta Frith. Does the autistic child have a “Theory of Mind”? *Cognition*, 21(1):37–46, 1985. doi: 10.1016/0010-0277(85)90022-8. URL [https://doi.org/10.1016/0010-0277\(85\)90022-8](https://doi.org/10.1016/0010-0277(85)90022-8).
- James Barrat. Why Stephen Hawking and Bill Gates are terrified of artificial intelligence. *Huffington Post*, 2015. URL [http://www.huffingtonpost.com/james-barrat/hawking-gates-artificial-intelligence\\_b\\_7008706.html](http://www.huffingtonpost.com/james-barrat/hawking-gates-artificial-intelligence_b_7008706.html).
- Christoph Bartneck. *eMuu: An embodied emotional character for the ambient intelligent home*. PhD thesis, Technische Universiteit Eindhoven, 2002. URL <http://www.bartneck.de/publications/2002/eMuu/bartneckPHDThesis2002.pdf>.
- Christoph Bartneck and Jun Hu. Rapid prototyping for interactive robots. In *The 8th Conference on Intelligent Autonomous Systems (IAS-8)*, pages 136–145, 2004. doi: 10.6084/m9.figshare.5160775.v1. URL <https://doi.org/10.6084/m9.figshare.5160775.v1>.
- Christoph Bartneck and Michael J. Lyons. Facial expression analysis, modeling and synthesis: Overcoming the limitations of artificial intelligence with the art of the soluble. In Jordi Vallverdu and David Casacuberta, editors, *Handbook of research on synthetic emotions and sociable robotics: New applications in affective computing and artificial intelligence*, Information Science Reference, pages 33–53. IGI Global, 2009. URL <http://www.bartneck.de>.

## References

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- de/publications/2009/facialExpressionAnalysisModelingSynthesisAI/  
 bartneckLyonsEmotionBook2009.pdf.
- Christoph Bartneck and M. Rauterberg. HCI reality—an unreal tournament. *International Journal of Human-Computer Studies*, 65(8):737–743, 2007. doi: 10.1016/j.ijhcs.2007.03.003. URL <https://doi.org/10.1016/j.ijhcs.2007.03.003>.
- Christoph Bartneck and Juliane Reichenbach. Subtle emotional expressions of synthetic characters. *International Journal of Human-Computer Studies*, 62(2):179 – 192, 2005. ISSN 1071-5819. doi: 10.1016/j.ijhcs.2004.11.006. URL <https://doi.org/10.1016/j.ijhcs.2004.11.006>. Subtle expressivity for characters and robots.
- Christoph Bartneck, T. Nomura, T. Kanda, Tomohiro Suzuki, and Kato Kensuke. Cultural differences in attitudes towards robots. In *AISB Symposium on Robot Companions: Hard Problems and Open Challenges in Human-Robot Interaction*, pages 1–4. The Society for the Study of Artificial Intelligence and the Simulation of Behaviour (AISB), 2005. doi: 10.13140/RG.2.2.22507.34085. URL <http://www.bartneck.de/publications/2005/cultureNars/bartneckAISB2005.pdf>.
- Christoph Bartneck, Elizabeth Croft, Dana Kulic, and Susana Zoghbi. Measurement instruments for the anthropomorphism, animacy, likeability, perceived intelligence, and perceived safety of robots. *International Journal of Social Robotics*, 1(1):71–81, 2009. doi: 10.1007/s12369-008-0001-3. URL <https://doi.org/10.1007/s12369-008-0001-3>.
- Christoph Bartneck, Andreas Duenser, Elena Moltchanova, and Karolina Zawieska. Comparing the similarity of responses received from studies in Amazon’s Mechanical Turk to studies conducted online and with direct recruitment. *PloS One*, 10(4):e0121595, 2015. doi: 10.1371/journal.pone.0121595. URL <https://doi.org/10.1371/journal.pone.0121595>.
- Christoph Bartneck, Kumar Yogeeswaran, Qi Min Ser, Graeme Woodward, R. Sparrow, Siheng Wang, and Friederike Eyssel. Robots and racism. In *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*, pages 196–204. ACM, 2018. ISBN 978-1-4503-4953-6. doi: 10.1145/3171221.3171260. URL <https://doi.org/10.1145/3171221.3171260>.
- Timo Baumann and David Schlangen. The INPROTK 2012 release. In *NAACL-HLT Workshop on Future Directions and Needs in the Spoken Dialog Community: Tools and Data*, pages 29–32. Association for Computational Linguistics, 2012. URL <http://dl.acm.org/citation.cfm?id=2390444.2390464>.
- Roy F. Baumeister and Mark R. Leary. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3):497–529, 1995. doi: 10.1037/0033-2909.117.3.497. URL <https://doi.org/10.1037/0033-2909.117.3.497>.
- Paul Baxter, James Kennedy, Emmanuel Senft, Severin Lemaignan, and Tony Belpaeme. From characterising three years of HRI to methodology and reporting recommendations. In *The 11th ACM/IEEE International Conference on Human-Robot Interaction*, pages 391–398. IEEE Press, 2016. ISBN 978-1-4673-8370-7. doi: 10.1109/HRI.2016.7451777. URL <https://doi.org/10.1109/HRI.2016.7451777>.
- Aryel Beck, Antoine Hiole, Alexandre Mazel, and Lola Cañamero. Interpretation of emotional body language displayed by robots. In *Proceedings of the 3rd International Workshop on Affective Interaction in Natural Environments*, pages 37–42. ACM, 2010. ISBN 978-1-4503-0170-1. doi: 10.1145/1877826.1877837. URL <https://doi.org/10.1145/1877826.1877837>.
- Christopher Beedie, Peter Terry, and Andrew Lane. Distinctions between emotion and mood. *Cognition & Emotion*, 19(6):847–878, 2005. doi: 10.1080/02699930541000057. URL <https://doi.org/10.1080/02699930541000057>.

- Tony Belpaeme, Paul E. Baxter, Robin Read, Rachel Wood, Heriberto Cuayáhuitl, Bernd Kiefer, Stefania Racioppa, Ivana Kruijff-Korbayová, Georgios Athanasopoulos, Valentin Enescu, et al. Multimodal child-robot interaction: Building social bonds. *Journal of Human-Robot Interaction*, 1(2):33–53, 2012. doi: 10.5898/JHRI.1.2.Belpaeme. URL <https://doi.org/10.5898/JHRI.1.2.Belpaeme>.
- Tony Belpaeme, James Kennedy, Paul Baxter, Paul Vogt, Emiel E. J. Krahmer, Stefan Kopp, Kirsten Bergmann, Paul Leseman, Aylin C. Küntay, Tilbe Gökşun, et al. L2tor-second language tutoring using social robots. In *Proceedings of the ICSR 2015 WONDER Workshop*, 2015. URL <https://pub.uni-bielefeld.de/download/2900267/2900268>.
- Sandra L. Bem. The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology*, 42:155–162, 1974. doi: 10.1037/h0036215. URL <https://doi.org/10.1037/h0036215>.
- Koen Berghuis. Robot ‘preacher’ can beam light from its hands and give automated blessings to worshippers, 2017. URL <https://www.mirror.co.uk/news/weird-news/robot-priest-can-beam-light-10523678>.
- Jasmin Bernotat, Birte Schiffhauer, Friederike Eyssel, Patrick Holthaus, Christian Leichsenring, Viktor Richter, Marian Pohling, Birte Carlmeyer, Norman Köster, Sebastian Meyer zu Borgsen, et al. Welcome to the future: How naïve users intuitively address an intelligent robotics apartment. In *International Conference on Social Robotics*, pages 982–992. Springer, 2016. ISBN 978-3-319-47436-6. doi: 10.1007/978-3-319-47437-3\_96. URL [https://doi.org/10.1007/978-3-319-47437-3\\_96](https://doi.org/10.1007/978-3-319-47437-3_96).
- Cindy L. Bethel and Robin R. Murphy. Survey of non-facial/non-verbal affective expressions for appearance-constrained robots. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*, 38(1):83–92, 2008. doi: 10.1109/TSMCC.2007.905845. URL <https://doi.org/10.1109/TSMCC.2007.905845>.
- Cindy L. Bethel and Robin R. Murphy. Review of human studies methods in HRI and recommendations. *International Journal of Social Robotics*, 2(4):347–359, 2010. doi: 10.1007/s12369-010-0064-9. URL <https://doi.org/10.1007/s12369-010-0064-9>.
- Cindy L. Bethel, Kristen Salomon, Robin R. Murphy, and Jennifer L. Burke. Survey of psychophysiology measurements applied to human-robot interaction. In *The 16th IEEE International Symposium on Robot and Human Interactive Communication*, pages 732–737. IEEE, 2007. ISBN 978-1-4244-1634-9. doi: 10.1109/ROMAN.2007.4415182. URL <https://doi.org/10.1109/ROMAN.2007.4415182>.
- James R. Blair. Responding to the emotions of others: Dissociating forms of empathy through the study of typical and psychiatric populations. *Consciousness and Cognition*, 14(4):698–718, 2005. doi: 10.1016/j.concog.2005.06.004. URL <https://doi.org/10.1016/j.concog.2005.06.004>.
- Benjamin S. Bloom. The 2 sigma problem: The search for methods of group instruction as effective as one-to-one tutoring. *Educational Researcher*, 13(6):4–16, 1984. doi: 10.3102/0013189X013006004. URL <https://doi.org/10.3102/0013189X013006004>.
- Robert Bogue. Exoskeletons and robotic prosthetics: A review of recent developments. *Industrial Robot: An International Journal*, 36(5):421–427, 2009. doi: 10.1108/01439910910980141. URL <https://doi.org/10.1108/01439910910980141>.
- George A. Bonanno, Laura Goorin, and Karin G. Coifman. Social functions of emotion. In Michael Lewis, Jeanette M. Haviland-Jones, and Lisa Feldman Barrett, editors, *Handbook of emotions*, volume 3, pages 456–468. Guilford Press, New York, NY, 2008. ISBN 978-1-59385-650-2. URL <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.472.7583&rep=rep1&type=pdf>.

- Jason Borenstein and Ronald C. Arkin. Robots, ethics, and intimacy: The need for scientific research. In *Conference of the International Association for Computing and Philosophy*, 2016. URL <https://www.cc.gatech.edu/ai/robot-lab/online-publications/RobotsEthicsIntimacy-IACAP.pdf>.
- Valentino Braitenberg. *Vehicles: Experiments in synthetic psychology*. MIT Press, Cambridge, MA, 1986. ISBN 978-0262521123. URL <http://www.worldcat.org/oclc/254155258>.
- Jürgen Brandstetter, Péter Rácz, Clay Beckner, Eduardo B. Sandoval, Jennifer Hay, and Christoph Bartneck. A peer pressure experiment: Recreation of the Asch conformity experiment with robots. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1335–1340. IEEE, 2014. ISBN 978-1-4799-6934-0. doi: 10.1109/IROS.2014.6942730. URL <https://doi.org/10.1109/IROS.2014.6942730>.
- Jürgen Brandstetter, Eduardo B. Sandoval, Clay Beckner, and Christoph Bartneck. Persistent lexical entrainment in HRI. In *ACM/IEEE International Conference on Human-Robot Interaction*, pages 63–72. ACM, 2017. ISBN 978-1-4503-4336-7. doi: 10.1145/2909824.3020257. URL <https://doi.org/10.1145/2909824.3020257>.
- Cynthia Breazeal. *Designing sociable robots*. MIT Press, Cambridge, MA, Cambridge, 2003. ISBN 978-0262524315. URL <http://www.worldcat.org/oclc/758042496>.
- Cynthia Breazeal. Function meets style: Insights from emotion theory applied to HRI. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*, 34(2):187–194, 2004a. doi: 10.1109/TSMCC.2004.826270. URL <https://doi.org/10.1109/TSMCC.2004.826270>.
- Cynthia Breazeal. Social interactions in HRI: The robot view. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*, 34(2): 181–186, 2004b. doi: 10.1109/TSMCC.2004.826268. URL <https://doi.org/10.1109/TSMCC.2004.826268>.
- Cynthia Breazeal and Brian Scassellati. A context-dependent attention system for a social robot. In *Proceedings of the 16th International Joint Conference on Artificial Intelligence, Volume 2*, pages 1146–1151. Morgan Kaufmann Publishers Inc., 1999. URL <http://dl.acm.org/citation.cfm?id=1624312.1624382>.
- Cynthia Breazeal, Cory D. Kidd, Andrea Lockerd Thomaz, Guy Hoffman, and Matt Berlin. Effects of nonverbal communication on efficiency and robustness in human-robot teamwork. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 708–713. IEEE, 2005. ISBN 0-7803-8912-3. doi: 10.1109/IROS.2005.1545011. URL <https://doi.org/10.1109/IROS.2005.1545011>.
- Paul Bremner, Anthony Pipe, Chris Melhuish, Mike Fraser, and Sriram Subramanian. Conversational gestures in human-robot interaction. In *IEEE International Conference on Systems, Man and Cybernetics*, pages 1645–1649. IEEE, 2009. ISBN 978-1-4244-2793-2. doi: 10.1109/ICSMC.2009.5346903. URL <https://doi.org/10.1109/ICSMC.2009.5346903>.
- Elizabeth Broadbent, Rebecca Stafford, and Bruce MacDonald. Acceptance of healthcare robots for the older population: Review and future directions. *International Journal of Social Robotics*, 1(4):319–330, 2009. doi: 10.1007/s12369-009-0030-6. URL <https://doi.org/10.1007/s12369-009-0030-6>.
- Joost Broekens, Marcel Heerink, Henk Rosendal, et al. Assistive social robots in elderly care: A review. *Gerontechnology*, 8(2):94–103, 2009. doi: 10.4017/gt.2009.08.02.002.00. URL <https://doi.org/10.4017/gt.2009.08.02.002.00>.
- Rodney Brooks. A robust layered control system for a mobile robot. *IEEE Journal*

- on Robotics and Automation*, 2(1):14–23, 1986. doi: 10.1109/JRA.1986.1087032. URL <https://doi.org/10.1109/JRA.1986.1087032>.
- Rodney A. Brooks. Intelligence without representation. *Artificial Intelligence*, 47(1-3):139–159, 1991. doi: 10.1016/0004-3702(91)90053-M. URL [https://doi.org/10.1016/0004-3702\(91\)90053-M](https://doi.org/10.1016/0004-3702(91)90053-M).
- Rodney Allen Brooks. *Flesh and machines: How robots will change us*. Vintage, New York, NY, 2003. ISBN 9780375725272. URL <http://www.worldcat.org/oclc/249859485>.
- Drazen Brscić, Takayuki Kanda, Tetsushi Ikeda, and Takahiro Miyashita. Person tracking in large public spaces using 3-D range sensors. *IEEE Transactions on Human-Machine Systems*, 43(6):522–534, 2013. doi: 10.1109/THMS.2013.2283945. URL <https://doi.org/10.1109/THMS.2013.2283945>.
- Drazen Brscić, Hiroyuki Kidokoro, Yoshitaka Suehiro, and Takayuki Kanda. Escaping from children’s abuse of social robots. In *Proceedings of the 10th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 59–66. ACM, 2015. ISBN 978-1-4503-2883-8. doi: 10.1145/2696454.2696468. URL <https://doi.org/10.1145/2696454.2696468>.
- Barbara Bruno, Nak Young Chong, Hiroko Kamide, Sanjeev Kanoria, Jaeryoung Lee, Yuto Lim, Amit Kumar Pandey, Chris Papadopoulos, Irena Papadopoulos, Federico Pecora, et al. The CARESSES EU-Japan project: Making assistive robots culturally competent. *arXiv*, page 1708.06276, 2017. URL <https://arxiv.org/abs/1708.06276>.
- Richard Buchanan. Wicked problems in design thinking. *Design Issues*, 8(2):5–21, 1992. URL <https://www.jstor.org/stable/1511637>.
- Wolfram Burgard, Armin B. Cremers, Dieter Fox, Dirk Hähnel, Gerhard Lakemeyer, Dirk Schulz, Walter Steiner, and Sebastian Thrun. The interactive museum tour-guide robot. In *Proceedings of the 15th National/10th Conference on Artificial Intelligence/Innovative Applications of Artificial Intelligence*, pages 11–18, 1998. ISBN 0-262-51098-7. URL <https://dl.acm.org/citation.cfm?id=295249>.
- Maya Cakmak, Siddhartha S. Srinivasa, Min Kyung Lee, Jodi Forlizzi, and Sara Kiesler. Human preferences for robot-human hand-over configurations. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1986–1993. IEEE, 2011. ISBN 978-1-61284-454-1. doi: 10.1109/IROS.2011.6094735. URL <https://doi.org/10.1109/IROS.2011.6094735>.
- Rafael A. Calvo, Sidney D’Mello, Jonathan Gratch, and Arvid Kappas. *The Oxford handbook of affective computing*. Oxford Library of Psychology, Oxford, UK, 2015. ISBN 978-0199942237. URL <http://www.worldcat.org/oclc/1008985555>.
- James Cameron. *The Terminator*, 1984. URL <https://www.imdb.com/title/tt0088247/>.
- Murray Campbell, A. Joseph Hoane, and Feng-hsiung Hsu. Deep blue. *Artificial Intelligence*, 134(1-2):57–83, 2002. doi: 10.1016/S0004-3702(01)00129-1. URL [https://doi.org/10.1016/S0004-3702\(01\)00129-1](https://doi.org/10.1016/S0004-3702(01)00129-1).
- Zhe Cao, Tomas Simon, Shih-En Wei, and Yaser Sheikh. Realtime multi-person 2d pose estimation using part affinity fields. In *IEEE Conference on Computer Vision and Pattern Recognition*, pages 1302–1310, 2017. ISBN 9781538604571. doi: 10.1109/CVPR.2017.143. URL <https://doi.org/10.1109/CVPR.2017.143>.
- Julie Carpenter. *Culture and human-robot interaction in militarized spaces: A war story*. Routledge, New York, NY, 2016. ISBN 978-1-4724-4311-3. URL <http://www.worldcat.org/oclc/951397181>.
- Colleen M. Carpinella, Alisa B. Wyman, Michael A. Perez, and Steven J. Stroessner. The Robotic Social Attributes Scale (RoSAS): Development and validation. In

## References

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- ACM/IEEE International Conference on Human-Robot Interaction*, pages 254–262. ACM, 2017. ISBN 978-1-4503-4336-7. doi: 10.1145/2909824.3020208. URL <https://doi.org/10.1145/2909824.3020208>.
- Sybil Carrere and John Mordechai Gottman. Predicting divorce among newlyweds from the first three minutes of a marital conflict discussion. *Family Process*, 38(3):293–301, 1999. doi: 10.1111/j.1545-5300.1999.00293.x. URL <https://doi.org/10.1111/j.1545-5300.1999.00293.x>.
- J. Cassell, Joseph Sullivan, Scott Prevost, and Elizabeth Churchill. *Embodied conversational agents*. MIT Press, Cambridge, MA, 2000. ISBN 9780262032780. URL <http://www.worldcat.org/oclc/440727862>.
- Filippo Cavallo, Raffaele Limosani, Alessandro Manzi, Manuele Bonaccorsi, Raffaele Esposito, Maurizio Di Rocco, Federico Pecora, Giancarlo Teti, Alessandro Safiotti, and Paolo Dario. Development of a socially believable multi-robot solution from town to home. *Cognitive Computation*, 6(4):954–967, 2014. doi: 10.1007/s12559-014-9290-z. URL <https://doi.org/10.1007/s12559-014-9290-z>.
- Wan-Ling Chang and Selma Šabanović. Interaction expands function: Social shaping of the therapeutic robot PARO in a nursing home. In *The 10th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 343–350. ACM, 2015. ISBN 978-1-4503-2883-8. doi: 10.1145/2696454.2696472. URL <https://doi.org/10.1145/2696454.2696472>.
- Tony Charman, Simon Baron-Cohen, John Swettenham, Gillian Baird, Antony Cox, and Auriol Drew. Testing joint attention, imitation, and play as infancy precursors to language and Theory of Mind. *Cognitive Development*, 15(4):481–498, 2000. doi: 10.1016/S0885-2014(01)00037-5. URL [https://doi.org/10.1016/S0885-2014\(01\)00037-5](https://doi.org/10.1016/S0885-2014(01)00037-5).
- Tanya L. Chartrand and John A. Bargh. The chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology*, 76(6):893–910, 1999. doi: 10.1037/0022-3514.76.6.893. URL <https://doi.org/10.1037/0022-3514.76.6.893>.
- Tiffany L. Chen, Chih-Hung Aaron King, Andrea L. Thomaz, and Charles C. Kemp. An investigation of responses to robot-initiated touch in a nursing context. *International Journal of Social Robotics*, 6(1):141–161, 2014. doi: 10.1007/s12369-013-0215-x. URL <https://doi.org/10.1007/s12369-013-0215-x>.
- Takenobu Chikaraishi, Yuichiro Yoshikawa, Kohei Ogawa, Oriza Hirata, and Hiroshi Ishiguro. Creation and staging of android theatre “sayonara” towards developing highly human-like robots. *Future Internet*, 9(4):75–92, 2017. doi: 10.3390/fi9040075. URL <https://doi.org/10.3390/fi9040075>.
- Howie M. Choset, Seth Hutchinson, Kevin M. Lynch, George Kantor, Wolfram Burgard, Lydia E. Kavraki, and Sebastian Thrun. *Principles of robot motion: Theory, algorithms, and implementation*. MIT Press, Cambridge, MA, 2005. ISBN 978-026203327. URL <http://www.worldcat.org/oclc/762070740>.
- Robert Coe. It’s the effect size, stupid: What effect size is and why it is important. In *Annual Conference of the British Educational Research Association*. Education-line, 2002. URL <http://www.leeds.ac.uk/educol/documents/00002182.htm>.
- Jacob Cohen. *Statistical power analysis for the behavioral sciences*. Academic Press, New York, NY, 1977. ISBN 9781483276489. URL <http://www.worldcat.org/oclc/898103044>.
- Jacob Cohen. The earth is round ( $p < .05$ ). *American Psychologist*, 49:997–1003, 1994. doi: 10.1037/0003-066X.49.12.997. URL <https://doi.org/10.1037/0003-066X.49.12.997>.
- Mark Cook. Experiments on orientation and proxemics. *Human Relations*, 23(1):61–76, 1970. doi: 10.1177/001872677002300107. URL <https://doi.org/10.1177/001872677002300107>.

- Martin Cooney, Takayuki Kanda, Aris Alissandarakis, and Hiroshi Ishiguro. Designing enjoyable motion-based play interactions with a small humanoid robot. *International Journal of Social Robotics*, 6(2):173–193, 2014. doi: 10.1007/s12369-013-0212-0. URL <https://doi.org/10.1007/s12369-013-0212-0>.
- Jo Cribb and David Glover. *Don't worry about the robots*. Allen & Unwin, Auckland, New Zealand, 2018. ISBN 9781760633509. URL <http://www.worldcat.org/oclc/1042120802>.
- Richard J. Crisp and Rhiannon N. Turner. Imagined intergroup contact: Refinements, debates, and clarifications. In Gordon Hodson and Miles Hewstone, editors, *Advances in intergroup contact*, chapter 6, pages 149–165. Psychology Press, 2013. ISBN 978-1136213908. URL <http://www.worldcat.org/oclc/694393740>.
- April H. Crusco and Christopher G. Wetzel. The Midas touch: The effects of interpersonal touch on restaurant tipping. *Personality and Social Psychology Bulletin*, 10(4):512–517, 1984. doi: 10.1177/0146167284104003. URL <https://doi.org/10.1177/0146167284104003>.
- Mihaly Csikszentmihalyi and Isabella Selega Csikszentmihalyi. *Optimal experience: Psychological studies of flow in consciousness*. Cambridge University Press, Cambridge, UK, 1988. ISBN 0521342880. URL <http://www.worldcat.org/oclc/963712478>.
- Amy Cuddy, Susan Fiske, and Peter Glick. Warmth and competence as universal dimensions of social perception: The stereotype content model and the bias map. *Advances in Experimental Social Psychology*, 40:61–149, 12 2008. doi: 10.1016/S0065-2601(07)00002-0. URL [https://doi.org/10.1016/S0065-2601\(07\)00002-0](https://doi.org/10.1016/S0065-2601(07)00002-0).
- Geoff Cumming. Replication and  $p$  intervals:  $p$  values predict the future only vaguely, but confidence intervals do much better. *Perspectives on Psychological Science*, 3(4):286–300, 2008. doi: 10.1111/j.1745-6924.2008.00079.x. URL <https://doi.org/10.1111/j.1745-6924.2008.00079.x>.
- Geoff Cumming. The new statistics: Why and how. *Psychological Science*, 25(1): 7–29, 2014. doi: 10.1177/0956797613504966. URL <http://journals.sagepub.com/doi/10.1177/0956797613504966>.
- Kate Darling. Extending legal protection to social robots: The effects of anthropomorphism, empathy, and violent behavior towards robotic objects. In *We Robot Conference*. SSRN, 2012. doi: 10.2139/ssrn.2044797. URL <https://doi.org/10.2139/ssrn.2044797>.
- K. Dautenhahn, M. Walters, S. Woods, K. L. Koay, C. L. Nehaniv, A. Sisbot, R. Alami, and T. Siméon. How may I serve you? A robot companion approaching a seated person in a helping context. In *Proceedings of the 1st ACM SIGCHI/SIGART Conference on Human-Robot Interaction*, HRI '06, pages 172–179, New York, NY, 2006a. ACM. ISBN 1-59593-294-1. doi: 10.1145/1121241.1121272. URL <http://doi.acm.org/10.1145/1121241.1121272>.
- Kerstin Dautenhahn, Michael Walters, Sarah Woods, Kheng Lee Koay, Chrystopher L. Nehaniv, A. Sisbot, Rachid Alami, and Thierry Siméon. How may I serve you? A robot companion approaching a seated person in a helping context. In *1st ACM SIGCHI/SIGART Conference on Human-Robot Interaction*, pages 172–179. ACM, 2006b. ISBN 1-59593-294-1. doi: 10.1145/1121241.1121272. URL <https://doi.org/10.1145/1121241.1121272>.
- Andrew J. Davison, Ian D. Reid, Nicholas D. Molton, and Olivier Stasse. Monoslam: Real-time single camera slam. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 29(6):1052–1067, 2007. doi: 10.1109/TPAMI.2007.1049. URL <http://doi.org/10.1109/TPAMI.2007.1049>.
- Antonella De Angeli. Ethical implications of verbal disinhibition with conversational



- agents. *PsychNology Journal*, 7(1), 2009. URL [http://psychnology.org/File/PNJ7\(1\)/PSYCHNOLOGY\\_JOURNAL\\_7\\_1\\_DEANGELI.pdf](http://psychnology.org/File/PNJ7(1)/PSYCHNOLOGY_JOURNAL_7_1_DEANGELI.pdf).
- Maartje de Graaf, Somaya Ben Allouch, and Jan van Dijk. Why do they refuse to use my robot? Reasons for non-use derived from a long-term home study. In *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*, pages 224–233. ACM, 2017. ISBN 978-1-4503-4336-7. doi: 10.1145/2909824.3020236. URL <https://doi.org/10.1145/2909824.3020236>.
- Frans De Waal. *The ape and the sushi master: Cultural reflections of a primatologist*. Basic Books, New York, NY, 2001. ISBN 978-0465041763. URL <http://www.worldcat.org/oclc/458716823>.
- Philip K. Dick. *Do androids dream of electric sheep?* Boom! Studios, a division of Boom Entertainment, Los Angeles, CA, 1986. ISBN 978-160886784. URL <http://www.worldcat.org/oclc/929049302>.
- Philip K. Dick. *Blade runner: Do androids dream of electric sheep?* Ballantine Books, New York, NY, 25th anniversary edition, 2007. ISBN 9780345350473. URL <http://www.worldcat.org/oclc/776604212>.
- Joshua J. Diehl, Lauren M. Schmitt, Michael Villano, and Charles R. Crowell. The clinical use of robots for individuals with autism spectrum disorders: A critical review. *Research in Autism Spectrum Disorders*, 6(1):249–262, 2012. doi: 10.1016/j.rasd.2011.05.006. URL <https://doi.org/10.1016/j.rasd.2011.05.006>.
- Carl DiSalvo, Illah Nourbakhsh, David Holstius, Ayça Akin, and Marti Louw. The neighborhood networks project: A case study of critical engagement and creative expression through participatory design. In *10th Anniversary Conference on Participatory Design 2008*, pages 41–50. Indiana University, 2008. ISBN 978-0-9818561-0-0. URL <https://dl.acm.org/citation.cfm?id=1795241>.
- Carl F. DiSalvo, Francine Gemperle, Jodi Forlizzi, and Sara Kiesler. All robots are not created equal: The design and perception of humanoid robot heads. In *Proceedings of the 4th Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques*, DIS '02, pages 321–326, New York, NY, 2002. ACM. ISBN 1-58113-515-7. doi: 10.1145/778712.778756. URL <http://doi.acm.org/10.1145/778712.778756>.
- Steve Dixon. Metal performance humanizing robots, returning to nature, and camping about. *TDR/The Drama Review*, 48(4):15–46, 2004. ISSN 1054-2043. doi: 10.1162/1054204042442017. URL <http://dx.doi.org/10.1162/1054204042442017>.
- Anhai Doan, Raghu Ramakrishnan, and Alon Y. Halevy. Crowdsourcing systems on the world-wide web. *Communications of the ACM*, 54(4):86–96, 2011. doi: 10.1145/1924421.1924442. URL <https://doi.org/10.1145/1924421.1924442>.
- Anca D. Dragan, Kenton C. T. Lee, and Siddhartha S. Srinivasa. Legibility and predictability of robot motion. In *8th ACM/IEEE International Conference on Human-Robot Interaction*, pages 301–308. IEEE, 2013. ISBN 978-1-4673-3099-2. doi: 10.1109/HRI.2013.6483603. URL <https://doi.org/10.1109/HRI.2013.6483603>.
- Brian R. Duffy. Anthropomorphism and the social robot. *Robotics and Autonomous Systems*, 42(3):177–190, 2003. ISSN 0921-8890. doi: 10.1016/S0921-8890(02)00374-3. URL [https://doi.org/10.1016/S0921-8890\(02\)00374-3](https://doi.org/10.1016/S0921-8890(02)00374-3).
- Autumn Edwards, Chad Edwards, Patric R. Spence, Christina Harris, and Andrew Gambino. Robots in the classroom: Differences in students' perceptions of credibility and learning between “teacher as robot” and “robot as teacher”. *Computers in Human Behavior*, 65:627–634, 2016. doi: 10.1016/j.chb.2016.06.005. URL <https://doi.org/10.1016/j.chb.2016.06.005>.
- Naomi I. Eisenberger, Matthew D. Lieberman, and Kipling D. Williams. Does rejection hurt? An fMRI study of social exclusion. *Science*, 302(5643):290–292,

2003. doi: 10.1126/science.1089134. URL <https://doi.org/10.1126/science.1089134>.
- Pantaleimon Ekkekakis. *The measurement of affect, mood, and emotion: A guide for health-behavioral research*. Cambridge University Press, Cambridge, UK, 2013. doi: 10.1017/CBO9780511820724. URL <https://doi.org/10.1017/CBO9780511820724>.
- Paul Ekman. Facial expressions of emotion: New findings, new questions. *Psychological Science*, 3(1):34–38, 1992. doi: 10.1111/j.1467-9280.1992.tb00253.x. URL <https://doi.org/10.1111/j.1467-9280.1992.tb00253.x>.
- Paul Ekman. Basic emotions. In T. Dalgleich and M. Power, editors, *Handbook of cognition and emotion*, pages 45–60. Wiley Online Library, 1999. ISBN 978-1462509997. URL <http://www.worldcat.org/oclc/826592694>.
- Paul Ekman and Wallace Friesen. Facial action coding system: A technique for the measurement of facial movement. *Palo Alto: Consulting Psychologists*, 1978.
- Paul Ekman and Wallace V. Friesen. *Unmasking the face*. Prentice Hall, Englewood Cliffs, NJ, 1975. ISBN 978-1883536367. URL <http://www.worldcat.org/oclc/803874427>.
- Moataz El Ayadi, Mohamed S. Kamel, and Fakhri Karray. Survey on speech emotion recognition: Features, classification schemes, and databases. *Pattern Recognition*, 44(3):572–587, 2011. doi: 10.1016/j.patcog.2010.09.020. URL <https://doi.org/10.1016/j.patcog.2010.09.020>.
- Ilias El Makrini, Shirley A. Elprama, Jan Van den Bergh, Bram Vanderborght, Albert-Jan Knevels, Charlotte I. C. Jewell, Frank Stals, Geert De Coppel, Ilse Ravyse, Johan Potargent, et al. Working with Walt. *IEEE Robotics & Automation Magazine*, 25:51–58, 2018. doi: 10.1109/MRA.2018.2815947. URL <https://doi.org/10.1109/MRA.2018.2815947>.
- Alexis M. Elder. *Friendship, robots, and social media: False friends and second selves*. Routledge, New York, NY, 2017. ISBN 978-1138065666. URL <http://www.worldcat.org/oclc/1016009820>.
- Nicholas Epley, Adam Waytz, and John T. Cacioppo. On seeing human: A three-factor theory of anthropomorphism. *Psychological Review*, 114(4):864–886, 2007. doi: 10.1037/0033-295X.114.4.864. URL <https://doi.org/10.1037/0033-295X.114.4.864>.
- Nicholas Epley, Adam Waytz, Scott Akalis, and John T. Cacioppo. When we need a human: Motivational determinants of anthropomorphism. *Social Cognition*, 26(2):143–155, 2008. doi: 10.1521/soco.2008.26.2.143. URL <https://doi.org/10.1521/soco.2008.26.2.143>.
- European Commission. Public attitudes towards robots: A report. Technical Report Special Eurobarometer 382 / Wave EB77.1, Directorate-General for Information Society and Media, 2012. URL [http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs\\_382\\_en.pdf](http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_382_en.pdf).
- Vanessa Evers, Heidy C. Maldonado, Talia L. Brodecki, and Pamela J. Hinds. Relational vs. group self-construal: Untangling the role of national culture in HRI. In *Proceedings of the 3rd ACM/IEEE International Conference on Human-Robot Interaction*, HRI '08, pages 255–262, New York, NY, 2008. ACM. ISBN 978-1-60558-017-3. doi: 10.1145/1349822.1349856. URL <http://doi.acm.org/10.1145/1349822.1349856>.
- Florian Eyben, Felix Weninger, Florian Gross, and Björn Schuller. Recent developments in OpenSMILE, the Munich open-source multimedia feature extractor. In *21st ACM International Conference on Multimedia*, pages 835–838. ACM, 2013. ISBN 978-1-4503-2404-5. doi: 10.1145/2502081.2502224. URL <https://doi.org/10.1145/2502081.2502224>.

## References

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- F. Eyssel and N. Reich. Loneliness makes the heart grow fonder (of robots)—on the effects of loneliness on psychological anthropomorphism. In *Proceedings of the 8th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, pages 121–122, 2013. ISBN 978-1-4673-3101-2. doi: 10.1109/HRI.2013.6483531. URL <https://doi.org/10.1109/HRI.2013.6483531>.
- Friederike Eyssel. An experimental psychological perspective on social robotics. *Robotics and Autonomous Systems*, 87(Supplement C):363–371, 2017. ISSN 0921-8890. doi: <https://doi.org/10.1016/j.robot.2016.08.029>. URL <http://www.sciencedirect.com/science/article/pii/S0921889016305462>.
- Friederike Eyssel and Frank Hegel. (S)he’s got the look: Gender-stereotyping of social robots. *Journal of Applied Social Psychology*, 42:2213–2230, 2012. doi: 10.1111/j.1559-1816.2012.00937.x. URL <https://doi.org/10.1111/j.1559-1816.2012.00937.x>.
- Friederike Eyssel, Dieta Kuchenbrandt, Simon Bobinger, Laura de Ruiter, and Frank Hegel. “If you sound like me, you must be more human”: On the interplay of robot and user features on human-robot acceptance and anthropomorphism. In *Proceedings of the 7th Annual ACM/IEEE International Conference on Human-Robot Interaction*, HRI ’12, pages 125–126, New York, NY, 2012a. ACM. ISBN 978-1-4503-1063-5. doi: 10.1145/2157689.2157717. URL <http://doi.acm.org/10.1145/2157689.2157717>.
- Friederike Eyssel, Dieta Kuchenbrandt, Frank Hegel, and Laura de Ruiter. Activating elicited agent knowledge: How robot and user features shape the perception of social robots. In *Robot and human interactive communication (RO-MAN)*, pages 851–857. IEEE, 2012b. doi: 10.1109/ROMAN.2012.6343858. URL <https://doi.org/10.1109/ROMAN.2012.6343858>.
- Franz Faul, Edgar Erdfelder, Albert-Georg Lang, and Buchner Axel. G\*power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39:175–191, 2007. doi: 10.3758/BF03193146. URL <https://doi.org/10.3758/BF03193146>.
- David Feil-Seifer and Maja J. Matarić. Socially assistive robotics. *IEEE Robotics & Automation Magazine*, 18(1):24–31, 2011. doi: 10.1109/MRA.2010.940150. URL <https://doi.org/10.1109/MRA.2010.940150>.
- Catherine Feng, Shiri Azenkot, and Maya Cakmak. Designing a robot guide for blind people in indoor environments. In *The 10th Annual ACM/IEEE International Conference on Human-Robot Interaction Extended Abstracts*, pages 107–108. ACM, 2015. ISBN 978-1-4503-3318-4. doi: 10.1145/2701973.2702060. URL <https://doi.org/10.1145/2701973.2702060>.
- Francesco Ferrari, Maria Paola Paladino, and Jolanda Jetten. Blurring human-machine distinctions: Anthropomorphic appearance in social robots as a threat to human distinctiveness. *International Journal of Social Robotics*, 8(2):287–302, 2016. doi: 10.1007/s12369-016-0338-y. URL <https://doi.org/10.1007/s12369-016-0338-y>.
- Andy Field. *Discovering statistics using IBM SPSS statistics*. Sage, Thousand Oaks, CA, 2018. ISBN 9781526419514. URL <http://www.worldcat.org/oclc/1030545826>.
- Andy Field and Graham Hole. *How to design and report experiments*. Sage, Thousand Oaks, CA, 2002. ISBN 978085702829. URL <http://www.worldcat.org/title/how-to-design-and-report-experiments/oclc/961100072>.
- Julia Fink. Anthropomorphism and human likeness in the design of robots and human-robot interaction. In Shuzhi Sam Ge, Oussama Khatib, John-John Cabibihan, Reid Simmons, and Mary-Anne Williams, editors, *Social robotics*, pages 199–208, Berlin, Heidelberg, 2012. Springer. ISBN 978-3-642-34103-8. doi: 10.1007/

- 978-3-642-34103-8\_20. URL [https://doi.org/10.1007/978-3-642-34103-8\\_20](https://doi.org/10.1007/978-3-642-34103-8_20).
- Julia Fink, Valérie Bauwens, Frédéric Kaplan, and Pierre Dillenbourg. Living with a vacuum cleaning robot. *International Journal of Social Robotics*, 5(3):389–408, Aug 2013. ISSN 1875-4805. doi: 10.1007/s12369-013-0190-2. URL <https://doi.org/10.1007/s12369-013-0190-2>.
- Julia Fink, Séverin Lemaignan, Pierre Dillenbourg, Philippe Réturnaz, Florian Vausard, Alain Berthoud, Francesco Mondada, Florian Wille, and Karmen Franić. Which robot behavior can motivate children to tidy up their toys? Design and evaluation of ranger. In *ACM/IEEE International Conference on Human-Robot Interaction*, pages 439–446. ACM, 2014. ISBN 978-1-4503-2658-2. doi: 10.1145/2559636.2559659. URL <https://doi.org/10.1145/2559636.2559659>.
- Jaime Fisac, Andrea Bajcsy, Sylvia Herbert, David Fridovich-Keil, Steven Wang, Claire Tomlin, and Anca Dragan. Probabilistically safe robot planning with confidence-based human predictions. In *Proceedings of Robotics: Science and Systems*, Pittsburgh, Pennsylvania, June 2018. ISBN 978-0-9923747-4-7. doi: 10.15607/RSS.2018.XIV.069. URL <https://doi.org/10.15607/RSS.2018.XIV.069>.
- Kerstin Fischer, Katrin Lohan, Joe Saunders, Chrystopher Nehaniv, Britta Wrede, and Katharina Rohlfing. The impact of the contingency of robot feedback on HRI. In *International Conference on Collaboration Technologies and Systems*, pages 210–217. IEEE, 2013. ISBN 978-1-4673-6403-4. doi: 10.1109/CTS.2013.6567231. URL <https://doi.org/10.1109/CTS.2013.6567231>.
- Martin Ford. *The rise of the robots: Technology and the threat of mass unemployment*. Oneworld Publications, London, UK, 2015. ISBN 978-0465059997. URL <http://www.worldcat.org/oclc/993846206>.
- Jodi Forlizzi and Carl DiSalvo. Service robots in the domestic environment: A study of the Roomba vacuum in the home. In *Proceedings of the 1st ACM SIGCHI/SIGART Conference on Human-Robot Interaction*, HRI '06, pages 258–265, New York, NY, 2006. ACM. ISBN 1-59593-294-1. doi: 10.1145/1121241.1121286. URL <http://doi.acm.org/10.1145/1121241.1121286>.
- Floyd J. Fowler. *Improving survey questions: Design and evaluation*, volume 38. Sage, Thousand Oaks, CA, 1995. ISBN 978-0803945838. URL <http://www.worldcat.org/oclc/551387270>.
- Floyd J. Fowler Jr. *Survey research methods*. Sage, Thousand Oaks, CA, 2013. ISBN 978-1452259000. URL <http://www.worldcat.org/oclc/935314651>.
- Dieter Fox, Wolfram Burgard, and Sebastian Thrun. The dynamic window approach to collision avoidance. *IEEE Robotics & Automation Magazine*, 4(1):23–33, 1997. doi: 10.1109/100.580977. URL <https://doi.org/10.1109/100.580977>.
- Masahiro Fujita. Aibo: Toward the era of digital creatures. *International Journal of Robotics Research*, 20(10):781–794, 2001. doi: 10.1177/02783640122068092. URL <https://doi.org/10.1177/02783640122068092>.
- Future of Life Institute. An open letter—research priorities for robust and beneficial artificial intelligence, January 2015. URL <https://futureoflife.org/ai-open-letter/>.
- Joel Garreau. Bots on the ground. *Washington Post*, 2007. URL <http://www.washingtonpost.com/wp-dyn/content/article/2007/05/05/AR2007050501009.html>.
- Adam Gazzaley and Larry D. Rosen. *The distracted mind: Ancient brains in a high-tech world*. MIT Press, Cambridge, MA, 2016. ISBN 978-0262534437. URL <http://www.worldcat.org/oclc/978487215>.

## References

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- Guido H. E. Gendolla. On the impact of mood on behavior: An integrative theory and a review. *Review of General Psychology*, 4(4):378–408, 2000. doi: 10.1037/1089-2680.4.4.378. URL <https://doi.org/10.1037/1089-2680.4.4.378>.
- Oliver Genschow, Sofie van Den Bossche, Emiel Cracco, Lara Bardi, Davide Rigoni, and Marcel Brass. Mimicry and automatic imitation are not correlated. *PloS One*, 12(9):e0183784, 2017. doi: 10.1371/journal.pone.0183784. URL <https://doi.org/10.1371/journal.pone.0183784>.
- Robert M. Geraci. Spiritual robots: Religion and our scientific view of the natural world. *Theology and Science*, 4(3):229–246, 2006. doi: 10.1080/14746700600952993. URL <https://doi.org/10.1080/14746700600952993>.
- James J. Gibson. *The ecological approach to visual perception: Classic edition*. Psychology Press, London, UK, 2014. ISBN 978-1848725782. URL <http://www.worldcat.org/oclc/896794768>.
- Rachel Gockley, Allison Bruce, Jodi Forlizzi, Marek Michalowski, Anne Mundell, Stephanie Rosenthal, Brennan Sellner, Reid Simmons, Kevin Snipes, Alan C. Schultz, et al. Designing robots for long-term social interaction. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1338–1343. IEEE, 2005. ISBN 0-7803-8912-3. doi: 10.1109/IROS.2005.1545303. URL <https://doi.org/10.1109/IROS.2005.1545303>.
- Rachel Gockley, Jodi Forlizzi, and Reid Simmons. Interactions with a moody robot. In *Proceedings of the 1st ACM SIGCHI/SIGART Conference on Human-Robot Interaction*, pages 186–193. ACM, 2006. ISBN 1-59593-294-1. doi: 10.1145/1121241.1121274. URL <https://doi.org/10.1145/1121241.1121274>.
- Rachel Gockley, Jodi Forlizzi, and Reid Simmons. Natural person-following behavior for social robots. In *ACM/IEEE International Conference on Human-Robot Interaction*, pages 17–24. ACM, 2007. ISBN 978-1-59593-617-2. doi: 10.1145/1228716.1228720. URL <https://doi.org/10.1145/1228716.1228720>.
- Ben Goldacre. *Bad science*. Fourth Estate, London, UK, 2008. ISBN 9780007240197. URL <http://www.worldcat.org/oclc/760098401>.
- Joseph K. Goodman, Cynthia E. Cryder, and Amar Cheema. Data collection in a flat world: The strengths and weaknesses of mechanical turk samples. *Journal of Behavioral Decision Making*, 26(3):213–224, 2013. doi: 10.1002/bdm.1753. URL <https://doi.org/10.1002/bdm.1753>.
- Eberhard Graether and Florian Mueller. Joggobot: A flying robot as jogging companion. In *CHI '12 Extended Abstracts on Human Factors in Computing Systems*, pages 1063–1066, New York, NY, 2012. ACM. ISBN 978-1-4503-1016-1. doi: 10.1145/2212776.2212386. URL <https://doi.org/10.1145/2212776.2212386>.
- Heather M. Gray, Kurt Gray, and Daniel M. Wegner. Dimensions of mind perception. *Science*, 315(5812):619–619, 2007. ISSN 0036-8075. doi: 10.1126/science.1134475. URL <http://science.sciencemag.org/content/315/5812/619>.
- Leslie S. Greenberg. Application of emotion in psychotherapy. In Michael Lewis, Jeanette M. Haviland-Jones, and Lisa Feldman Barrett, editors, *Handbook of emotions*, volume 3, pages 88–101. Guilford Press, New York, NY, 2008. ISBN 978-1-59385-650-2. URL <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.472.7583&rep=rep1&type=pdf>.
- H.-M. Gross, H. Boehme, Ch Schroeter, Steffen Müller, Alexander König, Erik Einhorn, Ch Martin, Matthias Merten, and Andreas Bley. Toomas: Interactive shopping guide robots in everyday use-final implementation and experiences from long-term field trials. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 2005–2012. IEEE, 2009. ISBN 978-1-4244-3803-7. doi: 10.1109/IROS.2009.5354497. URL <https://doi.org/10.1109/IROS.2009.5354497>.
- James J. Gross. Emotion regulation: Conceptual foundations. In James J. Gross,

- editor, *Handbook of emotion regulation*, chapter 1, pages 3–22. Guilford Press, 2007. ISBN 978-1462520732. URL <http://www.worldcat.org/oclc/1027033463>.
- Hatice Gunes, Björn Schuller, Maja Pantic, and Roddy Cowie. Emotion representation, analysis and synthesis in continuous space: A survey. In *IEEE International Conference on Automatic Face & Gesture Recognition and Workshops*, pages 827–834. IEEE, 2011. ISBN 978-1-4244-9140-7. doi: 10.1109/FG.2011.5771357. URL <https://doi.org/10.1109/FG.2011.5771357>.
- Martin Haegele. *World robotics service robots*. IFR Statistical Department, Chicago, IL, 2016. ISBN 9783816306948. URL <http://www.worldcat.org/oclc/979905174>.
- Edward T. Hall, Ray L. Birdwhistell, Bernhard Bock, Paul Bohannon, A. Richard Diebold Jr., Marshall Durbin, Munro S. Edmonson, J. L. Fischer, Dell Hymes, Solon T. Kimball, et al. Proxemics [and comments and replies]. *Current Anthropology*, 9(2/3):83–108, 1968. doi: 10.1086/200975. URL <https://doi.org/10.1086/200975>.
- Kun Han, Dong Yu, and Ivan Tashev. Speech emotion recognition using deep neural network and extreme learning machine. In *15th Annual Conference of the International Speech Communication Association*, pages 223–227, 2014. URL [https://www.isca-speech.org/archive/archive\\_papers/interspeech\\_2014/i14\\_0223.pdf](https://www.isca-speech.org/archive/archive_papers/interspeech_2014/i14_0223.pdf).
- Takuya Hashimoto, Igor M. Verner, and Hiroshi Kobayashi. Human-like robot as teacher’s representative in a science lesson: An elementary school experiment. In J. H. Kim, Matson E., and Xu P. Myung H., editors, *Robot intelligence technology and applications*, volume 208 of *Advances in Intelligent Systems and Computing*, pages 775–786. Springer, 2013. doi: 10.1007/978-3-642-37374-9\_74. URL [https://doi.org/10.1007/978-3-642-37374-9\\_74](https://doi.org/10.1007/978-3-642-37374-9_74).
- Nick Haslam. Dehumanization: An integrative review. *Personality and Social Psychology Review*, 10(3):252–264, 2006. doi: 10.1207/s15327957pspr1003\_4. URL [https://doi.org/10.1207/s15327957pspr1003\\_4](https://doi.org/10.1207/s15327957pspr1003_4).
- Kotaro Hayashi, Masahiro Shiomi, Takayuki Kanda, Norihiro Hagita, and AI Robotics. Friendly patrolling: A model of natural encounters. In Hugh Durrant-Whyte, Nicholas Roy, and Pieter Abbeel, editors, *Robotics: Science and systems, Volume II*, pages 121–129. MIT Press, Cambridge, MA, 2012. ISBN 978-0-262-51779-9. URL <http://www.worldcat.org/oclc/858018257>.
- Fritz Heider and Marianne Simmel. An experimental study of apparent behavior. *American Journal of Psychology*, 57(2):243–259, 1944. doi: 10.2307/1416950. URL <https://doi.org/10.2307/1416950>.
- Mattias Heldner and Jens Edlund. Pauses, gaps and overlaps in conversations. *Journal of Phonetics*, 38(4):555–568, 2010. doi: 10.1016/j.wocn.2010.08.002. URL <https://doi.org/10.1016/j.wocn.2010.08.002>.
- Carl-Herman Hjortsjö. *Man’s face and mimic language*. Studen litteratur, Sweden, 1969. URL <http://www.worldcat.org/oclc/974134474>.
- Chin-Chang Ho and Karl F. MacDorman. Revisiting the Uncanny Valley theory: Developing and validating an alternative to the Godspeed indices. *Computers in Human Behavior*, 26(6):1508–1518, 2010. doi: 10.1016/j.chb.2010.05.015. URL <https://doi.org/10.1016/j.chb.2010.05.015>.
- Guy Hoffman. Dumb robots, smart phones: A case study of music listening companionship. In *The 21st IEEE International Symposium on Robot and Human Interactive Communication*, pages 358–363. IEEE, 2012. ISBN 978-1-4673-4604-7. doi: 10.1109/ROMAN.2012.6343779. URL <https://doi.org/10.1109/ROMAN.2012.6343779>.
- Guy Hoffman and Cynthia Breazeal. Effects of anticipatory action on human-robot teamwork efficiency, fluency, and perception of team. In *Proceedings of*

- the *ACM/IEEE International Conference on Human-Robot Interaction*, pages 1–8. ACM, 2007. ISBN 978-1-59593-617-2. doi: 10.1145/1228716.1228718. URL <https://doi.org/10.1145/1228716.1228718>.
- Guy Hoffman and Keinan Vanunu. Effects of robotic companionship on music enjoyment and agent perception. In *8th ACM/IEEE International Conference on Human-Robot Interaction*, pages 317–324. IEEE, 2013. ISBN 978-1-4673-3099-2. doi: 10.1109/HRI.2013.6483605. URL <https://doi.org/10.1109/HRI.2013.6483605>.
- Guy Hoffman and Gil Weinberg. Shimon: An interactive improvisational robotic marimba player. In *CHI’10 Extended Abstracts on Human Factors in Computing Systems*, pages 3097–3102. ACM, 2010. ISBN 978-1-60558-930-5. doi: 10.1145/1753846.1753925. URL <https://doi.org/10.1145/1753846.1753925>.
- Olle Holm. Analyses of longing: Origins, levels, and dimensions. *Journal of Psychology*, 133(6):621–630, 1999. doi: 10.1080/00223989909599768. URL <https://doi.org/10.1080/00223989909599768>.
- Deanna Hood, Séverin Lemaignan, and Pierre Dillenbourg. When children teach a robot to write: An autonomous teachable humanoid which uses simulated handwriting. In *10th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 83–90. ACM, 2015. ISBN 978-1-4503-2883-8. doi: 10.1145/2696454.2696479. URL <https://doi.org/10.1145/2696454.2696479>.
- Andrew J. Hunt and Alan W. Black. Unit selection in a concatenative speech synthesis system using a large speech database. In *IEEE International Conference on Acoustics, Speech, and Signal Processing*, volume 1, pages 373–376. IEEE, 1996. ISBN 0-7803-3192-3. doi: 10.1109/ICASSP.1996.541110. URL <https://doi.org/10.1109/ICASSP.1996.541110>.
- Helge Hüttenrauch, Kerstin Severinson Eklundh, Anders Green, and Elin A. Topp. Investigating spatial relationships in human-robot interaction. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 5052–5059. IEEE, 2006. ISBN 1-4244-0258-1. doi: 10.1109/IROS.2006.282535. URL <https://doi.org/10.1109/IROS.2006.282535>.
- Michita Imai, Tetsuo Ono, and Hiroshi Ishiguro. Physical relation and expression: Joint attention for human-robot interaction. *IEEE Transactions on Industrial Electronics*, 50(4):636–643, 2003. doi: 10.1109/TIE.2003.814769. URL <https://doi.org/10.1109/TIE.2003.814769>.
- Bahar Irfan, James Kennedy, Séverin Lemaignan, Fotios Papadopoulos, Emmanuel Senft, and Tony Belpaeme. Social psychology and human-robot interaction: An uneasy marriage. In *Companion of the 2018 ACM/IEEE International Conference on Human-Robot Interaction, HRI ’18*, pages 13–20, New York, NY, 2018. ACM. ISBN 978-1-4503-5615-2. doi: 10.1145/3173386.3173389. URL <http://doi.acm.org/10.1145/3173386.3173389>.
- Carlos T. Ishi, Chaoran Liu, Hiroshi Ishiguro, and Norihiro Hagita. Speech-driven lip motion generation for tele-operated humanoid robots. In *Auditory-visual speech processing*, pages 131–135, 2011. URL [https://www.isca-speech.org/archive/avsp11/papers/av11\\_131.pdf](https://www.isca-speech.org/archive/avsp11/papers/av11_131.pdf).
- Hiroshi Ishiguro. Android science. In Thrun S., Brooks R., and Durrant-Whyte H., editors, *Robotics research*, pages 118–127. Springer, 2007. ISBN 978-3-540-48110-2. doi: 10.1007/978-3-540-48113-3\_11. URL [https://doi.org/10.1007/978-3-540-48113-3\\_11](https://doi.org/10.1007/978-3-540-48113-3_11).
- Oliver P. John, Sanjay Srivastava, et al. The Big Five trait taxonomy: History, measurement, and theoretical perspectives. *Handbook of personality: Theory and research*, 2(1999):102–138, 1999.
- Spike Jonze. *Her*, 2013. URL [https://www.imdb.com/title/tt1798709/?ref\\_=fn\\_al\\_tt\\_1](https://www.imdb.com/title/tt1798709/?ref_=fn_al_tt_1).

- Jutta Joormann and Ian H. Gotlib. Emotion regulation in depression: Relation to cognitive inhibition. *Cognition and Emotion*, 24(2):281–298, 2010. doi: 10.1080/02699930903407948. URL <https://doi.org/10.1080/02699930903407948>.
- Malte Jung and Pamela Hinds. Robots in the wild: A time for more robust theories of human-robot interaction. *ACM Transactions on Human-Robot Interaction (THRI)*, 7(1):2, 2018. doi: 10.1145/3208975. URL <https://doi.org/10.1145/3208975>.
- Peter H. Kahn, Nathan G. Freier, Takayuki Kanda, Hiroshi Ishiguro, Jolina H. Ruckert, Rachel L. Severson, and Shaun K. Kane. Design patterns for sociality in human-robot interaction. In *The 3rd ACM/IEEE International Conference on Human-Robot Interaction*, pages 97–104. ACM, 2008. ISBN 978-1-60558-017-3. doi: 10.1145/1349822.1349836. URL <https://doi.org/10.1145/1349822.1349836>.
- Peter H. Kahn Jr., Takayuki Kanda, Hiroshi Ishiguro, Brian T. Gill, Jolina H. Ruckert, Solace Shen, Heather E. Gary, Aimee L. Reichert, Nathan G. Freier, and Rachel L. Severson. Do people hold a humanoid robot morally accountable for the harm it causes? In *Proceedings of the 7th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 33–40. ACM, 2012. ISBN 978-1-4503-1063-5. doi: 10.1145/2157689.2157696. URL <https://doi.org/10.1145/2157689.2157696>.
- Peter H. Kahn Jr., Takayuki Kanda, Hiroshi Ishiguro, Solace Shen, Heather E. Gary, and Jolina H. Ruckert. Creative collaboration with a social robot. In *ACM International Joint Conference on Pervasive and Ubiquitous Computing*, pages 99–103. ACM, 2014. ISBN 978-1-4503-2968-2. doi: 10.1145/2632048.2632058. URL <https://doi.org/10.1145/2632048.2632058>.
- Takayuki Kanda, Takayuki Hirano, Daniel Eaton, and Hiroshi Ishiguro. Interactive robots as social partners and peer tutors for children: A field trial. *Human-Computer Interaction*, 19(1):61–84, 2004. doi: 10.1080/07370024.2004.9667340. URL <https://doi.org/10.1080/07370024.2004.9667340>.
- Takayuki Kanda, Masayuki Kamasima, Michita Imai, Tetsuo Ono, Daisuke Sakamoto, Hiroshi Ishiguro, and Yuichiro Anzai. A humanoid robot that pretends to listen to route guidance from a human. *Autonomous Robots*, 22(1):87–100, 2007a. doi: 10.1007/s10514-006-9007-6. URL <https://doi.org/10.1007/s10514-006-9007-6>.
- Takayuki Kanda, Rumi Sato, Naoki Saiwaki, and Hiroshi Ishiguro. A two-month field trial in an elementary school for long-term human-robot interaction. *IEEE Transactions on Robotics*, 23(5):962–971, 2007b. doi: 10.1109/TRO.2007.904904. URL <https://doi.org/10.1109/TRO.2007.904904>.
- Takayuki Kanda, Masahiro Shiomi, Zenta Miyashita, Hiroshi Ishiguro, and Norihiro Hagita. A communication robot in a shopping mall. *IEEE Transactions on Robotics*, 26(5):897–913, 2010. doi: 10.1109/TRO.2010.2062550. URL <https://doi.org/10.1109/TRO.2010.2062550>.
- Kyong Il Kang, Sanford Freedman, Maja J. Mataric, Mark J. Cunningham, and Becky Lopez. A hands-off physical therapy assistance robot for cardiac patients. In *9th International Conference on Rehabilitation Robotics (ICORR)*, pages 337–340. IEEE, 2005. ISBN 0-7803-9003-2. doi: 10.1109/ICORR.2005.1501114. URL <https://doi.org/10.1109/ICORR.2005.1501114>.
- Frederic Kaplan. Who is afraid of the humanoid? Investigating cultural differences in the acceptance of robots. *International Journal of Humanoid Robotics*, 1(3):1–16, 2004. doi: 10.1142/S0219843604000289. URL <https://doi.org/10.1142/S0219843604000289>.
- Victor Kaptelinin. Technology and the givens of existence: Toward an existential inquiry framework in HCI research. In *Proceedings of the 2018 CHI Conference on*



## References

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- Human Factors in Computing Systems*, CHI '18, pages 270:1–270:14, New York, NY, 2018. ACM. ISBN 978-1-4503-5620-6. doi: 10.1145/3173574.3173844. URL <http://doi.acm.org/10.1145/3173574.3173844>.
- Yusuke Kato, Takayuki Kanda, and Hiroshi Ishiguro. May I help you? design of human-like polite approaching behavior. In *10th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 35–42. ACM, 2015. ISBN 978-1-4503-2883-8. doi: 10.1145/2696454.2696463. URL <https://doi.org/10.1145/2696454.2696463>.
- Dacher Keltner and Ann M. Kring. Emotion, social function, and psychopathology. *Review of General Psychology*, 2(3):320–342, 1998. doi: 10.1037/1089-2680.2.3.320. URL <https://doi.org/10.1037/1089-2680.2.3.320>.
- Theodore D. Kemper. How many emotions are there? Wedding the social and the autonomic components. *American Journal of Sociology*, 93(2):263–289, 1987. doi: 10.1086/228745. URL <https://doi.org/10.1086/228745>.
- Adam Kendon. *Conducting interaction: Patterns of behavior in focused encounters*. Cambridge University Press, Cambridge, UK, 1990. ISBN 978-0521389389. URL <http://www.worldcat.org/oclc/785489376>.
- James Kennedy, Paul Baxter, and Tony Belpaeme. The robot who tried too hard: Social behaviour of a robot tutor can negatively affect child learning. In *10th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 67–74. ACM, 2015. ISBN 978-1-4503-2883-8. doi: 10.1145/2696454.2696457. URL <https://doi.org/10.1145/2696454.2696457>.
- James Kennedy, Séverin Lemaignan, Caroline Montassier, Pauline Lavalade, Bahar Irfan, Fotios Papadopoulos, Emmanuel Senft, and Tony Belpaeme. Child speech recognition in human-robot interaction: Evaluations and recommendations. In *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*, pages 82–90. ACM, 2017. ISBN 978-1-4503-4336-7. doi: 10.1145/2909824.3020229. URL <https://doi.org/10.1145/2909824.3020229>.
- Cory D. Kidd and Cynthia Breazeal. A robotic weight loss coach. In *Proceedings of the 22nd National Conference on Artificial Intelligence, Volume 2, AAAI'07*, pages 1985–1986. AAAI Press, 2007. ISBN 978-1-57735-323-2. URL <http://dl.acm.org/citation.cfm?id=1619797.1619992>.
- Cory D. Kidd and Cynthia Breazeal. Robots at home: Understanding long-term human-robot interaction. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 3230–3235. IEEE, 2008. ISBN 978-1-4244-2057-5. doi: 10.1109/IROS.2008.4651113. URL <https://doi.org/10.1109/IROS.2008.4651113>.
- Sara Kiesler, Aaron Powers, Susan R. Fussell, and Cristen Torrey. Anthropomorphic interactions with a robot and robot-like agent. *Social Cognition*, 26(2):169–181, 2008. doi: 10.1521/soco.2008.26.2.169. URL <https://doi.org/10.1521/soco.2008.26.2.169>.
- Ki Joon Kim, Eunil Park, and S. Shyam Sundar. Caregiving role in human-robot interaction: A study of the mediating effects of perceived benefit and social presence. *Computers in Human Behavior*, 29(4):1799–1806, 2013. doi: 10.1016/j.chb.2013.02.009. URL <https://doi.org/10.1016/j.chb.2013.02.009>.
- Sandra L. Kirmeyer and Thung-Rung Lin. Social support: Its relationship to observed communication with peers and superiors. *Academy of Management Journal*, 30(1):138–151, 1987. doi: 10.5465/255900. URL <https://doi.org/10.5465/255900>.
- Naho Kitano. “Rinri”: An incitement towards the existence of robots in Japanese society. *International Review of Information Ethics*, 6:78–83, 2006. URL [http://www.i-r-i-e.net/inhalt/006/006\\_Kitano.pdf](http://www.i-r-i-e.net/inhalt/006/006_Kitano.pdf).

- Frank Klassner. A case study of LEGO Mindstorms suitability for artificial intelligence and robotics courses at the college level. *SIGCSE Bulletin*, 34(1): 8–12, February 2002. ISSN 0097-8418. doi: 10.1145/563517.563345. URL <http://doi.acm.org/10.1145/563517.563345>.
- Kheng Lee Koay, Emrah Akin Sisbot, Dag Sverre Syrdal, Mick L. Walters, Kerstin Dautenhahn, and Rachid Alami. Exploratory study of a robot approaching a person in the context of handing over an object. In *AAAI Spring Symposium: Multidisciplinary Collaboration for Socially Assistive Robotics*, pages 18–24, 2007a. URL <http://www.aaai.org/Papers/Symposia/Spring/2007/SS-07-07/SS07-07-004.pdf>.
- Kheng Lee Koay, Dag Sverre Syrdal, Michael L. Walters, and Kerstin Dautenhahn. Living with robots: Investigating the habituation effect in participants’ preferences during a longitudinal human-robot interaction study. In *The 16th IEEE International Symposium on Robot and Human Interactive Communication*, pages 564–569. IEEE, 2007b. ISBN 978-1-4244-1634-9. doi: 10.1109/ROMAN.2007.4415149. URL <https://doi.org/10.1109/ROMAN.2007.4415149>.
- Thomas Kollar, Stefanie Tellex, Deb Roy, and Nicholas Roy. Toward understanding natural language directions. In *5th ACM/IEEE International Conference on Human-Robot Interaction*, pages 259–266. IEEE, 2010. ISBN 978-1-4244-4892-0. doi: 10.1109/HRI.2010.5453186. URL <https://doi.org/10.1109/HRI.2010.5453186>.
- Jeamin Koo, Jungsuk Kwac, Wendy Ju, Martin Steinert, Larry Leifer, and Clifford Nass. Why did my car just do that? Explaining semi-autonomous driving actions to improve driver understanding, trust, and performance. *International Journal on Interactive Design and Manufacturing (IJIDeM)*, 9(4):269–275, 2015. doi: 10.1007/s12008-014-0227-2. URL <https://doi.org/10.1007/s12008-014-0227-2>.
- Stefan Kopp, Brigitte Krenn, Stacy Marsella, Andrew N. Marshall, Catherine Pelachaud, Hannes Pirker, Kristinn R. Thórisson, and Hannes Vilhjálmsson. Towards a common framework for multimodal generation: The behavior markup language. In *International Workshop on Intelligent Virtual Agents*, pages 205–217. Springer, 2006. ISBN 978-3-540-37593-7. doi: 10.1007/11821830\_17. URL [https://doi.org/10.1007/11821830\\_17](https://doi.org/10.1007/11821830_17).
- Hideki Kozima, Marek P. Michalowski, and Cocoro Nakagawa. Keapon. *International Journal of Social Robotics*, 1(1):3–18, 2009. doi: 10.1007/s12369-008-0009-8. URL <https://doi.org/10.1007/s12369-008-0009-8>.
- Thibault Kruse, Amit Kumar Pandey, Rachid Alami, and Alexandra Kirsch. Human-aware robot navigation: A survey. *Robotics and Autonomous Systems*, 61(12):1726–1743, 2013. doi: 10.1016/j.robot.2013.05.007. URL <https://doi.org/10.1016/j.robot.2013.05.007>.
- Dieta Kuchenbrandt, Nina Riether, and Friederike Eyssel. Does anthropomorphism reduce stress in HRI? In *Proceedings of the 2014 ACM/IEEE International Conference on Human-Robot Interaction*, pages 218–219, New York, NY, 2014. ACM. ISBN 978-1-4503-2658-2. doi: 10.1145/2559636.2563710. URL <http://doi.org/10.1145/2559636.2563710>.
- Thomas S. Kuhn. *The structure of scientific revolutions*. University of Chicago Press, Chicago, IL, 2nd edition, 1970. ISBN 0226458032. URL <http://www.worldcat.org/oclc/468581998>.
- Dana Kulic and Elizabeth A. Croft. Safe planning for human-robot interaction. *Journal of Field Robotics*, 22(7):383–396, 2005. doi: 10.1002/rob.20073. URL <https://doi.org/10.1002/rob.20073>.
- Hideaki Kuzuoka, Yuya Suzuki, Jun Yamashita, and Keiichi Yamazaki. Reconfiguring spatial formation arrangement by robot body orientation. In *5th ACM/IEEE International Conference on Human-Robot Interaction*, pages 285–292. IEEE

- Press, 2010. ISBN 978-1-4244-4892-0. doi: 10.1109/HRI.2010.5453182. URL <https://doi.org/10.1109/HRI.2010.5453182>.
- Peter J. Lang, Margaret M. Bradley, and Bruce N. Cuthbert. Motivated attention: Affect, activation, and action. In Peter J. Lang, Robert F. Simons, Marie Balaban, and Robert Simons, editors, *Attention and orienting: Sensory and motivational processes*, pages 97–135. Erlbaum, Hillsdale, NJ, 1997. ISBN 9781135808204. URL <http://www.worldcat.org/oclc/949987355>.
- Juan S. Lara, Jonathan Casas, Andres Aguirre, Marcela Munera, Monica Rincon-Roncancio, Bahar Irfan, Emmanuel Senft, Tony Belpaeme, and Carlos A. Cifuentes. Human-robot sensor interface for cardiac rehabilitation. In *International Conference on Rehabilitation Robotics (ICORR)*, pages 1013–1018. IEEE, 2017. ISBN 978-1-5386-2296-4. doi: 10.1109/ICORR.2017.8009382. URL <https://doi.org/10.1109/ICORR.2017.8009382>.
- Randy J. Larsen and Edward Diener. Promises and problems with the circumplex model of emotion. In Margaret S. Clark, editor, *Emotion: The review of personality and social psychology*, volume 13, chapter 2, pages 25–59. Thousand Oaks, CA: Sage, 1992. ISBN 978-0803946149. URL <http://www.worldcat.org/oclc/180631851>.
- Richard S. Lazarus. *Emotion and adaptation*. Oxford University Press on Demand, 1991. ISBN 978-0195092660. URL <http://www.worldcat.org/oclc/298419692>.
- Yann LeCun, Yoshua Bengio, and Geoffrey Hinton. Deep learning. *Nature*, 521 (7553):436, 2015. doi: 10.1038/nature14539. URL <https://doi.org/10.1038/nature14539>.
- Hee Rin Lee, JaYoung Sung, Selma Šabanović, and Joenghye Han. Cultural design of domestic robots: A study of user expectations in Korea and the United States. In *IEEE International Workshop on Robot and Human Interactive Communication*, pages 803–808. IEEE, 2012. ISBN 978-1-4673-4604-7. doi: 10.1109/ROMAN.2012.6343850. URL <https://doi.org/10.1109/ROMAN.2012.6343850>.
- Hee Rin Lee, Selma Šabanović, Wan-Ling Chang, Shinichi Nagata, Jennifer Piatt, Casey Bennett, and David Hakken. Steps toward participatory design of social robots: Mutual learning with older adults with depression. In *ACM/IEEE International Conference on Human-Robot Interaction*, pages 244–253. ACM, 2017. ISBN 978-1-4503-4336-7. doi: 10.1145/2909824.3020237. URL <https://doi.org/10.1145/2909824.3020237>.
- Min Kyung Lee, Jodi Forlizzi, Paul E Rybski, Frederick Crabbe, Wayne Chung, Josh Finkle, Eric Glaser, and Sara Kiesler. The Snackbot: Documenting the design of a robot for long-term human-robot interaction. In *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*, pages 7–14. ACM, 2009. ISBN 978-1-60558-404-1. doi: 10.1145/1514095.1514100. URL <https://doi.org/10.1145/1514095.1514100>.
- Sau-lai Lee, Ivy Yee-man Lau, Sara Kiesler, and Chi-Yue Chiu. Human mental models of humanoid robots. In *IEEE International Conference on Robotics and Automation*, pages 2767–2772. IEEE, 2005. ISBN 0-7803-8914-X. doi: 10.1109/ROBOT.2005.1570532. URL <https://doi.org/10.1109/ROBOT.2005.1570532>.
- Iolanda Leite, Ginevra Castellano, André Pereira, Carlos Martinho, and Ana Paiva. Modelling empathic behaviour in a robotic game companion for children: An ethnographic study in real-world settings. In *Proceedings of the 7th Annual ACM/IEEE International Conference on Human-Robot Interaction*, HRI '12, pages 367–374, New York, NY, 2012. ACM. ISBN 978-1-4503-1063-5. doi: 10.1145/2157689.2157811. URL <https://dx.doi.org/10.1145/2157689.2157811>.
- Iolanda Leite, Carlos Martinho, and Ana Paiva. Social robots for long-term

- interaction: A survey. *International Journal of Social Robotics*, 5(2):291–308, 2013. doi: 10.1007/s12369-013-0178-y. URL <https://doi.org/10.1007/s12369-013-0178-y>.
- Iolanda Leite, Marissa McCoy, Monika Lohani, Daniel Ullman, Nicole Salomons, Charlene Stokes, Susan Rivers, and Brian Scassellati. Emotional storytelling in the classroom: Individual versus group interaction between children and robots. In *Proceedings of the 10th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 75–82. ACM, 2015. ISBN 978-1-4503-2883-8. doi: 10.1145/2696454.2696481. URL <https://doi.org/10.1145/2696454.2696481>.
- Séverin Lemaignan, Mathieu Warnier, E. Akin Sisbot, Aurélie Clodic, and Rachid Alami. Artificial cognition for social human-robot interaction: An implementation. *Artificial Intelligence*, 247:45–69, 2017. ISSN 0004-3702. doi: 10.1016/j.artint.2016.07.002. URL <http://doi.org/10.1016/j.artint.2016.07.002>.
- Douglas B. Lenat. Cyc: A large-scale investment in knowledge infrastructure. *Communications of the ACM*, 38(11):33–38, 1995. doi: 10.1145/219717.219745. URL <https://doi.org/10.1145/219717.219745>.
- David Levy. *Love and sex with robots: The evolution of human-robot relationships*. Harper Collins, New York, NY, 2009. ISBN 978-0061359804. URL <http://www.worldcat.org/oclc/1021135698>.
- Jacques-Philippe Leyens, Armando Rodríguez, Ramon Rodríguez-Torres, Ruth Gaunt, Maria Paladino, Jeroen Vaes, and Stéphanie Demoulin. Psychological essentialism and the differential attribution of uniquely human emotions to in-groups and outgroups. *European Journal of Social Psychology*, 31:395–411, 07 2001. doi: 10.1002/ejsp.50. URL <https://doi.org/10.1002/ejsp.50>.
- Daniel Leyzberg, Samuel Spaulding, Mariya Toneva, and Brian Scassellati. The physical presence of a robot tutor increases cognitive learning gains. In *Proceedings of the Cognitive Science Society*, pages 1882–1887, 2012. URL <https://escholarship.org/uc/item/7ck0p200>.
- Patrick Lin, Keith Abney, and George A. Bekey. *Robot ethics: The ethical and social implications of robotics*. Intelligent robotics and autonomous agents. MIT Press, Cambridge, MA, 2012. ISBN 9780262016667. URL <http://www.worldcat.org/oclc/1004334474>.
- Jessica Lindblom and Tom Ziemke. Social situatedness of natural and artificial intelligence: Vygotsky and beyond. *Adaptive Behavior*, 11(2):79–96, 2003. doi: 10.1177/10597123030112002. URL <https://doi.org/10.1177/10597123030112002>.
- P. Liu, D. F. Glas, T. Kanda, and H. Ishiguro. Data-driven HRI: Learning social behaviors by example from human-human interaction. *IEEE Transactions on Robotics*, 32(4):988–1008, 2016. ISSN 1552-3098. doi: 10.1109/TRO.2016.2588880. URL <https://doi.org/10.1109/TRO.2016.2588880>.
- Phoebe Liu, Dylan F. Glas, Takayuki Kanda, Hiroshi Ishiguro, and Norihiro Hagita. It’s not polite to point: Generating socially-appropriate deictic behaviors towards people. In *The 8th ACM/IEEE International Conference on Human-Robot Interaction*, pages 267–274. IEEE Press, 2013. ISBN 978-1-4673-3099-2. doi: 10.1109/HRI.2013.6483598. URL <https://doi.org/10.1109/HRI.2013.6483598>.
- Travis Lowdermilk. *User-centered design: A developer’s guide to building user-friendly applications*. O’Reilly, Sebastopol, CA, 2013. ISBN 978-1449359805. URL <http://www.worldcat.org/oclc/940703603>.
- Matthias Luber, Luciano Spinello, Jens Silva, and Kai O. Arras. Socially-aware robot navigation: A learning approach. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 902–907. IEEE, 2012. ISBN 978-1-4673-1737-5. doi: 10.1109/IROS.2012.6385716. URL <https://doi.org/10.1109/IROS.2012.6385716>.

## References

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- Karl F. MacDorman, Sandosh K. Vasudevan, and Chin-Chang Ho. Does Japan really have robot mania? comparing attitudes by implicit and explicit measures. *AI & SOCIETY*, 23(4):485–510, Jul 2009. ISSN 1435-5655. doi: 10.1007/s00146-008-0181-2. URL <https://doi.org/10.1007/s00146-008-0181-2>.
- Alex Mar. Modern love: Are we ready for intimacy with androids?, October 2017. URL <https://www.wired.com/2017/10/hiroshi-ishiguro-when-robots-act-just-like-humans/>. Online; accessed 7-September-2018.
- Aarian Marshall and Alex Davies. Uber’s self-driving car saw the woman it killed, report says. *Wired Magazine*, March 2018. URL <https://www.wired.com/story/uber-self-driving-crash-arizona-ntsb-report/>. Online; accessed 7-November-2018.
- Paul Marshall, Yvonne Rogers, and Nadia Pantidi. Using f-formations to analyse spatial patterns of interaction in physical environments. In *Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work*, pages 445–454. ACM, 2011. ISBN 978-1-4503-0556-3. doi: 10.1145/1958824.1958893. URL <https://doi.org/10.1145/1958824.1958893>.
- Maja J. Matarić. *The robotics primer*. MIT Press, Cambridge, MA, 2007. ISBN 9780262633543. URL <http://www.worldcat.org/oclc/604083625>.
- Nikolaos Mavridis. A review of verbal and non-verbal human–robot interactive communication. *Robotics and Autonomous Systems*, 63:22–35, 2015. ISSN 0921-8890. doi: 10.1016/j.robot.2014.09.031. URL <https://doi.org/10.1016/j.robot.2014.09.031>.
- Richard E. Mayer and C. Scott DaPra. An embodiment effect in computer-based learning with animated pedagogical agents. *Journal of Experimental Psychology: Applied*, 18(3):239–252, 2012. doi: 10.1037/a0028616. URL <http://doi.org/10.1037/a0028616>.
- Pamela McCorduck. *Machines who think: A personal inquiry into the history and prospects of artificial intelligence*. W. H. Freeman, San Francisco, 1979. ISBN 978-1568812052. URL <http://www.worldcat.org/oclc/748860627>.
- Drew McDermott. Yes, computers can think. *New York Times*, 1997. URL <http://www.nytimes.com/1997/05/14/opinion/yes-computers-can-think.html>.
- Albert Mehrabian. *Basic dimensions for a general psychological theory: Implications for personality, social, environmental, and developmental studies*. Oelgeschlager, Gunn & Hain, Cambridge, MA, 1980. ISBN 978-0899460048. URL <http://www.worldcat.org/oclc/925130232>.
- Albert Mehrabian and James A. Russell. *An approach to environmental psychology*. MIT Press, Cambridge, MA, 1974. ISBN 9780262630719. URL <http://www.worldcat.org/oclc/318133343>.
- Marek P. Michalowski, Selma Sabanovic, and Reid Simmons. A spatial model of engagement for a social robot. In *9th IEEE International Workshop on Advanced Motion Control*, pages 762–767. IEEE, 2006. ISBN 0-7803-9511-1. doi: 10.1109/AMC.2006.1631755. URL <https://doi.org/10.1109/AMC.2006.1631755>.
- Marek P. Michalowski, Selma Sabanovic, and Hideki Kozima. A dancing robot for rhythmic social interaction. In *2nd ACM/IEEE International Conference on Human-Robot Interaction*, pages 89–96. IEEE, 2007. ISBN 978-1-59593-617-2. doi: 10.1145/1228716.1228729. URL <https://doi.org/10.1145/1228716.1228729>.
- Sushmita Mitra and Tinku Acharya. Gesture recognition: A survey. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*, 37(3):311–324, 2007. doi: 10.1109/TSMCC.2007.893280. URL <https://doi.org/10.1109/TSMCC.2007.893280>.

- Roger K. Moore. A Bayesian explanation of the “uncanny valley” effect and related psychological phenomena. *Scientific Reports*, 2:864, 2012. doi: 10.1038/srep00864. URL <http://dx.doi.org/10.1038/srep00864>.
- Luis Yoichi Morales Saiki, Satoru Satake, Takayuki Kanda, and Norihiro Hagita. Modeling environments from a route perspective. In *6th International Conference on Human-Robot interaction*, pages 441–448. ACM, 2011. ISBN 978-1-4503-0561-7. doi: 10.1145/1957656.1957815. URL <https://doi.org/10.1145/1957656.1957815>.
- Luis Yoichi Morales Saiki, Satoru Satake, Rajibul Huq, Dylan Glas, Takayuki Kanda, and Norihiro Hagita. How do people walk side-by-side? Using a computational model of human behavior for a social robot. In *7th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 301–308. ACM, 2012. ISBN 978-1-4503-1063-5. doi: 10.1145/2157689.2157799. URL <https://doi.org/10.1145/2157689.2157799>.
- Masahiro Mori. The Uncanny Valley. *Energy*, 7:33–35, 1970. doi: 10.1109/MRA.2012.2192811. URL <https://doi.org/10.1109/MRA.2012.2192811>.
- Masahiro Mori. *The Buddha in the robot*. Tuttle Publishing, Tokyo, Japan, 1982. ISBN 978-4333010028. URL <http://www.worldcat.org/oclc/843422852>.
- Masahiro Mori, Karl F. MacDorman, and Norri Kageki. The Uncanny Valley [from the field]. *IEEE Robotics & Automation Magazine*, 19(2):98–100, 2012. doi: 10.1109/MRA.2012.2192811. URL <https://doi.org/10.1109/MRA.2012.2192811>.
- Omar Mubin, Catherine J. Stevens, Suleman Shahid, Abdullah Al Mahmud, and Jian-Jie Dong. A review of the applicability of robots in education. *Journal of Technology in Education and Learning*, 1(209-0015):1–7, 2013. doi: 10.2316/Journal.209.2013.1.209-0015. URL <http://doi.org/10.2316/Journal.209.2013.1.209-0015>.
- Jonathan Mumm and Bilge Mutlu. Human-robot proxemics: Physical and psychological distancing in human-robot interaction. In *Proceedings of the 2011 ACM/IEEE International Conference on Human-Robot Interaction*, pages 331–338. ACM, 2011. ISBN 978-1-4503-0561-7. doi: 10.1145/1957656.1957786. URL <https://dl.acm.org/citation.cfm?doid=1957656.1957786>.
- Mike Murphy. The beginning of the end: Google’s AI has beaten a top human player at the complex game of go. *Quartz*, 2016. URL <https://qz.com/636637/the-beginning-of-the-end-googles-ai-has-beaten-a-top-human-player-at-the-complex-game-of-go/>.
- Bilge Mutlu and Jodi Forlizzi. Robots in organizations: The role of workflow, social, and environmental factors in human-robot interaction. In *3rd ACM/IEEE International Conference on Human-Robot Interaction*, pages 287–294. IEEE, 2008. ISBN 978-1-60558-017-3. doi: 10.1145/1349822.1349860. URL <https://doi.org/10.1145/1349822.1349860>.
- Bilge Mutlu, Jodi Forlizzi, and Jessica Hodgins. A storytelling robot: Modeling and evaluation of human-like gaze behavior. In *6th IEEE-RAS International Conference on Humanoid Robots*, pages 518–523. Citeseer, 2006. ISBN 1-4244-0199-2. doi: <https://doi.org/10.1109/ICHR.2006.321322>. URL <https://doi.org/10.1109/ICHR.2006.321322>.
- Bilge Mutlu, Toshiyuki Shiwa, Takayuki Kanda, Hiroshi Ishiguro, and Norihiro Hagita. Footing in human-robot conversations: How robots might shape participant roles using gaze cues. In *The 4th ACM/IEEE International Conference on Human-Robot Interaction*, pages 61–68. ACM, 2009. ISBN 978-1-60558-404-1. doi: 10.1145/1514095.1514109. URL <https://doi.org/10.1145/1514095.1514109>.
- Bilge Mutlu, Takayuki Kanda, Jodi Forlizzi, Jessica Hodgins, and Hiroshi Ishiguro. Conversational gaze mechanisms for humanlike robots. *ACM Transactions on Interactive Intelligent Systems*, 1(2):12, 2012. doi: 10.1145/2070719.2070725. URL <https://doi.org/10.1145/2070719.2070725>.

## References

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- Yasushi Nakauchi and Reid Simmons. A social robot that stands in line. *Autonomous Robots*, 12(3):313–324, 2002. doi: 10.1023/A:1015273816637. URL <https://doi.org/10.1023/A:1015273816637>.
- Roberto Navigli and Simone Paolo Ponzetto. Babelnet: The automatic construction, evaluation and application of a wide-coverage multilingual semantic network. *Artificial Intelligence*, 193:217–250, 2012. doi: 10.1016/j.artint.2012.07.001. URL <https://doi.org/10.1016/j.artint.2012.07.001>.
- C. L. Nehaniv, K. Dautenhahn, J. Kubacki, M. Haeghele, C. Parlitiz, and R. Alami. A methodological approach relating the classification of gesture to identification of human intent in the context of human-robot interaction. In *IEEE International Workshop on Robot and Human Interactive Communication*, pages 371–377, 2005. ISBN 0780392744. doi: 10.1109/ROMAN.2005.1513807. URL <https://doi.org/10.1109/ROMAN.2005.1513807>.
- Shogo Nishiguchi, Kohei Ogawa, Yuichiro Yoshikawa, Takenobu Chikaraishi, Oriza Hirata, and Hiroshi Ishiguro. Theatrical approach: Designing human-like behaviour in humanoid robots. *Robotics and Autonomous Systems*, 89:158–166, 2017. doi: 10.1016/j.robot.2016.11.017. URL <https://doi.org/10.1016/j.robot.2016.11.017>.
- Don Norman. *The design of everyday things: Revised and expanded edition*. Basic Books, New York, NY, 2013. ISBN 9780465072996. URL <http://www.worldcat.org/oclc/862103168>.
- Donald A. Norman. The way i see it: Signifiers, not affordances. *Interactions*, 15(6): 18–19, 2008. doi: 10.1145/1409040.1409044. URL <https://doi.org/10.1145/1409040.1409044>.
- Brian A. Nosek, Charles R. Ebersole, Alexander DeHaven, and David Mellor. The preregistration revolution. *Proceedings of the National Academy of Sciences of the United States of America*, 115(11):2600–2606, 2017. doi: 10.1073/pnas.1708274114. URL <https://doi.org/10.1073/pnas.1708274114>.
- Illah R. Nourbakhsh, Judith Bobenage, Sebastien Grange, Ron Lutz, Roland Meyer, and Alvaro Soto. An affective mobile robot educator with a full-time job. *Artificial Intelligence*, 114(1-2):95–124, 1999. doi: 10.1016/S0004-3702(99)00027-2. URL [https://doi.org/10.1016/S0004-3702\(99\)00027-2](https://doi.org/10.1016/S0004-3702(99)00027-2).
- Illah Reza Nourbakhsh. *Robot futures*. MIT Press, Cambridge, MA, 2013. ISBN 9780262018623. URL <http://www.worldcat.org/oclc/945438245>.
- Jekaterina Novikova and Leon Watts. Towards artificial emotions to assist social coordination in HRI. *International Journal of Social Robotics*, 7(1):77–88, 2015. doi: 10.1007/s12369-014-0254-y. URL <https://doi.org/10.1007/s12369-014-0254-y>.
- Regina Nuzzo. Statistical errors. *Nature*, 506(7487):150, 2014. doi: 10.1038/506150a. URL <https://doi.org/10.1038/506150a>.
- Daniel M. Oppenheimer, Tom Meyvis, and Nicolas Davidenko. Instructional manipulation checks: Detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology*, 45(4):867–872, 2009. doi: 10.1016/j.jesp.2009.03.009. URL <https://doi.org/10.1016/j.jesp.2009.03.009>.
- Andrew Ortony and Terence J Turner. What’s basic about basic emotions? *Psychological Review*, 97(3):315, 1990. doi: 10.1037/0033-295X.97.3.315. URL <https://doi.org/10.1037/0033-295X.97.3.315>.
- Andrew Ortony, Gerald Clore, and Allan Collins. *The cognitive structure of emotions*. Cambridge University Press, Cambridge, UK, 1988. ISBN 978-0521386647. URL <http://www.worldcat.org/oclc/910015120>.
- Hirota Osawa, Ren Ohmura, and Michita Imai. Using attachable humanoid parts for realizing imaginary intention and body image. *International Journal of Social*

- Robotics*, 1(1):109–123, 2009. doi: 10.1007/s12369-008-0004-0. URL <https://doi.org/10.1007/s12369-008-0004-0>.
- Elena Pacchierotti, Henrik I. Christensen, and Patric Jensfelt. Evaluation of passing distance for social robots. In *The 15th IEEE International Symposium on Robot and Human Interactive Communication*, pages 315–320. IEEE, 2006. ISBN 1-4244-0564-5. doi: 10.1109/ROMAN.2006.314436. URL <https://doi.org/10.1109/ROMAN.2006.314436>.
- Steffi Paepcke and Leila Takayama. Judging a bot by its cover: An experiment on expectation setting for personal robots. In *5th ACM/IEEE International Conference on Human-Robot Interaction*, pages 45–52. IEEE, 2010. ISBN 978-1-4244-4892-0. doi: 10.1109/HRI.2010.5453268. URL <https://doi.org/10.1109/HRI.2010.5453268>.
- Maja Pantic, Alex Pentland, Anton Nijholt, and Thomas S. Huang. Human computing and machine understanding of human behavior: A survey. In Huang T. S., Nijholt A., Pantic M., and Pentland A., editors, *Artificial intelligence for human computing*, volume 4451 of *Lecture Notes in Computer Science*, pages 47–71. Springer, 2007. doi: 10.1007/978-3-540-72348-6\_3. URL [https://doi.org/10.1007/978-3-540-72348-6\\_3](https://doi.org/10.1007/978-3-540-72348-6_3).
- Hae Won Park, Mirko Gelsomini, Jin Joo Lee, and Cynthia Breazeal. Telling stories to robots: The effect of backchanneling on a child’s storytelling. In *ACM/IEEE International Conference on Human-Robot Interaction*, pages 100–108. ACM, 2017. ISBN 978-1-4503-4336-7. doi: 10.1145/2909824.3020245. URL <https://doi.org/10.1145/2909824.3020245>.
- Michael Partridge and Christoph Bartneck. The invisible naked guy: An exploration of a minimalistic robot. In *The First International Conference on Human-Agent Interaction*, pages II–2–p2, 2013. doi: 10.17605/OSF.IO/A4YM5. URL <https://doi.org/10.17605/OSF.IO/A4YM5>.
- Alex Pentland and Tracy Heibeck. *Honest signals: How they shape our world*. MIT Press, Cambridge, MA, 2010. ISBN 978-0262515122. URL <http://www.worldcat.org/oclc/646395585>.
- Ignacio Pérez-Hurtado, Jesús Capitán, Fernando Caballero, and Luis Merino. Decision-theoretic planning with person trajectory prediction for social navigation. In *Robot 2015: Second Iberian Robotics Conference*, pages 247–258. Springer, 2016. ISBN 978-3-319-27148-4. doi: 10.1007/978-3-319-27149-1\_20. URL [https://doi.org/10.1007/978-3-319-27149-1\\_20](https://doi.org/10.1007/978-3-319-27149-1_20).
- Thomas F. Pettigrew, Linda R. Tropp, Ulrich Wagner, and Oliver Christ. Recent advances in intergroup contact theory. *International Journal of Intercultural Relations*, 35(3):271–280, 2011. doi: 10.1016/j.ijintrel.2011.03.001. URL <https://doi.org/10.1016/j.ijintrel.2011.03.001>.
- R. W. Picard. *Affective computing*. MIT Press, Cambridge, MA, 1997. ISBN 978-0262661157. URL <https://mitpress.mit.edu/books/affective-computing>.
- Joelle Pineau, Michael Montemerlo, Martha Pollack, Nicholas Roy, and Sebastian Thrun. Towards robotic assistants in nursing homes: Challenges and results. *Robotics and Autonomous Systems*, 42(3-4):271–281, 2003. doi: 10.1016/S0921-8890(02)00381-0. URL [https://doi.org/10.1016/S0921-8890\(02\)00381-0](https://doi.org/10.1016/S0921-8890(02)00381-0).
- Robert M. Pirsig. *Zen and the art of motorcycle maintenance: An inquiry into values*. Morrow, New York, NY, 1974. ISBN 0688002307. URL <http://www.worldcat.org/oclc/41356566>.
- Diego A. Pizzagalli, Avram J. Holmes, Daniel G. Dillon, Elena L. Goetz, Jeffrey L. Birk, Ryan Bogdan, Darin D. Dougherty, Dan V. Iosifescu, Scott L. Rauch, and Maurizio Fava. Reduced caudate and nucleus accumbens response to rewards in unmedicated individuals with major depressive disorder. *American Journal*



- of *Psychiatry*, 166(6):702–710, 2009. doi: 10.1016/j.jpsychires.2008.03.001. URL <https://doi.org/10.1016/j.jpsychires.2008.03.001>.
- Robert Ed Plutchik and Hope R. Conte. *Circumplex models of personality and emotions*. American Psychological Association, Washington, D.C., 1997. ISBN 978-1557983800. URL <http://www.worldcat.org/oclc/442562242>.
- Cristina Anamaria Pop, Ramona Simut, Sebastian Pinteau, Jelle Saldien, Alina Rusu, Daniel David, Johan Vanderfaellie, Dirk Lefeber, and Bram Vanderborght. Can the social robot Probo help children with autism to identify situation-based emotions? A series of single case experiments. *International Journal of Humanoid Robotics*, 10(03):1350025, 2013. doi: 10.1142/S0219843613500254. URL <https://doi.org/10.1142/S0219843613500254>.
- Jonathan Posner, James A. Russell, and Bradley S. Peterson. The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology. *Development and Psychopathology*, 17(3):715–734, 2005. doi: 10.1017/S0954579405050340. URL <https://doi.org/10.1017/S0954579405050340>.
- Michael I. Posner. *Cognitive neuroscience of attention*. Guilford Press, New York, NY, 2011. ISBN 978-1609189853. URL <http://www.worldcat.org/oclc/958053069>.
- Aaron Powers, Adam D. I. Kramer, Shirlene Lim, Jean Kuo, Sau-lai Lee, and Sara Kiesler. Eliciting information from people with a gendered humanoid robot. In *IEEE International Workshop on Robot and Human Interactive Communication*, pages 158–163. IEEE, 2005. ISBN 0-7803-9274-4. doi: 10.1109/ROMAN.2005.1513773. URL <https://doi.org/10.1109/ROMAN.2005.1513773>.
- Aaron Powers, Sara Kiesler, Susan Fussell, and Cristen Torrey. Comparing a computer agent with a humanoid robot. In *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*, pages 145–152. ACM, 2007. ISBN 978-1-59593-617-2. doi: 10.1145/1228716.1228736. URL <https://doi.org/10.1145/1228716.1228736>.
- Byron Reeves and Clifford Ivar Nass. *The media equation: How people treat computers, television, and new media like real people and places*. Cambridge University Press, Cambridge, UK, 1996. ISBN 978-1575860534. URL <http://www.worldcat.org/oclc/796222708>.
- Natalia Reich-Stiebert and Friederike Eyssel. Learning with educational companion robots? Toward attitudes on education robots, predictors of attitudes, and application potentials for education robots. *International Journal of Social Robotics*, 7(5):875–888, Nov 2015. ISSN 1875-4805. doi: 10.1007/s12369-015-0308-9. URL <https://doi.org/10.1007/s12369-015-0308-9>.
- Natalia Reich-Stiebert and Friederike Eyssel. Robots in the classroom: What teachers think about teaching and learning with education robots. In *International Conference on Social Robotics*, pages 671–680. Springer, 2016. ISBN 978-3-319-47436-6. doi: 10.1007/978-3-319-47437-3\_66. URL [https://doi.org/10.1007/978-3-319-47437-3\\_66](https://doi.org/10.1007/978-3-319-47437-3_66).
- Natalia Reich-Stiebert and Friederike Anne Eyssel. Leben mit robotern-eine onlinebefragung im deutschen sprachraum zur akzeptanz von servicerobotern im alltag (poster), 2013. URL <https://pub.uni-bielefeld.de/publication/2907019>.
- Jasia Reichardt. *Robots: Fact, fiction, and prediction*. Thames and Hudson, London, UK, 1978. ISBN 9780140049381. URL <http://www.worldcat.org/oclc/1001944069>.
- Nancy A. Remington, Leandre R. Fabrigar, and Penny S. Visser. Reexamining the circumplex model of affect. *Journal of Personality and Social Psychology*, 79(2):286–300, 2000. doi: 10.1037/0022-3514.79.2.286. URL <https://doi.org/10.1037/0022-3514.79.2.286>.

- Charles Rich, Brett Ponsler, Aaron Holroyd, and Candace L. Sidner. Recognizing engagement in human-robot interaction. In *5th ACM/IEEE International Conference on Human-Robot Interaction*, pages 375–382. IEEE, 2010. ISBN 978-1-4244-4892-0. doi: 10.1109/HRI.2010.5453163. URL <https://doi.org/10.1109/HRI.2010.5453163>.
- Laurel D. Riek. Wizard of Oz studies in HRI: A systematic review and new reporting guidelines. *Journal of Human-Robot Interaction*, 1(1):119–136, 2012. doi: 10.5898/JHRI.1.1.Riek. URL <https://doi.org/10.5898/JHRI.1.1.Riek>.
- Laurel D. Riek, Philip C. Paul, and Peter Robinson. When my robot smiles at me: Enabling human-robot rapport via real-time head gesture mimicry. *Journal on Multimodal User Interfaces*, 3(1-2):99–108, 2010. doi: 10.1007/s12193-009-0028-2. URL <https://doi.org/10.1007/s12193-009-0028-2>.
- Ben Robins, Paul Dickerson, Penny Stribling, and Kerstin Dautenhahn. Robot-mediated joint attention in children with autism: A case study in robot-human interaction. *Interaction Studies*, 5(2):161–198, 2004. doi: 10.1075/is.5.2.02rob. URL <https://doi.org/10.1075/is.5.2.02rob>.
- Ben Robins, Kerstin Dautenhahn, and Paul Dickerson. From isolation to communication: A case study evaluation of robot assisted play for children with autism with a minimally expressive humanoid robot. In *2nd International Conferences on Advances in Computer-Human Interactions*, pages 205–211. IEEE, 2009. ISBN 978-1-4244-3351-3. doi: 10.1109/ACHI.2009.32. URL <https://doi.org/10.1109/ACHI.2009.32>.
- Hayley Robinson, Bruce MacDonald, and Elizabeth Broadbent. The role of health-care robots for older people at home: A review. *International Journal of Social Robotics*, 6(4):575–591, 2014. doi: 10.1007/s12369-014-0242-2. URL <https://doi.org/10.1007/s12369-014-0242-2>.
- Raquel Ros, Séverin Lemaignan, E. Akin Sisbot, Rachid Alami, Jasmin Steinwender, Katharina Hamann, and Felix Warneken. Which one? grounding the referent based on efficient human-robot interaction. In *19th International Symposium in Robot and Human Interactive Communication*, pages 570–575, 2010. ISBN 1944-9445. doi: 10.1109/ROMAN.2010.5598719. URL <http://doi.org/10.1109/ROMAN.2010.5598719>.
- Rasmus Rothe, Radu Timofte, and Luc Van Gool. Deep expectation of real and apparent age from a single image without facial landmarks. *International Journal of Computer Vision (IJCV)*, 126(2):144–157, 2016. doi: 10.1007/s11263-016-0940-3. URL <https://doi.org/10.1007/s11263-016-0940-3>.
- Dirk Rothenbücher, Jamy Li, David Sirkin, Brian Mok, and Wendy Ju. Ghost driver: A field study investigating the interaction between pedestrians and driverless vehicles. In *25th IEEE International Symposium on Robot and Human Interactive Communication*, pages 795–802. IEEE, 2016. ISBN 978-1-5090-3930-2. doi: 10.1109/ROMAN.2016.7745210. URL <https://doi.org/10.1109/ROMAN.2016.7745210>.
- James A. Russell. A circumplex model of affect. *Journal of Personality and Social Psychology*, 39(6):1161–1178, 1980. doi: 10.1037/h0077714. URL <https://doi.org/10.1037/h0077714>.
- James A. Russell and Lisa Feldman Barrett. Core affect, prototypical emotional episodes, and other things called emotion: Dissecting the elephant. *Journal of Personality and Social Psychology*, 76(5):805, 1999. doi: 10.1037/0022-3514.76.5.805. URL <https://doi.org/10.1037/0022-3514.76.5.805>.
- James A. Russell, Maria Lewicka, and Toomas Niit. A cross-cultural study of a circumplex model of affect. *Journal of Personality and Social Psychology*, 57(5):848–856, 1989. doi: 10.1037/0022-3514.57.5.848. URL <https://doi.org/10.1037/0022-3514.57.5.848>.

- Stuart Russell and Peter Norvig. *Artificial intelligence: A modern approach*. Pearson, Essex, UK, 3rd edition, 2009. ISBN 978-0136042594. URL <http://www.worldcat.org/oclc/496976145>.
- Mel D. Rutherford and Ashley M. Towns. Scan path differences and similarities during emotion perception in those with and without autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 38(7):1371–1381, 2008. doi: 10.1007/s10803-007-0525-7. URL <https://doi.org/10.1007/s10803-007-0525-7>.
- Selma Šabanović. *Imagine all the robots: Developing a critical practice of cultural and disciplinary traversals in social robotics*. PhD thesis, Doctoral Thesis Faculty of Rensselaer Polytechnic Institute, 2007. URL [digitool.rpi.edu:8881/dtl\\_publish/50/9729.html](http://digitool.rpi.edu:8881/dtl_publish/50/9729.html).
- Selma Šabanović. Emotion in robot cultures: Cultural models of affect in social robot design. In *Proceedings of the Conference on Design & Emotion (D&E2010)*, pages 4–11, 2010.
- Selma Šabanović and Wan-Ling Chang. Socializing robots: Constructing robotic sociality in the design and use of the assistive robot PARO. *AI & Society*, 31(4):537–551, 2016. doi: 10.1007/s00146-015-0636-1. URL <https://doi.org/10.1007/s00146-015-0636-1>.
- Selma Šabanović, Marek P. Michalowski, and Reid Simmons. Robots in the wild: Observing human-robot social interaction outside the lab. In *9th IEEE International Workshop on Advanced Motion Control*, pages 596–601. IEEE, 2006. ISBN 0-7803-9511-1. doi: 10.1109/AMC.2006.1631758. URL <https://doi.org/10.1109/AMC.2006.1631758>.
- Selma Šabanović, Sarah M. Reeder, and Bobak Kechavarzi. Designing robots in the wild: In situ prototype evaluation for a break management robot. *Journal of Human-Robot Interaction*, 3(1):70–88, February 2014. ISSN 2163-0364. doi: 10.5898/JHRI.3.1.Sabanovic. URL <https://doi.org/10.5898/JHRI.3.1.Sabanovic>.
- Selma Šabanović, Wan-Ling Chang, Casey C. Bennett, Jennifer A. Piatt, and David Hakken. A robot of my own: Participatory design of socially assistive robots for independently living older adults diagnosed with depression. In *International Conference on Human Aspects of IT for the Aged Population*, pages 104–114. Springer, 2015. ISBN 978-3-319-20891-6. doi: 10.1007/978-3-319-20892-3\_11. URL [https://doi.org/10.1007/978-3-319-20892-3\\_11](https://doi.org/10.1007/978-3-319-20892-3_11).
- Harvey Sacks, Emanuel A. Schegloff, and Gail Jefferson. A simplest systematics for the organization of turn-taking for conversation. *Language*, 4:696–735, 1974. doi: 10.2307/412243. URL <https://doi.org/10.2307/412243>.
- Martin Saerbeck and Christoph Bartneck. Perception of affect elicited by robot motion. In *5th ACM/IEEE International Conference on Human-Robot Interaction*, pages 53–60. ACM, 2010. ISBN 978-1-4244-4893-7. doi: 10.1145/1734454.1734473. URL <https://doi.org/10.1145/1734454.1734473>.
- Martin Saerbeck, Tom Schut, Christoph Bartneck, and Maddy Janse. Expressive robots in education—varying the degree of social supportive behavior of a robotic tutor. In *28th ACM Conference on Human Factors in Computing Systems (CHI2010)*, pages 1613–1622. ACM, 2010. ISBN 978-1-60558-929-9. doi: 10.1145/1753326.1753567. URL <https://doi.org/10.1145/1753326.1753567>.
- Daisuke Sakamoto, Takayuki Kanda, Tetsuo Ono, Hiroshi Ishiguro, and Norihiro Hagita. Android as a telecommunication medium with a human-like presence. In *2nd ACM/IEEE International Conference on Human-Robot Interaction*, pages 193–200. IEEE, 2007. ISBN 978-1-59593-617-2. doi: 10.1145/1228716.1228743. URL <https://doi.org/10.1145/1228716.1228743>.

- Maha Salem, Friederike Eyssel, Katharina Rohlfing, Stefan Kopp, and Frank Joublin. To err is human (-like): Effects of robot gesture on perceived anthropomorphism and likability. *International Journal of Social Robotics*, 5(3):313–323, 2013. doi: 10.1007/s12369-013-0196-9. URL <https://doi.org/10.1007/s12369-013-0196-9>.
- P. Salvini, G. Ciaravella, W. Yu, G. Ferri, A. Manzi, B. Mazzolai, C. Laschi, S. R. Oh, and P. Dario. How safe are service robots in urban environments? Bullying a robot. In *19th International Symposium in Robot and Human Interactive Communication*, pages 368–374, 2010. ISBN 978-1-4244-7991-7. doi: 10.1109/ROMAN.2010.5654677. URL <http://dx.doi.org/10.1109/ROMAN.2010.5654677>.
- Jyotirmay Sanghvi, Ginevra Castellano, Iolanda Leite, André Pereira, Peter W McOwan, and Ana Paiva. Automatic analysis of affective postures and body motion to detect engagement with a game companion. In *6th ACM/IEEE International Conference on Human-Robot Interaction*, pages 305–311. IEEE, 2011. ISBN 978-1-4503-0561-7. doi: 10.1145/1957656.1957781. URL <https://doi.org/10.1145/1957656.1957781>.
- Porter Edward Sargent. *The new immoralities: Clearing the way for a new ethics*. Porter Sargent, Boston, MA, 2013. ISBN 978-1258541880. URL <http://www.worldcat.org/oclc/3794581>.
- Satoru Satake, Takayuki Kanda, Dylan F. Glas, Michita Imai, Hiroshi Ishiguro, and Norihiro Hagita. How to approach humans? Strategies for social robots to initiate interaction. In *4th ACM/IEEE International Conference on Human-Robot Interaction*, pages 109–116. IEEE, 2009. ISBN 978-1-60558-404-1. doi: 10.1145/1514095.1514117. URL <https://doi.org/10.1145/1514095.1514117>.
- Allison Saupé and Bilge Mutlu. The social impact of a robot co-worker in industrial settings. In *33rd Annual ACM Conference on Human Factors in Computing Systems*, pages 3613–3622. ACM, 2015. ISBN 978-1-4503-3145-6. doi: 10.1145/2702123.2702181. URL <https://doi.org/10.1145/2702123.2702181>.
- Brian Scassellati. Imitation and mechanisms of joint attention: A developmental structure for building social skills on a humanoid robot. In Nehaniv C. L., editor, *Computation for metaphors, analogy, and agents*, volume 1562 of *Lecture Notes in Computer Science*, pages 176–195. Springer, 1999. ISBN 978-3-540-65959-4. doi: 10.1007/3-540-48834-0\_11. URL [https://doi.org/10.1007/3-540-48834-0\\_11](https://doi.org/10.1007/3-540-48834-0_11).
- Brian Scassellati. Investigating models of social development using a humanoid robot. In Barbara Webb and Thomas Consi, editors, *Biorobotics: Methods and applications*, pages 145–168. MIT Press, 2000. ISBN 9780262731416. URL <http://www.worldcat.org/oclc/807529041>.
- Brian Scassellati, Henny Admoni, and Maja Matarić. Robots for use in autism research. *Annual Review of Biomedical Engineering*, 14:275–294, 2012. doi: 10.1146/annurev-bioeng-071811-150036. URL <https://doi.org/10.1146/annurev-bioeng-071811-150036>.
- Klaus R. Scherer. Emotion as a multicomponent process: A model and some cross-cultural data. *Review of Personality & Social Psychology*, 1984. URL <https://doi.org/10.1146/annurev-bioeng-071811-150036>.
- Leonhard Schilbach, Marcus Wilms, Simon B. Eickhoff, Sandro Romanzetti, Ralf Tepest, Gary Bente, N. Jon Shah, Gereon R. Fink, and Kai Vogeley. Minds made for sharing: Initiating joint attention recruits reward-related neurocircuitry. *Journal of Cognitive Neuroscience*, 22(12):2702–2715, 2010. doi: 10.1162/jocn.2009.21401. URL <https://doi.org/10.1162/jocn.2009.21401>.
- Tyler Schnoebelen and Victor Kuperman. Using Amazon Mechanical Turk for linguistic research. *Psihologija*, 43(4):441–464, 2010. doi: 10.2298/PSI1004441S. URL <https://doi.org/10.2298/PSI1004441S>.

- Billy Schonenberg and Christoph Bartneck. Mysterious machines. In *5th ACM/IEEE International Conference on Human-Robot Interaction*, pages 349–350, Osaka, 2010. ACM. ISBN 978-1-4244-4893-7. doi: 10.1145/1734454.1734572. URL <https://doi.org/10.1145/1734454.1734572>.
- Jake Schreier. Robot and Frank, 2013. URL <https://www.imdb.com/title/tt1990314/>.
- John R. Searle. Minds, brains and programs. *Behavioral and Brain Sciences*, 3(3): 417–457, 1980. doi: 10.1017/S0140525X00005756. URL <https://doi.org/10.1017/S0140525X00005756>.
- Charles R. Seger, Eliot R. Smith, Elise James Percy, and Frederica R. Conrey. Reach out and reduce prejudice: The impact of interpersonal touch on intergroup liking. *Basic and Applied Social Psychology*, 36(1):51–58, 2014. doi: 10.1080/01973533.2013.856786. URL <https://doi.org/10.1080/01973533.2013.856786>.
- Aparna Shankar, Mark Hamer, Anne McMunn, and Andrew Steptoe. Social isolation and loneliness: Relationships with cognitive function during 4 years of follow-up in the English Longitudinal Study of Ageing. *Psychosomatic Medicine*, 75(2): 161–170, 2013. doi: 10.1097/PSY.0b013e31827f09cd. URL <https://doi.org/10.1097/PSY.0b013e31827f09cd>.
- Amanda J. C. Sharkey. Should we welcome robot teachers? *Ethics and Information Technology*, 18(4):283–297, 2016. doi: 10.1007/s10676-016-9387-z. URL <https://doi.org/10.1007/s10676-016-9387-z>.
- Megha Sharma, Dale Hildebrandt, Gem Newman, James E. Young, and Rasit Eskicioglu. Communicating affect via flight path: Exploring use of the Laban effort system for designing affective locomotion paths. In *8th ACM/IEEE International Conference on Human-Robot Interaction*, pages 293–300. IEEE, 2013. ISBN 978-1-4673-3099-2. doi: 10.1109/HRI.2013.6483602. URL <https://doi.org/10.1109/HRI.2013.6483602>.
- Glenda Shaw-Garlock. Looking forward to sociable robots. *International Journal of Social Robotics*, 1(3):249–260, Aug 2009. ISSN 1875-4805. doi: 10.1007/s12369-009-0021-7. URL <https://doi.org/10.1007/s12369-009-0021-7>.
- Chao Shi, Masahiro Shiomi, Christian Smith, Takayuki Kanda, and Hiroshi Ishiguro. A model of distributional handing interaction for a mobile robot. In *Robotics: Science and systems*, pages 24–28, 2013. URL <http://roboticsproceedings.org/rss09/p55.pdf>.
- Takanori Shibata. Therapeutic seal robot as biofeedback medical device: Qualitative and quantitative evaluations of robot therapy in dementia care. *Proceedings of the IEEE*, 100(8):2527–2538, 2012. doi: 10.1109/JPROC.2012.2200559. URL <https://doi.org/10.1109/JPROC.2012.2200559>.
- Takanori Shibata, Kazuyoshi Wada, Yousuke Ikeda, and Selma Sabanovic. Cross-cultural studies on subjective evaluation of a seal robot. *Advanced Robotics*, 23(4):443–458, 2009. doi: 10.1163/156855309X408826. URL <https://doi.org/10.1163/156855309X408826>.
- Masahiro Shiomi, Takayuki Kanda, Hiroshi Ishiguro, and Norihiro Hagita. Interactive humanoid robots for a science museum. In *Proceedings of the 1st ACM SIGCHI/SIGART Conference on Human-Robot Interaction*, HRI ’06, pages 305–312, New York, NY, 2006. ACM. ISBN 1-59593-294-1. doi: 10.1145/1121241.1121293. URL <http://doi.acm.org/10.1145/1121241.1121293>.
- Masahiro Shiomi, Francesco Zanolungo, Kotaro Hayashi, and Takayuki Kanda. Towards a socially acceptable collision avoidance for a mobile robot navigating among pedestrians using a pedestrian model. *International Journal of Social Robotics*, 6(3):443–455, 2014. doi: 10.1007/s12369-014-0238-y. URL <https://doi.org/10.1007/s12369-014-0238-y>.

- Bruno Siciliano and Oussama Khatib. *Springer handbook of robotics*. Springer, Berlin, 2016. ISBN 9783319325507. URL <http://www.worldcat.org/oclc/945745190>.
- Jack Sidnell. *Conversation analysis: An introduction*, volume 45. John Wiley & Sons, New York, NY, 2011. ISBN 978-1405159012. URL <http://www.worldcat.org/oclc/973423100>.
- Candace L. Sidner, Christopher Lee, Cory D. Kidd, Neal Lesh, and Charles Rich. Explorations in engagement for humans and robots. *Artificial Intelligence*, 166 (1-2):140–164, 2005. doi: 10.1016/j.artint.2005.03.005. URL <https://doi.org/10.1016/j.artint.2005.03.005>.
- Herbert Alexander Simon. *The sciences of the artificial*. MIT Press, Cambridge, MA, 3rd edition, 1996. ISBN 0262691914. URL <http://www.worldcat.org/oclc/552080160>.
- Peter W. Singer. *Wired for war: The robotics revolution and conflict in the twenty-first century*. Penguin, New York, NY, 2009. ISBN 9781594201981. URL <http://www.worldcat.org/oclc/857636246>.
- Ashish Singh and James E. Young. Animal-inspired human-robot interaction: A robotic tail for communicating state. In *7th ACM/IEEE International Conference on Human-Robot Interaction*, pages 237–238. IEEE, 2012. ISBN 978-1-4503-1063-5. doi: 10.1145/2157689.2157773. URL <https://doi.org/10.1145/2157689.2157773>.
- David Sirkin, Brian Mok, Stephen Yang, and Wendy Ju. Mechanical ottoman: How robotic furniture offers and withdraws support. In *10th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 11–18. ACM, 2015. ISBN 978-1-4503-2883-8. doi: 10.1145/2696454.2696461. URL <https://doi.org/10.1145/2696454.2696461>.
- Emrah Akin Sisbot, Luis F. Marin-Urias, Rachid Alami, and Thierry Simeon. A human aware mobile robot motion planner. *IEEE Transactions on Robotics*, 23 (5):874–883, 2007. doi: 10.1109/TRO.2007.904911. URL <https://doi.org/10.1109/TRO.2007.904911>.
- Ka-Chun Siu, Irene H Suh, Mukul Mukherjee, Dmitry Oleynikov, and Nick Stergiou. The effect of music on robot-assisted laparoscopic surgical performance. *Surgical Innovation*, 17(4):306–311, 2010. doi: 10.1177/1553350610381087. URL <https://doi.org/10.1177/1553350610381087>.
- Aaron Smith. US views of technology and the future: Science in the next 50 years. Pew Research Center, April 17, 2014. URL <http://assets.pewresearch.org/wp-content/uploads/sites/14/2014/04/US-Views-of-Technology-and-the-Future.pdf>.
- Richard L. Soash. Media equation: How people treat computers, television, and new media like real people and places. *Collection Management*, 24(3-4):310–311, 1999. doi: 10.1300/J105v24n03\_14. URL [https://doi.org/10.1300/J105v24n03\\_14](https://doi.org/10.1300/J105v24n03_14).
- Olivia Solon. Roomba creator responds to reports of “Poopocalypse”: “We see this a lot”. *The Guardian*, 2016. URL <https://www.theguardian.com/technology/2016/aug/15/roomba-robot-vacuum-poopocalypse-facebook-post>. Accessed: 2018-01-06.
- Stefan Sosnowski, Ansgar Bittermann, Kolja Kuhnlenz, and Martin Buss. Design and evaluation of emotion-display EDDIE. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 3113–3118. IEEE, 2006. ISBN 1-4244-0258-1. doi: 10.1109/IROS.2006.282330. URL <https://doi.org/10.1109/IROS.2006.282330>.
- Robert Sparrow. Robotic weapons and the future of war. In Paolo Tripodi and Jessica Wolfendale, editors, *New wars and new soldiers: Military ethics in the*

## References

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- contemporary world*, chapter 7, pages 117–133. Ashgate Surrey, 2011. ISBN 978-1-4094-0105-6. URL <http://www.worldcat.org/oclc/960210186>.
- Robert Sparrow. Robots, rape, and representation. *International Journal of Social Robotics*, 9(4):465–477, Sep 2017. ISSN 1875-4805. doi: 10.1007/s12369-017-0413-z. URL <https://doi.org/10.1007/s12369-017-0413-z>.
- Robert Sparrow and Linda Sparrow. In the hands of machines? The future of aged care. *Minds and Machines*, 16(2):141–161, 2006. doi: 10.1007/s11023-006-9030-6. URL <https://doi.org/10.1007/s11023-006-9030-6>.
- Thorsten Spexard, Shuyin Li, Britta Wrede, Jannik Fritsch, Gerhard Sagerer, Olaf Booij, Zoran Zivkovic, Bas Terwijn, and Ben Krose. BIRON, where are you? Enabling a robot to learn new places in a real home environment by integrating spoken dialog and visual localization. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 934–940. IEEE, 2006. ISBN 1-4244-0258-1. doi: 10.1109/IROS.2006.281770. URL <https://doi.org/10.1109/IROS.2006.281770>.
- A. Stedeman, D. Sutherland, and Christoph Bartneck. *Learning ROILA*. CreateSpace, Charleston, SC, 2011. ISBN 978-1466494978. URL <https://www.createpace.com/3716932>.
- Luc Steels. The artificial life roots of artificial intelligence. *Artificial Life*, 1(1/2): 75–110, 1993. doi: 10.1162/artl.1993.1.1.2.75. URL <https://doi.org/10.1162/artl.1993.1.1.2.75>.
- Nancy L. Stein and Keith Oatley. Basic emotions: Theory and measurement. *Cognition & Emotion*, 6(3-4):161–168, 1992. doi: 10.1080/02699939208411067. URL <https://doi.org/10.1080/02699939208411067>.
- Mariëlle Stel, Rick B. Van Baaren, and Roos Vonk. Effects of mimicking: Acting prosocially by being emotionally moved. *European Journal of Social Psychology*, 38(6):965–976, 2008. doi: 10.1002/ejsp.472. URL <https://doi.org/10.1002/ejsp.472>.
- Sofia Strömbergsson, Anna Hjalmarsson, Jens Edlund, and David House. Timing responses to questions in dialogue. In *Interspeech*, pages 2584–2588, 2013. URL [http://www.isca-speech.org/archive/archive\\_papers/interspeech\\_2013/i13\\_2584.pdf](http://www.isca-speech.org/archive/archive_papers/interspeech_2013/i13_2584.pdf).
- Osamu Sugiyama, Takayuki Kanda, Michita Imai, Hiroshi Ishiguro, and Norihiro Hagita. Natural deictic communication with humanoid robots. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1441–1448. IEEE, 2007. ISBN 978-1-4244-0911-2. doi: 10.1109/IROS.2007.4399120. URL <https://doi.org/10.1109/IROS.2007.4399120>.
- Ja-Young Sung, Lan Guo, Rebecca E. Grinter, and Henrik I. Christensen. “my Roomba is Rambo”: Intimate home appliances. In *9th International Conference on Ubiquitous Computing, UbiComp ’07*, pages 145–162, Berlin, Heidelberg, 2007. Springer-Verlag. ISBN 978-3-540-74852-6. doi: 10.1007/978-3-540-74853-3\_9. URL [https://doi.org/10.1007/978-3-540-74853-3\\_9](https://doi.org/10.1007/978-3-540-74853-3_9).
- JaYoung Sung, Rebecca E. Grinter, and Henrik I. Christensen. “Pimp my Roomba”: Designing for personalization. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, CHI ’09*, pages 193–196, New York, NY, 2009. ACM. ISBN 978-1-60558-246-7. doi: 10.1145/1518701.1518732. URL <http://doi.acm.org/10.1145/1518701.1518732>.
- Siddharth Suri and Duncan J. Watts. Cooperation and contagion in web-based, networked public goods experiments. *PloS One*, 6(3):e16836, 2011. doi: 10.1371/journal.pone.0016836. URL <https://doi.org/10.1371/journal.pone.0016836>.
- Daniel Szafir, Bilge Mutlu, and Terry Fong. Communicating directionality in flying

- robots. In *The 10th Annual ACM/IEEE International Conference on Human-Robot Interaction*, pages 19–26. ACM, 2015. ISBN 978-1-4503-2883-8. doi: 10.1145/2696454.2696475. URL <https://doi.org/10.1145/2696454.2696475>.
- Tajika Taichi, Miyashita Takahiro, Ishiguro Hiroshi, and Hagita Norihiro. Automatic categorization of haptic interactions—what are the typical haptic interactions between a human and a robot? In *6th IEEE-RAS International Conference on Humanoid Robots*, pages 490–496. IEEE, 2006. ISBN 1-4244-0199-2. doi: <https://doi.org/10.1109/ICHR.2006.321318>. URL 10.1109/ICHR.2006.321318.
- Leila Takayama, Doug Dooley, and Wendy Ju. Expressing thought: Improving robot readability with animation principles. In *Proceedings of the 6th International Conference on Human-Robot Interaction*, pages 69–76. ACM, 2011. ISBN 978-1-4673-4393-0. doi: 10.1145/1957656.1957674. URL <https://doi.org/10.1145/1957656.1957674>.
- Leila A. Takayama. *Throwing voices: Investigating the psychological effects of the spatial location of projected voices*. PhD thesis, Stanford University, 2008. URL <https://searchworks.stanford.edu/view/7860025>.
- Fumihide Tanaka and Takeshi Kimura. Care-receiving robot as a tool of teachers in child education. *Interaction Studies*, 11(2):263–268, 2010. doi: 10.1075/is.11.2.14tan. URL <https://doi.org/10.1075/is.11.2.14tan>.
- Fumihide Tanaka, Aaron Cicourel, and Javier R. Movellan. Socialization between toddlers and robots at an early childhood education center. *Proceedings of the National Academy of Sciences*, 104(46):17954–17958, 2007. doi: 10.1073/pnas.0707769104. URL <https://doi.org/10.1073/pnas.0707769104>.
- Adriana Tapus, Maja J. Mataric, and Brian Scassellati. Socially assistive robotics [grand challenges of robotics]. *IEEE Robotics & Automation Magazine*, 14(1): 35–42, 2007. doi: 10.1109/MRA.2007.339605. URL <https://doi.org/10.1109/MRA.2007.339605>.
- Adriana Tapus, Andreea Peca, Amir Aly, Cristina Pop, Lavinia Jisa, Sebastian Pintea, Alina S. Rusu, and Daniel O. David. Children with autism social engagement in interaction with Nao, an imitative robot: A series of single case experiments. *Interaction Studies*, 13(3):315–347, 2012. doi: 10.1075/is.13.3.01tap. URL <https://doi.org/10.1075/is.13.3.01tap>.
- Serge Thill, Cristina A. Pop, Tony Belpaeme, Tom Ziemke, and Bram Vanderborght. Robot-assisted therapy for autism spectrum disorders with (partially) autonomous control: Challenges and outlook. *Paladyn*, 3(4):209–217, 2012. doi: 10.2478/s13230-013-0107-7. URL <https://doi.org/10.2478/s13230-013-0107-7>.
- Frank Thomas, Ollie Johnston, and Thomas Frank. *The illusion of life: Disney animation*. Hyperion, New York, NY, 1995. ISBN 978-0786860708. URL <http://www.worldcat.org/oclc/974772586>.
- Sebastian Thrun, Wolfram Burgard, and Dieter Fox. *Probabilistic robotics*. MIT Press, Cambridge, MA, 2005. ISBN 978-0-2622-0162-9. URL <http://www.worldcat.org/oclc/705585641>.
- Jonas Togler, Fabian Hemmert, and Reto Wettach. Living interfaces: The thrifty faucet. In *Proceedings of the 3rd International Conference on Tangible and Embedded Interaction*, pages 43–44. ACM, 2009. ISBN 978-1-60558-493-5. doi: 10.1145/1517664.1517680. URL <https://doi.org/10.1145/1517664.1517680>.
- J. Gregory Trafton, Nicholas L. Cassimatis, Magdalena D. Bugajska, Derek P. Brock, Farilee E. Mintz, and Alan C. Schultz. Enabling effective human-robot interaction using perspective-taking in robots. *IEEE Trans. on Systems, Man, and Cybernetics. Part A: Systems and Humans*, 35(4):460–470, 2005. doi: 10.1109/TSMCA.2005.850592. URL <https://doi.org/10.1109/TSMCA.2005.850592>.



- Robert Trappl, Paolo Petta, and Sabine Payr. *Emotions in humans and artifacts*. MIT Press, Cambridge, MA, 2003. ISBN 978-0262201421. URL <https://mitpress.mit.edu/books/emotions-humans-and-artifacts>.
- Rudolph Triebel, Kai Arras, Rachid Alami, Lucas Beyer, Stefan Breuers, Raja Chatila, Mohamed Chetouani, Daniel Cremers, Vanessa Evers, Michelangelo Fiore, et al. Spencer: A socially aware service robot for passenger guidance and help in busy airports. In *Field and service robotics*, pages 607–622. Springer, 2016. ISBN 978-3-319-27700-4. doi: 10.1007/978-3-319-27702-8\_40. URL [https://doi.org/10.1007/978-3-319-27702-8\\_40](https://doi.org/10.1007/978-3-319-27702-8_40).
- Alan M. Turing. Computing machinery and intelligence. *Mind*, 59(236):433–460, 1950. doi: 10.1007/978-1-4020-6710-5\_3. URL [https://doi.org/10.1007/978-1-4020-6710-5\\_3](https://doi.org/10.1007/978-1-4020-6710-5_3).
- Sherry Turkle. *Reclaiming conversation: The power of talk in a digital age*. Penguin, New York, NY, 2016. ISBN 978-0143109792. URL <http://www.worldcat.org/oclc/960703115>.
- Sherry Turkle. *Alone together: Why we expect more from technology and less from each other*. Basic Books, New York, NY, 2017. ISBN 9780465031467. URL <https://www.basicbooks.com/titles/sherry-turkle/alone-together/9780465093663/>.
- George E. Vaillan. *Triumphs of experience: The men of the Harvard Grant Study*. Belknap Press, Cambridge, MA, 2015. ISBN 978-0674503816. URL <http://www.worldcat.org/oclc/910969527>.
- Albert van Breemen, Xue Yan, and Bernt Meerbeek. iCat: An animated user-interface robot with personality. In *Proceedings of the 4th International Joint Conference on Autonomous Agents and Multiagent Systems*, pages 143–144. ACM, 2005. ISBN 1-59593-093-0. doi: 10.1145/1082473.1082823. URL <https://doi.org/10.1145/1082473.1082823>.
- Aaron van den Oord, Sander Dieleman, Heiga Zen, Karen Simonyan, Oriol Vinyals, Alex Graves, Nal Kalchbrenner, Andrew Senior, and Koray Kavukcuoglu. Wavenet: A generative model for raw audio. *arXiv*, 2016. URL <http://arxiv.org/abs/1609.03499>.
- Jan BF Van Erp and Alexander Toet. How to touch humans: Guidelines for social agents and robots that can touch. In *Humaine Association Conference on Affective Computing and Intelligent Interaction*, pages 780–785. IEEE, 2013. ISBN 978-0-7695-5048-0. doi: 10.1109/ACII.2013.145. URL <https://doi.org/10.1109/ACII.2013.145>.
- Kurt VanLehn. The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. *Educational Psychologist*, 46(4):197–221, 2011. doi: 10.1080/00461520.2011.611369. URL <https://doi.org/10.1080/00461520.2011.611369>.
- Gentiane Venture, Hideki Kadone, Tianxiang Zhang, Julie Grèzes, Alain Berthoz, and Halim Hicheur. Recognizing emotions conveyed by human gait. *International Journal of Social Robotics*, 6(4):621–632, 2014. doi: 10.1007/s12369-014-0243-1. URL <https://doi.org/10.1007/s12369-014-0243-1>.
- Janet Vertesi. *Seeing like a rover: How robots, teams, and images craft knowledge of Mars*. University of Chicago Press, Chicago, IL, 2015. ISBN 978-0226155968. URL <http://www.worldcat.org/oclc/904790036>.
- Gianmarco Veruggio, Fiorella Operto, and George Bekey. Roboethics: Social and ethical implications. In Bruno Siciliano and Oussama Khatib, editors, *Springer handbook of robotics*, pages 2135–2160. Springer, 2016. ISBN 978-3-319-32550-7. doi: 10.1007/978-3-319-32552-1. URL <https://doi.org/10.1007/978-3-319-32552-1>.

- Walter G. Vincenti. *What engineers know and how they know it: Analytical studies from aeronautical history*. Johns Hopkins studies in the history of technology. Johns Hopkins University Press, Baltimore, MD, 1990. ISBN 0801839742. URL <http://www.worldcat.org/oclc/877307767>.
- Anna-Lisa Vollmer, Robin Read, Dries Trippas, and Tony Belpaeme. Children conform, adults resist: A robot group induced peer pressure on normative social conformity. *Science Robotics*, 3(21):eaat7111, 2018. doi: 10.1126/scirobotics.aat7111. URL <https://doi.org/10.1126/scirobotics.aat7111>.
- Karel Vredenburg, Ji-Ye Mao, Paul W Smith, and Tom Carey. A survey of user-centered design practice. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pages 471–478. ACM, 2002. ISBN 1-58113-453-3. doi: 10.1145/503376.503460. URL <https://doi.org/10.1145/503376.503460>.
- Kazuyoshi Wada and Takanori Shibata. Living with seal robots—its sociopsychological and physiological influences on the elderly at a care house. *IEEE Transactions on Robotics*, 23(5):972–980, 2007. doi: 10.1109/TRO.2007.906261. URL <https://doi.org/10.1109/TRO.2007.906261>.
- Jeffrey J. Walczyk, Karen S. Roper, Eric Seemann, and Angela M. Humphrey. Cognitive mechanisms underlying lying to questions: Response time as a cue to deception. *Applied Cognitive Psychology*, 17(7):755–774, 2003. doi: 10.1002/acp.914. URL <https://doi.org/10.1002/acp.914>.
- Justin Walden, Eun Hwa Jung, S. Shyam Sundar, and Ariel Celeste Johnson. Mental models of robots among senior citizens: An interview study of interaction expectations and design implications. *Interaction Studies*, 16(1):68–88, 2015. doi: 10.1075/is.16.1.04wal. URL <https://doi.org/10.1075/is.16.1.04wal>.
- Michael L. Walters, Kerstin Dautenhahn, René Te Boekhorst, Kheng Lee Koay, Christina Kaouri, Sarah Woods, Chrystopher Nehaniv, David Lee, and Iain Werry. The influence of subjects’ personality traits on personal spatial zones in a human-robot interaction experiment. In *IEEE International Workshop on Robot and Human Interactive Communication*, pages 347–352. IEEE, 2005. ISBN 0-7803-9274-4. doi: 10.1109/ROMAN.2005.1513803. URL <https://doi.org/10.1109/ROMAN.2005.1513803>.
- Michael L. Walters, Dag Sverre Syrdal, Kheng Lee Koay, Kerstin Dautenhahn, and R. Te Boekhorst. Human approach distances to a mechanical-looking robot with different robot voice styles. In *Robot and human interactive communication (ROMAN)*, pages 707–712. IEEE, 2008. doi: 10.1109/ROMAN.2008.4600750. URL <https://doi.org/10.1109/ROMAN.2008.4600750>.
- Michael L. Walters, Kerstin Dautenhahn, René Te Boekhorst, Kheng Lee Koay, Dag Sverre Syrdal, and Chrystopher L. Nehaniv. An empirical framework for human-robot proxemics. *Proceedings of New Frontiers in Human-Robot Interaction*, 2009. URL <http://hdl.handle.net/2299/9670>.
- Lin Wang, Pei-Luen Patrick Rau, Vanessa Evers, Benjamin Krisper Robinson, and Pamela Hinds. When in Rome: The role of culture & context in adherence to robot recommendations. In *5th ACM/IEEE International Conference on Human-Robot Interaction*, pages 359–366, Piscataway, NJ, USA, 2010. IEEE. ISBN 978-1-4244-4893-7. doi: 10.1109/HRI.2010.5453165. URL <https://doi.org/10.1109/HRI.2010.5453165>.
- Rebecca M. Warner, Daniel Malloy, Kathy Schneider, Russell Knoth, and Bruce Wilder. Rhythmic organization of social interaction and observer ratings of positive affect and involvement. *Journal of Nonverbal Behavior*, 11(2):57–74, 1987. doi: 10.1007/BF00990958. URL <https://doi.org/10.1007/BF00990958>.
- Miki Watanabe, Kohei Ogawa, and Hiroshi Ishiguro. Can androids be salespeople in the real world? In *Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems*, pages 781–788, New York,

## References

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- NY, 2015. ACM. ISBN 978-1-4503-3146-3. doi: 10.1145/2702613.2702967. URL <https://doi.org/10.1145/2702613.2702967>.
- Adam Waytz, John Cacioppo, and Nicholas Epley. Who sees human? The stability and importance of individual differences in anthropomorphism. *Perspectives on Psychological Science*, 5(3):219–232, 2010. doi: 10.1177/1745691610369336. URL <https://doi.org/10.1177/1745691610369336>.
- Blay Whitby. Sometimes it’s hard to be a robot: A call for action on the ethics of abusing artificial agents. *Interacting with Computers*, 20(3):326–333, 2008. doi: 10.1016/j.intcom.2008.02.002. URL <https://doi.org/10.1016/j.intcom.2008.02.002>.
- Andrew Whiten, Jane Goodall, William C. McGrew, Toshisada Nishida, Vernon Reynolds, Yukimaru Sugiyama, Caroline E. G. Tutin, Richard W. Wrangham, and Christophe Boesch. Cultures in chimpanzees. *Nature*, 399(6737):682–685, 1999. doi: 10.1038/21415. URL <https://doi.org/10.1038/21415>.
- Christian J. A. M. Willems, Gijs Huisman, Merel M. Jung, Jan B. F. van Erp, and Dirk K. J. Heylen. Observing touch from video: The influence of social cues on pleasantness perceptions. In *International Conference on Human Haptic Sensing and Touch Enabled Computer Applications*, pages 196–205. Springer, 2016. ISBN 978-3-319-42323-4. doi: 10.1007/978-3-319-42324-1\_20. URL [https://doi.org/10.1007/978-3-319-42324-1\\_20](https://doi.org/10.1007/978-3-319-42324-1_20).
- Kipling D. Williams. Ostracism. *Annual Review of Psychology*, 58:425–452, 2007. doi: 10.1146/annurev.psych.58.110405.085641. URL <https://doi.org/10.1146/annurev.psych.58.110405.085641>.
- Lawrence E. Williams and John A. Bargh. Keeping one’s distance: The influence of spatial distance cues on affect and evaluation. *Psychological Science*, 19(3):302–308, 2008. doi: 10.1111/j.1467-9280.2008.02084.x. URL <https://doi.org/10.1111/j.1467-9280.2008.02084.x>.
- Tom Williams, Daria Thames, Julia Novakoff, and Matthias Scheutz. Thank you for sharing that interesting fact: Effects of capability and context on indirect speech act use in task-based human-robot dialogue. In *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*, pages 298–306. ACM, 2018. ISBN 978-1-4503-4953-6. doi: 10.1145/3171221.3171246. URL <https://doi.org/10.1145/3171221.3171246>.
- Paul Wills, Paul Baxter, James Kennedy, Emmanuel Senft, and Tony Belpaeme. Socially contingent humanoid robot head behaviour results in increased charity donations. In *The 11th ACM/IEEE International Conference on Human-Robot Interaction*, pages 533–534. IEEE, 2016. ISBN 978-1-4673-8370-7. doi: 10.1109/HRI.2016.7451842. URL <https://doi.org/10.1109/HRI.2016.7451842>.
- Daniel H. Wilson. *How to survive a robot uprising: Tips on defending yourself against the coming rebellion*. Bloomsbury, New York, NY, 2005. ISBN 9781582345925. URL <http://www.worldcat.org/oclc/1029483559>.
- Katie Winkle, Praminda Caleb-Solly, Ailie Turton, and Paul Bremner. Social robots for engagement in rehabilitative therapies: Design implications from a study with therapists. In *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction*, pages 289–297. ACM, 2018. ISBN 978-1-4503-4953-6. doi: 10.1145/3171221.3171273. URL <https://doi.org/10.1145/3171221.3171273>.
- Ryan Wistort and Cynthia Breazeal. Tofu: A socially expressive robot character for child interaction. In *8th International Conference on Interaction Design and Children*, pages 292–293. ACM, 2009. ISBN 978-1-60558-395-2. doi: 10.1145/1551788.1551862. URL <https://doi.org/10.1145/1551788.1551862>.
- Ricarda Wullenkord. *Messung und Veränderung von Einstellungen gegenüber Robotern-Untersuchung des Einflusses von imaginiertem Kontakt auf implizite*

- und explizite Maße*. PhD thesis, University of Bielefeld, 2017. URL <https://pub.uni-bielefeld.de/publication/2913679>.
- Ricarda Wullenkord, Marlena R. Fraune, Friederike Eyssel, and Selma Šabanović. Getting in touch: How imagined, actual, and physical contact affect evaluations of robots. In *25th IEEE International Symposium on Robot and Human Interactive Communication*, pages 980–985. IEEE, 2016. ISBN 978-1-5090-3930-2. doi: 10.1109/ROMAN.2016.7745228. URL <https://doi.org/10.1109/ROMAN.2016.7745228>.
- Junchao Xu, Joost Broekens, Koen Hindriks, and Mark A. Neerincx. Robot mood is contagious: Effects of robot body language in the imitation game. In *International Conference on Autonomous Agents and Multi-Agent Systems*, pages 973–980. International Foundation for Autonomous Agents and Multiagent Systems, 2014. ISBN 978-1-4503-2738-1. URL <https://dl.acm.org/citation.cfm?id=2617401>.
- Yuto Yamaji, Taisuke Miyake, Yuta Yoshiike, P. Ravindra S. De Silva, and Michio Okada. STB: Human-dependent sociable trash box. In *5th ACM/IEEE International Conference on Human-Robot Interaction*, pages 197–198. IEEE, 2010. ISBN 978-1-4244-4892-0. doi: 10.1109/HRI.2010.5453196. URL <https://doi.org/10.1109/HRI.2010.5453196>.
- Fumitaka Yamaoka, Takayuki Kanda, Hiroshi Ishiguro, and Norihiro Hagita. “Life-like” behavior of communication robots based on developmental psychology findings. In *5th IEEE-RAS International Conference on Humanoid Robots*, pages 406–411, 2005. ISBN 0-7803-9320-1. doi: 10.1109/ICHR.2005.1573601. URL <https://doi.org/10.1109/ICHR.2005.1573601>.
- Fumitaka Yamaoka, Takayuki Kanda, Hiroshi Ishiguro, and Norihiro Hagita. A model of proximity control for information-presenting robots. *IEEE Transactions on Robotics*, 26(1):187–195, 2010. doi: 10.1109/TRO.2009.2035747. URL <https://doi.org/10.1109/TRO.2009.2035747>.
- Steve Yohanan and Karon E. MacLean. The role of affective touch in human-robot interaction: Human intent and expectations in touching the haptic creature. *International Journal of Social Robotics*, 4(2):163–180, 2012. doi: 10.1007/s12369-011-0126-7. URL <https://doi.org/10.1007/s12369-011-0126-7>.
- James E. Young, JaYoung Sung, Amy Volda, Ehud Sharlin, Takeo Igarashi, Henrik I. Christensen, and Rebecca E. Grinter. Evaluating human-robot interaction. *International Journal of Social Robotics*, 3(1):53–67, 2011. doi: 10.1007/s12369-010-0081-8. URL <https://doi.org/10.1007/s12369-010-0081-8>.
- Chen Yu and Linda B. Smith. Joint attention without gaze following: Human infants and their parents coordinate visual attention to objects through eye-hand coordination. *PloS One*, 8(11):e79659, 2013. doi: 10.1371/journal.pone.0079659. URL <https://doi.org/10.1371/journal.pone.0079659>.
- Robert B. Zajonc. Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, 9(2p2):1–27, 1968. doi: 10.1037/h0025848. URL <https://doi.org/10.1037/h0025848>.
- Heiga Zen, Keiichi Tokuda, and Alan W. Black. Statistical parametric speech synthesis. *Speech Communication*, 51(11):1039–1064, 2009. doi: 10.1016/j.specom.2009.04.004. URL <https://doi.org/10.1016/j.specom.2009.04.004>.
- Zhihong Zeng, Maja Pantic, Glenn I. Roisman, and Thomas S. Huang. A survey of affect recognition methods: Audio, visual, and spontaneous expressions. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 31(1):39–58, 2009. doi: 10.1109/TPAMI.2008.52. URL <https://doi.org/10.1109/TPAMI.2008.52>.
- Jakub Zlotowski, Diane Proudfoot, Kumar Yogeeswaran, and Christoph Bartneck. Anthropomorphism: Opportunities and challenges in human-robot interaction. *International Journal of Social Robotics*, 7(3):347–360, 2015. doi: 10.1007/s12369-014-0267-6. URL <https://doi.org/10.1007/s12369-014-0267-6>.

## References

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- Jakub Zlotowski, Kumar Yogeeswaran, and Christoph Bartneck. Can we control it? Autonomous robots are perceived as threatening. *International Journal of Human-Computer Studies*, 100(April 2017):48–54, 2017. doi: 10.1016/j.ijhcs.2016.12.008. URL <https://doi.org/10.1016/j.ijhcs.2016.12.008>.



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