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## Peaceful alternatives to asymmetric conflict

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## References

- Abbink, K., Brandts, J., Herrmann, B., & Orzen, H. (2010). Intergroup conflict and intra-Group punishment in an experimental contest game. *The American Economic Review*, *100*(1), 420–447.
- Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2005). Competition and innovation: an inverted-U relationship. *The Quarterly Journal of Economics*, *120*(2), 701–728.
- Agrell, W. (1987). Offensive versus defensive: military strategy and alternative defence. *Journal of Peace Research*, *24*(1), 75–85.
- Ahn, T. K., Isaac, R. M., & Salmon, T. C. (2011). Rent seeking in groups. *International Journal of Industrial Organization*, *29*(1), 116–125.
- Ali, H. E., & Abdellatif, O. A. (2015). Military expenditures and natural resources: Evidence from rentier states in the middle east and north africa. *Defence and Peace Economics*, *26*(1), 5–13.
- Antonakis, N. (1999). Guns versus butter: A Multisectorial approach of military expenditure and growth with evidence from greece, 1960—1993. *The Journal of Conflict Resolution*, *43*(4), 501–520.
- Au, W. (2004). Criticality and environmental uncertainty in step-level public goods dilemmas. *Group Dynamics: Theory, Research, and Practice*, *8*(1), 40–61.
- Axelrod, R., & Hamilton, W. D. (1981). The evolution of cooperation. *Science*, *211*(4489), 1390–1396.
- Bailey, I., Myatt, J. P., & Wilson, A. M. (2013). Group hunting within the carnivora: physiological, cognitive and environmental influences on strategy and cooperation. *Behavioral Ecology and Sociobiology*, *67*(1), 1–17.
- Balliet, D., Mulder, L. B., & Van Lange, P. A. M. (2011). Reward, punishment, and

- cooperation: a meta-analysis. *Psychological Bulletin*, 137(4), 594–615.
- Barth, M., Masson, T., Fritsche, I., & Ziemer, C.-T. (2018). Closing ranks: Ingroup norm conformity as a subtle response to threatening climate change. *Group Processes & Intergroup Relations: GPIR*, 21(3), 497–512.
- Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1)
- Battigalli, P., & Dufwenberg, M. (2007). Guilt in games. *The American Economic Review*, 97(2), 170–176.
- Baumeister, R. F. (1999). *Evil: Inside Human Violence and Cruelty*. Henry Holt and Company.
- Baye, M. R., Kovenock, D., & de Vries, C. G. (1996). The all-pay auction with complete information. *Economic Theory*, 8(2), 291–305.
- Becker, G. S. (1968). Crime and punishment: An economic approach. In *The Economic Dimensions of Crime* (pp. 13–68). London: Palgrave Macmillan UK.
- Besley, T., & Mueller, H. (2018). Predation, protection, and productivity: A firm-level perspective. *American Economic Journal: Macroeconomics*, 10(2), 184–221.
- Bena, J., & Li, K. (2014). Corporate innovations and mergers and acquisitions. *The Journal of Finance*, 69(5), 1923–1960.
- Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, Reciprocity, and Social History. *Games and Economic Behavior*, 10(1), 122–142.
- Bloom, N. (2009). The impact of uncertainty shocks. *Econometrica: Journal of the Econometric Society*, 77(3), 623–685.
- Borel, E. (1953). The theory of play and integral equations with skew symmetric kernels. *Econometrica: Journal of the Econometric Society*, 21(1), 97–100.
- Bornstein, G. (1992). The free-rider problem in intergroup conflicts over step-level and

- continuous public goods. *Journal of Personality and Social Psychology*, 62(4), 597–606.
- Bornstein, G. (2003). Intergroup conflict: individual, group, and collective interests. *Personality and Social Psychology Review*, 7(2), 129–145.
- Bornstein, G., & Ben-Yossef, M. (1994). Cooperation in intergroup and single-group social dilemmas. *Journal of Experimental Social Psychology*, 30(1), 52–67.
- Boyle, E. H., & Lawler, E. J. (1991). Resolving Conflict Through Explicit Bargaining. *Social Forces*, 69(4), 1183–1204.
- Brown, J. R., Martinsson, G., & Petersen, B. C. (2017). What promotes R&D? Comparative evidence from around the world. *Research Policy*, 46(2), 447–462.
- Brunnschweiler, C. N., & Bulte, E. H. (2009). Natural resources and violent conflict: Resource abundance, dependence, and the onset of civil wars. *Oxford Economic Papers*, 61(4), 651–674.
- Burgoon, B. (2006). On welfare and terror: Social welfare policies and political-economic roots of terrorism. *The Journal of Conflict Resolution*, 50(2), 176–203.
- Calo-Blanco, A., Kovářik, J., Mengel, F., & Romero, J. G. (2017). Natural disasters and indicators of social cohesion. *PloS One*, 12(6), e0176885.
- Camerer, C. (1999). Behavioral economics: reunifying psychology and economics. *Proceedings of the National Academy of Sciences of the United States of America*, 96(19), 10575–10577.
- Cannon, W. B. (1940). The wisdom of the body. Revised and enlarged edition. *The Journal of Nervous and Mental Disease*, 92(2), 262.
- Carter, J. R., & Anderton, C. H. (2001). An experimental test of a predator–prey model of appropriation. *Journal of Economic Behavior & Organization*, 45, 83–97.
- Cason, T. N., Sheremeta, R. M., & Zhang, J. (2012). Communication and efficiency in

- competitive coordination games. *Games and Economic Behavior*, 76(1), 26–43.
- Cason, T., Sheremeta, R., & Zhang, J. (2017). Asymmetric and endogenous within-group communication in competitive coordination games. *Experimental Economics*, 20(4), 946–972.
- Charness, G., & Dufwenberg, M. (2006). Promises and Partnership. *Econometrica: Journal of the Econometric Society*, 74(6), 1579–1601.
- Chaudhuri, A., & Gangadharan, L. (2007). An Experimental Analysis of Trust and Trustworthiness. *Southern Economic Journal*, 73(4), 959–985.
- Chemmanur, T. J., & Tian, X. (2018). Do antitakeover provisions spur corporate innovation? A regression discontinuity analysis. *Journal of Financial and Quantitative Analysis*, 53(3), 1163–1194.
- Chen, D. L., Schonger, M., & Wickens, C. (2016). oTree—An open-source platform for laboratory, online, and field experiments. *Journal of Behavioral and Experimental Finance*, 9, 88–97.
- Chowdhury, S. M., Jeon, J. Y., & Ramalingam, A. (2018). Property rights and loss aversion in contests. *Economic Inquiry*, 56(3), 1492–1511.
- Chowdhury, S. M., & Topolyan, I. (2016). The attack-and-defense group contests: Best shot versus weakest link. *Economic Inquiry*, 54(1), 548–557.
- Cialdini, R. B. (1984). *Influence: The Psychology of Persuasion*. New York: William Morrow.
- Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, 55, 591–621.
- Clark, D. J., & Konrad, K. A. (2007). Asymmetric conflict: Weakest link against best shot. *The Journal of Conflict Resolution*, 51, 457–469.
- Conti, R. (2014). Do non-competition agreements lead firms to pursue risky R&D projects?

- Strategic Management Journal*, 35(8), 1230–1248.
- Coombs, C. H. (1987). The structure of conflict. *American Psychologist*, 42(4), 355–363.
- Cornes, R., & Hartley, R. (2005). Asymmetric contests with general technologies. *Economic Theory*, 26, 923–946.
- Coughan, P. J., & Plott, C. R. (1997). An experimental analysis of the structure of legal fees: American rule vs. english rule. *Journal of Law, Economics, and Organization*, 3(1025), 68.
- Cox, J. C. (2004). How to identify trust and reciprocity. *Games and Economic Behavior*, 46(2), 260–281.
- Davis, D. D., & Reilly, R. J. (1998). Do too many cooks always spoil the stew? An experimental analysis of rent-seeking and the role of a strategic buyer. *Public Choice*, 95(1), 89–115.
- De Dreu, C. K. W. (1995). Coercive Power And Concession Making in Bilateral Negotiation. *Journal of Conflict Resolution*, 39(4), 646–670.
- De Dreu, C. K. W. (2010). Social value orientation moderates ingroup love but not outgroup hate in competitive intergroup conflict. *Group Processes & Intergroup Relations: GPIR*, 13(6), 701–713.
- De Dreu, C. K. W., Giacomantonio, M., Giffin, M. R., & Vecchiato, G. (2019). Psychological constraints on aggressive predation in economic contests. *Journal of Experimental Psychology. General*, 148(10), 1767–1781.
- De Dreu, C. K. W., & Gross, J. (2018). Revisiting the form and function of conflict: Neurobiological, psychological, and cultural mechanisms for attack and defense within and between groups. *The Behavioral and Brain Sciences*, 42, e116.
- De Dreu C.K.W. & Gross J.A.J (2019), Asymmetric conflict: Structures, strategies, and settlement, *Behavioral and Brain Sciences*, 42, e145.

- De Dreu C. K. W., Gross J., Fariña A. & Ma Y. (2020). Group cooperation, carrying-capacity stress, and intergroup conflict, *Trends in Cognitive Sciences* 24(9): 760-776.
- De Dreu, C. K. W., Gross, J., Méder, Z., Giffin, M., Prochazkova, E., Krikeb, J., & Columbus, S. (2016). In-group defense, out-group aggression, and coordination failures in intergroup conflict. *Proceedings of the National Academy of Sciences of the United States of America*, 113(38), 10524–10529.
- De Dreu, C. K. W., Gross, J., & Reddmann, L. (2022). Environmental stress increases out-group aggression and intergroup conflict in humans. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 377(1851), 20210147.
- De Dreu, C. K. W., Kret, M. E., & Sligte, I. G. (2016). Modulating prefrontal control in humans reveals distinct pathways to competitive success and collective waste. *Social Cognitive and Affective Neuroscience*, 11(8), 1236–1244.
- De Dreu, C. K. W., Pliskin, R., Rojek-Giffin, M., Méder, Z., & Gross, J. (2021). Political games of attack and defence. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 376(1822), 20200135.
- De Dreu, C. K. W., Scholte, H. S., van Winden, F. A. A. M., & Ridderinkhof, K. R. (2015). Oxytocin tempers calculated greed but not impulsive defense in predator-prey contests. *Social Cognitive and Affective Neuroscience*, 10(5), 721–728.
- De Dreu, C. K. W., & Triki, Z. (2022). Intergroup conflict: origins, dynamics and consequences across taxa. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 377(1851), 20210134.
- Dechenaux, E., Kovenock, D., & Sheremeta, R. M. (2015). A survey of experimental research on contests, all-pay auctions and tournaments. *Experimental Economics*, 18(4), 609–669.
- Dechenaux, E., & Mancini, M. (2008). *Auction-theoretic approach to modeling legal*

- systems: An experimental analysis*. <https://papers.ssrn.com/abstract=741844>
- Draca, M., & Machin, S. (2015). Crime and economic incentives. *Annual Review of Economics*, 7(1), 389–408.
- Duffy, J., & Kim, M. (2005). Anarchy in the laboratory (and the role of the state). *Journal of Economic Behavior & Organization*, 56, 297–329.
- Duncan, R. B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, 17(3), 313–327.
- Dunne, J. P., & Tian, N. (2015). Military expenditure, economic growth and heterogeneity. *Defence and Peace Economics*, 26(1), 15–31.
- Durham, Y., Hirshleifer, J., & Smith, V. L. (1998). Do the rich get richer and the poor poorer? Experimental tests of a model of power. *The American Economic Review*, 88(4), 970–983.
- Ellingsen, T., Östling, R., & Wengström, E. (2018). How does communication affect beliefs in one-shot games with complete information? *Games and Economic Behavior*, 107, 153–181.
- Ellis, B. J., Figueredo, A. J., Brumbach, B. H., & Schlomer, G. L. (2009). Fundamental dimensions of environmental risk: The impact of harsh versus unpredictable environments on the evolution and development of life history strategies. *Human Nature*, 20(2), 204–268.
- Ember, C. R., & Ember, M. (1992). Resource unpredictability, mistrust, and war: A cross-cultural study. *The Journal of Conflict Resolution*, 36(2), 242–262.
- Fang, Y., Dong, Y., & Fang, L. (2019). Honesty-humility and prosocial behavior: The mediating roles of perspective taking and guilt-proneness. *Scandinavian Journal of Psychology*, 60(4), 386–393.
- Fehr, E., & Fischbacher, U. (2004). Third-party punishment and social norms. *Evolution and*



- Human Behavior*, 25(2), 63-87.
- Fehr, E., & Gächter, S. (2000). Cooperation and Punishment in Public Goods Experiments. *The American Economic Review*, 90(4), 980–994.
- Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3), 817–868.
- Faber, N. S., & Häusser, J. A. (2022). Why stress and hunger both increase and decrease prosocial behaviour. *Current Opinion in Psychology*, 44, 49–57.
- Frankenhuis, W. E., Panchanathan, K., & Nettle, D. (2016). Cognition in harsh and unpredictable environments. *Current Opinion in Psychology*, 7, 76–80.
- Frey, B. S., & Stutzer, A. (2002). What can economists learn from happiness research? *Journal of Economic Literature*, 40(2), 402–435.
- Friedman, T. L. (2000). *The Lexus and the Olive Tree: Understanding Globalization*. New York, NY: Farrar, Strauss and Giroux.
- Friedman, T. L. (2006). *The world is flat [updated and expanded]: A brief history of the twenty-first century*. Retrieved from <http://capitolreader.com/bonus/The%20World%20Is%20Flat.pdf>
- Garfinkel, M. R., & Skaperdas, S. (2007). Economics of conflict: An overview. *Handbook of Defense Economics*, 2, 649–709.
- Glowacki, L., Isakov, A., Wrangham, R. W., McDermott, R., Fowler, J. H., & Christakis, N. A. (2016). Formation of raiding parties for intergroup violence is mediated by social network structure. *Proceedings of the National Academy of Sciences of the United States of America*, 113(43), 12114–12119.
- Guala, F., & Mittone, L. (2010). Paradigmatic experiments: The Dictator Game. *The Journal of Socio-Economics*, 39(5), 578–584.
- Gustafsson, M., Biel, A., & Gärling, T. (2000). Egoism bias in social dilemmas with

- resource uncertainty. *Group Processes & Intergroup Relations: GPIR*, 3(4), 351–365.
- Güth, W., Huck, S., & Müller, W. (2001). The relevance of equal splits in ultimatum games. *Games and Economic Behavior*, 37, 161–169.
- Griesinger, D. W., & Livingston, J. W. (1973). Toward a model of interpersonal motivation in experimental games. *Systems Research: The Official Journal of the International Federation for Systems Research*, 18(3), 173–188.
- Gross, J. A. J. & De Dreu, C. K. W. (2019). Individual solutions to shared problems create a modern tragedy of the commons. *Science Advances*, 5(4), eaau7296.
- Gross, J. A. J., Veistola, S., De Dreu, C. K. W., & Van Dijk, E. (2020). Self-reliance crowds out group cooperation and increases wealth inequality. *Nature Communications*, 11(1), 5161.
- Gross, J., De Dreu, C. K. W., & Reddmann, L. (2022). Shadow of conflict: How past conflict influences group cooperation and the use of punishment. *Organizational Behavior and Human Decision Processes*, 171, 104152.
- Grossman, H. I., & Kim, M. (1996a). Predation and production. In *The Political Economy of Conflict and Appropriation* (pp. 57–72). Cambridge University Press.
- Grossman, H. I., & Kim, M. (1996b). Predation and accumulation. *Journal of Economic Growth*, 1, 333–350.
- Gustafsson, M., Biel, A., & Gärling, T. (2000). Egoism bias in social dilemmas with resource uncertainty. *Group Processes & Intergroup Relations*, 3(4), 351–365.
- Haavelmo, T. (1954). *A study in the theory of economic evolution*. North-Holland Publishing Company.
- Halevy, N., Bornstein, G., & Sagiv, L. (2008). “In-group love” and “out-group hate” as motives for individual participation in intergroup conflict: a new game paradigm.

- Psychological Science*, 19(4), 405–411.
- Hamilton, W. D. (1970). Selfish and spiteful behaviour in an evolutionary model. *Nature*, 228(5277), 1218–1220.
- Hausken, K., & Zhuang, J. (2011). Governments' and terrorists' defense and attack in a T-period game. *Decision Analysis*, 8, 46–70.
- Hegre, H., & Nygård, H. M. (2015). Governance and conflict relapse. *Journal of Conflict Resolution*, 59(6), 984–1016.
- Hehenkamp, B., Leininger, W., & Possajennikov, A. (2004). Evolutionary equilibrium in Tullock contests: spite and overdissipation. *European Journal of Political Economy*, 20(4), 1045–1057.
- Hillman, A. L., & Riley, J. G. (1989). Politically contestable rents and transfers. *Economics and Politics*, 1(1), 17–39.
- Hirshleifer, J. (1988). The analytics of continuing conflict. *Synthese*, 76(2), 201–233.
- Hirshleifer, J. (1991). The paradox of power. *Economics and Politics*, 3(3), 177–200.
- Hirshleifer, J. (1995). Theorizing about conflict. *Handbook of Defense Economics*.
- Hogg, M. A. (2007). Uncertainty-Identity Theory. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 39, pp. 69–126). Academic Press.
- Hsiang, S. M., Burke, M., & Miguel, E. (2013). Quantifying the influence of climate on human conflict. *Science*, 341(6151), 1235367.
- Jablonski, R. S., & Oliver, S. (2013). The political economy of plunder: Economic opportunity and modern piracy. *Journal of Conflict Resolution*, 57, 682-708.
- Johnson, D. D., & Fowler, J. H. (2011). The evolution of overconfidence. *Nature*, 477(7364), 317–320.
- Jones, D. M., Bremer, S. A., & David Singer, J. (1996). Militarized Interstate Disputes, 1816–1992: Rationale, Coding Rules, and Empirical Patterns. *Conflict Management and*

- Peace Science, 15(2), 163–213.
- Katelaar, T., & Au, W. T. (2003). The Effects of Guilt on the Behavior of Uncooperative Individuals in Repeated Social Bargaining Games: An Affect-as-Information Interpretation of the Role of Emotion in Social Interaction. *Cognition and Emotion*, 17, 429–453.
- Kang, D. C. (2010). Hierarchy and legitimacy in international systems: The tribute system in early modern East Asia. *Security Studies*, 19(4), 591-622.
- Kelman, I., & Næss, M. W. (2019). Climate change and migration for scandinavian saami: A review of possible impacts. *Climate*, 7(4), 47.
- Kennett, D. J., & Marwan, N. (2015). Climatic volatility, agricultural uncertainty, and the formation, consolidation and breakdown of preindustrial agrarian states. *Philosophical Transactions. Series A, Mathematical, Physical, and Engineering Sciences*, 373(2055).
- Keynes, J. M. (2019). *The Economic Consequences of the Peace*. Palgrave Macmillan.
- Khan, K., Su, C.-W., & Rizvi, S. K. A. (2020). Guns and blood: A review of geopolitical risk and defence expenditures. *Defence and Peace Economics*, 1–17.
- Konrad, K. A. (2009). *Strategy and Dynamics in Contests*. OUP Catalogue.
- Korenok, O., Millner, E. L., & Razzolini, L. (2008). Experimental evidence on inequality aversion: Dictators give to help the less fortunate. Retrieved from [http://www.people.vcu.edu/~okorenok/DictatorEquity\\_080828.pdf](http://www.people.vcu.edu/~okorenok/DictatorEquity_080828.pdf)
- Koubi, V., Spilker, G., Böhmelt, T., & Bernauer, T. (2014). Do natural resources matter for interstate and intrastate armed conflict? *Journal of Peace Research*, 51(2), 227–243.
- Kruglanski, A. W., Pierro, A., Mannetti, L., & De Grada, E. (2006). Groups as epistemic providers: need for closure and the unfolding of group-centrism. *Psychological Review*, 113(1), 84–100.
- Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest Package: Tests in

- Linear Mixed Effects Models. *Journal of Statistical Software*, 82(13), 1–26.
- Lacomba, J. A., Lagos, F., Reuben, E., & van Winden, F. (2014). On the escalation and de-escalation of conflict. *Games and Economic Behavior*, 86, 40–57.
- Landau, M. J., Kay, A. C., & Whitson, J. A. (2015). Compensatory control and the appeal of a structured world. *Psychological Bulletin*, 141(3), 694–722.
- Large, M. D. (1999). The Effectiveness of Gifts as Unilateral Initiatives in Bargaining. *Sociological Perspectives: SP: Official Publication of the Pacific Sociological Association*, 42(3), 525–542.
- Lawler, E. J., Ford, R., & Large, M. D. (1999). Unilateral Initiatives as a Conflict Resolution Strategy. *Social Psychology Quarterly*, 62(3), 240–256.
- Lee, H. F. (2018). Internal wars in history: Triggered by natural disasters or socio-ecological catastrophes? *Holocene*, 28(7), 1071–1081.
- Leininger, W. (2003). On evolutionarily stable behavior in contests. *Economics of Governance*, 4(3), 177–186.
- Lemke, C. E., & Howson, J. T. (1964). Equilibrium points of bimatrix games. *Journal of the Society for Industrial and Applied Mathematics*, 12, 413–423.
- Lindsey, L. L. M. (2005). Anticipated guilt as behavioral motivation: An examination of appeals to help unknown others through bone marrow donation. *Human Communication Research*, 31(4), 453–481.
- Lindskold, S., & Han, G. (1988). GRIT as a Foundation for Integrative Bargaining. *Personality & Social Psychology Bulletin*, 14(2), 335–345.
- Linster, B. G., Fullerton, R. L., Mckee, M., & Slate, S. (2001). Rent-seeking models of international competition: An experimental investigation. *Defence and Peace Economics*, 12(4), 285–302.
- Lojowska, M., Gross, J., & De Dreu, C. K. W. (2023). Anticipatory threat mitigates the

- breakdown of group cooperation. *Psychological Science*, 34(1), 87–98.
- Lotz, S., Okimoto, T. G., Schlösser, T., & Fetchenhauer, D. (2011). Punitive versus compensatory reactions to injustice: Emotional antecedents to third-party interventions. *Journal of Experimental Social Psychology*, 47(2), 477–480.
- Luce, E. (2015). The end of the Golden Arches doctrine. *Financial Times*, May, 10.
- Lujala, P., Gleditsch, N. P., & Gilmore, E. (2005). A diamond curse? Civil war and a lootable resource. *Journal of Conflict Resolution*, 49, 538-562.
- Mantilla, C. (2018). Environmental uncertainty in commons dilemmas: A survey of experimental research. *The Commons Journal*, 12(2), 300-329.
- Maoz, Z., & Russett, B. (1993). Normative and structural causes of democratic peace, 1946–1986. *The American Political Science Review*, 87(3), 624–638.
- Moaz, I., & McCauley, C. (2008). Threat, dehumanization, and support for retaliatory aggressive policies in asymmetrical conflict. *Journal of Conflict Resolution*, 52, 93–116.
- McGuirk, E., & Burke, M. (2020). The economic origins of conflict in Africa. *The Journal of Political Economy*, 128, 3940–3997.
- Méder, Z., Dreu, C. K. W. D., & Gross, J. (2022). Equilibria of Attacker-Defender Games. *ArXiv*. <https://doi.org/10.48550/arXiv.2202.10072>
- Messick, D. M., Allison, S. T., & Samuelson, C. D. (1988). Framing and communication effects on group members' responses to environmental and social uncertainty. *Applied Behavioral Economics*, 2, 677–700.
- Mill, J. S. (1978). *On Liberty*. Hackett Publishing Company.
- Miller, S. V. (2017). Economic Threats or societal turmoil? Understanding preferences for authoritarian political systems. *Political Behavior*, 39(2), 457–478.

- Millner, E. L., & Pratt, M. D. (1989). An experimental investigation of efficient rent-seeking. *Public Choice*, 62(2), 139–151.
- Mintz, A., Redd, S. B., & Vedlitz, A. (2006). Can we generalize from student experiments to the real world in political science, military affairs, and international relations? *Journal of Conflict Resolution*, 50, 757–776.
- Mula, J., Poler, R., García-Sabater, J. P., & Lario, F. C. (2006). Models for production planning under uncertainty: A review. *International Journal of Production Economics*, 103, 271–285.
- Murphy, R. O., Ackermann, K. A., & Handgraaf, M. (2011). Measuring Social Value Orientation. *Judgment and Decision Making*, 6(8), 771-781.
- Nielsen, R. A., Findley, M. G., Davis, Z. S., Candland, T., & Nielson, D. L. (2011). Foreign aid shocks as a cause of violent armed conflict. *American Journal of Political Science*, 55(2), 219–232.
- O’Loughlin, J., Linke, A. M., & Witmer, F. D. W. (2014). Effects of temperature and precipitation variability on the risk of violence in sub-Saharan Africa, 1980–2012. *Proceedings of the National Academy of Sciences*, 111(47), 16712–16717.
- Olsson, O. (2007). Conflict diamonds. *Journal of Development Economics*, 82(2), 267-286.
- Osgood, C. E. (1962). An alternative to war or surrender. *Midwest Journal of Political Science*, 183(2), 183.
- Ostrom, E., Walker, J., & Gardner, R. (1992). Covenants With and Without a Sword: Self-Governance is Possible. *The American Political Science Review*, 86(2), 404–417.
- Pareto, V. (2014). *Manual of Political Economy: A Variorum Translation and Critical Edition*. OUP Oxford.
- Pletzer, J. L., Balliet, D., Joireman, J., Kuhlman, D. M., Voelpel, S. C., & Van Lange, P. A. M. (2018). Social value orientation, expectations, and cooperation in social

- dilemmas: A meta-analysis. *European Journal of Personality*, 32(1), 62–83.
- Ploeg, F. van der. (2011). Natural resources: Curse or blessing? *Journal of Economic Literature*, 49(2), 366–420.
- Powell, R. (2007). Defending against terrorist attacks with limited resources. *American Political Science Review*, 101, 527–541.
- Prendergast, C. (1999). The provision of incentives in firms. *Journal of Economic Literature*, 37(1), 7–63.
- Pruitt, D. G., & Kimmel, M. J. (1977). Twenty years of experimental gaming: Critique, synthesis, and suggestions for the Future. *Annual Review of Psychology*, 28(1), 363–392.
- Pruitt, D., Kim, S. H., & Rubin, J. Z. (2004). *Social Conflict*. McGraw-Hill.
- R Core Team. (2018). R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from <http://www.r-project.org>
- Raiffa, H. (1985). Post-settlement settlements. *Negotiation Journal*, 1, 9–12.
- Rapoport, A., Budescu, D. V., Suleiman, R., & Weg, E. (1992). Social dilemmas with uniformly distributed resources. *Social Dilemmas: Theoretical Issues and Research Findings.*, 334, 43–57.
- Rapoport, A., Chammah, A. M., & Orwant, C. J. (1965). *Prisoner's Dilemma: A Study in Conflict and Cooperation*. University of Michigan Press.
- Read, D. W., & LeBlanc, S. A. (2003). Population growth, carrying capacity, and conflict. *Current Anthropology*, 44(1), 59–85.
- Regan, D. T. (1971). Effects of a favor and liking on compliance. *Journal of Experimental Social Psychology*, 7(6), 627-639.
- Ripsman, N. M., & Levy, J. S. (2008). Wishful thinking or buying time? The logic of British



- appeasement in the 1930s. *International Security*, 33(2), 148–181.  
<https://doi.org/10.1162/isec.2008.33.2.148>.
- Rojek-Giffin, M., Lebreton, M., Scholte, H. S., van Winden, F., Ridderinkhof, K. R., & De Dreu, C. K. W. (2020). Neurocognitive underpinnings of aggressive predation in economic contests. *Journal of Cognitive Neuroscience*, 32(7), 1276–1288.
- Romano, A., Gross, J., & De Dreu, C. K. (2022). Conflict misperceptions between citizens and foreigners across the Globe. *PNAS Nexus*, 1(5).
- Rousseau, D. L., Gelpi, C., Reiter, D., & Huth, P. K. (1996). Assessing the dyadic nature of the democratic peace, 1918–88. *The American Political Science Review*, 90, 512–533.
- Schelling, T. C. (1980). *The Strategy of Conflict*. Cambridge University Press.
- Schleussner, C. F., Donges, J. F., Donner, R. V., & Schellnhuber, H. J. (2016). Armed-conflict risks enhanced by climate-related disasters in ethnically fractionalized countries. *Proceedings of the National Academy of Sciences of the United States of America*, 113(33), 9216–9221.
- Schweda, A., Faber, N. S., Crockett, M. J., & Kalenscher, T. (2019). The effects of psychosocial stress on intergroup resource allocation. *Scientific Reports*, 9(1), 18620.
- Schwert, W. G. (2000). Hostility in takeovers: In the eyes of the beholder? *The Journal of Finance*, 55(6), 2599–2640.
- Shane, J. M., & Magnuson, S. (2016). Successful and unsuccessful pirate attacks worldwide: A situational analysis. *Justice Quarterly*, 33, 682–707.
- Shank, D. B., Kashima, Y., Peters, K., Li, Y., Robins, G., & Kirley, M. (2019). Norm talk and human cooperation: Can we talk ourselves into cooperation? *Journal of Personality and Social Psychology*, 117(1), 99–123.
- Sharif, J., Rafiq, M. K., Rafiq, M. T., Aziz, R., Qayyum, A., Saleem, A. R., Nisa, W. U., Jenks, M. A., Li, Y. (2019). Climate change perceptions and adaptive actions by

- pastoral community on the Tibetan plateau, China. *Applied Ecology and Environmental Research*, 17(4).
- Sheremeta, R. M. (2010). Experimental comparison of multi-stage and one-stage contests. *Games and Economic Behavior*, 68(2), 731–747.
- Sheremeta, R. M. (2014). Behavioral dimensions of contests. *ESI Working Paper*. Retrieved from [http://digitalcommons.chapman.edu/esi\\_working\\_papers](http://digitalcommons.chapman.edu/esi_working_papers)
- Sheremeta, R. M., & Zhang, J. (2010). Can groups solve the problem of over-bidding in contests? *Social Choice and Welfare*, 35(2), 175–197.
- Shoji, M. (2022). Guilt and Prosocial Behavior: Lab-in-the-Field Evidence from Bangladesh. *Economic Development and Cultural Change*, 70(2), 823–833.
- Skaperdas, S. (1992). Cooperation, conflict, and power in the absence of property rights. *The American Economic Review*, 82(4), 720–739.
- Smith, A. C., Skarbek, D. B., & Wilson, B. J. (2012). Anarchy, groups, and conflict: An experiment on the emergence of protective associations. *Social Choice and Welfare*, 38, 325–353.
- Sommerfeld, R. D., Krambeck, H.-J., Semmann, D., & Milinski, M. (2007). Gossip as an alternative for direct observation in games of indirect reciprocity. *Proceedings of the National Academy of Sciences of the United States of America*, 104(44), 17435–17440.
- Suleiman, R., Budescu, D. V., & Rapoport, A. (2001). Provision of step-level public goods with uncertain provision threshold and continuous contribution. *Group Decision and Negotiation*, 10(3), 253–274.
- Szymanski, S. (2003). The economic design of sporting contests. *Journal of Economic Literature*, 41(4), 1137–1187.
- Taylor, S. E. (2006). Tend and Befriend: Biobehavioral Bases of Affiliation Under Stress.

*Current Directions in Psychological Science*, 15(6), 273–277.

Taylor, S.E., Klein, L.C., Lewis, B.P., Gruenewald, T.L., Gurung, R.A.R., & Updegraff, J.A.

(2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review*, 107, 411–429.

Team, R. D. C. (2018). *A Language and Environment for Statistical Computing*.

<http://www.r-project.org>.

Thielmann, I., Spadaro, G., & Balliet, D. (2020). Personality and prosocial behavior: A theoretical framework and meta-analysis. *Psychological Bulletin*, 146(1), 30–90.

Treisman, D. (2004). Rational Appeasement. *International Organization*, 58(2), 345–373.

Tyler, N. J. C., Hanssen-Bauer, I., Førland, E. J., & Nellemann, C. (2021). The shrinking resource base of pastoralism: Saami reindeer husbandry in a climate of change.

*Frontiers in Sustainable Food Systems*, 4.

Tullock, G. (1980). Efficient rent seeking. In J. M. Buchanan, R. D. Tollison, & G. Tullock (Eds.), *Toward a theory of the rent seeking society* (pp. 97–112). College Station: Texas A&M Press.

Uggen, C., & Shannon, S. K. S. (2014). Productive addicts and harm reduction: How work reduces crime - but not drug use. *Social Problems*, 61, 105–130.

Ullah, R., Shivakoti, G. P., Zulfiqar, F., & Kamran, M. A. (2016). Farm risks and uncertainties: Sources, impacts and management. *Outlook on Agriculture*, 45, 199–205.

Usher, D. (1987). Theft as a paradigm for departures from efficiency. *Oxford Economic Papers*, 39, 235–252.

Vaish, A. (2018). The prosocial functions of early social emotions: the case of guilt. *Current Opinion in Psychology*, 20, 25–29.

Van der Ploeg, F. (2011). Natural resources: Curse or blessing? *Journal of Economic*

- Literature*, 49, 366–420.
- Van der Ploeg, F., & Poelhekke, S. (2009). Volatility and the natural resource curse. *Oxford Economic Papers*, 61(4), 727–760.
- Van Dijk, E., & De Dreu, C. K. W. (2021). Experimental Games and Social Decision Making. *Annual Review of Psychology*, 72, 415–438.
- Van Dijk, E., Wilke, H., Wilke, M., & Metman, L. (1999). What information do we use in social dilemmas? Environmental uncertainty and the employment of coordination rules. *Journal of Experimental Social Psychology*, 35(2), 109–135.
- Van Lange, P. A. M., Balliet, D., Parks, C. D., & Van Vugt, M. (2015). *Social Dilemmas: The Psychology of Human Cooperation*. Oxford University Press.
- Van Lange, P. A. M., Bekkers, R., Schuyt, T. N. M., & Van Vugt, M. (2007). From Games to Giving: Social Value Orientation Predicts Donations to Noble Causes. *Basic and Applied Social Psychology*, 29(4), 375–384.
- Van Lange, P. A. M., Joireman, J., Parks, C. D., & Van Dijk, E. (2013). The psychology of social dilemmas: A review. *Organizational Behavior and Human Decision Processes*, 120(2), 125–141.
- Van Rossum, G., & Drake, F. L. (2009). *Python 3 Reference Manual*. CreateSpace.
- Von Neumann, J., & Morgenstern, O. (2007). *Theory of Games and Economic Behavior*. Princeton University Press.
- Von Uexkull, N., Croicu, M., Fjelde, H., & Buhaug, H. (2016). Civil conflict sensitivity to growing-season drought. *Proceedings of the National Academy of Sciences of the United States of America*, 113(44), 12391–12396.
- Vranceanu, R., & Dubart, D. (2019). Deceitful communication in a sender-receiver experiment: Does everyone have a price? *Journal of Behavioral and Experimental Economics*, 79, 43–52.

- Weimann, J., Yang, C.-L., & Vogt, C. (2000). An experiment on sequential rent-seeking. *Journal of Economic Behavior & Organization*, *41*(4), 405–426.
- Weisel, O., & Böhm, R. (2015). “Ingroup love” and “outgroup hate” in intergroup conflict between natural groups. *Journal of Experimental Social Psychology*, *60*, 110–120.
- Weisel, O., & Zultan, R. (2021). Perceptions of conflict: Parochial cooperation and outgroup spite revisited. *Organizational Behavior and Human Decision Processes*, *167*, 57–71.
- Williams, L. K. (2019). Guns yield butter? An exploration of defense spending preferences. *Journal of Conflict Resolution*, *63*, 1193–1221.
- Wit, A., & Wilke, H. A. M. (1998). Public good provision under environmental and social uncertainty. *European Journal of Social Psychology*, *28*(6), 249–256.
- Wittman, D. (2000). The wealth and size of nations. *The Journal of Conflict Resolution*, *44*(6), 868–884.
- Xu, H., Bègue, L., & Shankland, R. (2011). Guilt and guiltlessness: An integrative review. *Social and Personality Psychology Compass*, *5*(7), 440–457.
- Yang, J., Zhang, H., Ni, J., De Dreu, C. K. W., & Ma, Y. (2020). Within-group synchronization in the prefrontal cortex associates with intergroup conflict. *Nature Neuroscience*, *23*(6), 754–760.
- Züst, T., & Agrawal, A. A. (2017). Trade-offs between plant growth and defense against insect herbivory: An emerging mechanistic synthesis. *Annual Review of Plant Biology*, *68*, 513–534.

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## **Curriculum Vitae Lennart Reddmann**

Lennart Reddmann was born on 10th April 1988 in Solingen, Germany. In 2008, he received his Abitur from the August-Dicke-Gymnasium in Solingen. After completing his civilian service, Lennart went on to study Psychology in Groningen, Netherlands, and received his Bachelor's degree in 2013. He then had a brief stint as a consultant for an Executive Search firm in Berlin, Germany. In 2015, he returned to the Netherlands to pursue his Master's studies in Social & Organisational Psychology at the University of Leiden, obtaining his degree in 2017. From 2017 to 2018, he worked as a research assistant with various researchers in the Social, Economic, and Organisational Psychology Department at Leiden University. In 2018, he began his PhD under the supervision of prof.dr. Carsten de Dreu and prof.dr. Jörg Gross, investigating peaceful alternatives in asymmetrical conflict situations, and completed his dissertation in 2023.