ROUSE RELATIONAL OS™

Academic Foundations and HRI Validation

Peer-Reviewed Convergence · Human–Robot Interaction Validation Matrix · Bibliography

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PART 1

Academic Foundations

Independently Developed. Later Found to Converge.

The Rouse Relational OS™ was developed independently, through direct observation, before being compared against existing literature. When that comparison was made, its five structural regulators, its governing laws, and its diagnostic model were each found to align with decades of established, peer-reviewed research across developmental psychology, attachment theory, emotion regulation, and dyadic coping science.

This section maps that convergence — organised by the ROS™ component each body of research corroborates.

Environment

Supports the premise that layered external systems — economic, occupational, and social — shape relational functioning, and that stress in one domain spills into others.

Bronfenbrenner, U. (1979). The Ecology of Human Development. Harvard University Press.

Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-nurture reconceptualised in developmental perspective: A bioecological model. Psychological Review, 101(4), 568–586.

Conger, R. D., Wallace, L. E., Sun, Y., Simons, R. L., McLoyd, V. C., & Brody, G. H. (2002). Economic pressure in African American families. Developmental Psychology, 38(2), 179–193.

Kavanaugh, S. A., Neppl, T. K., & Melby, J. N. (2018). Economic pressure and depressive symptoms. Journal of Family Psychology, 32(7), 957–965.

French, K. A., Dumani, S., Allen, T. D., & Shockley, K. M. (2018). A meta-analysis of work-family conflict and social support. Psychological Bulletin, 144(3), 284–314.

Huang, Y., Mao, Y., & Zhan, Y. (2023). Spillover and crossover from work overload to spouse-rated work-to-family conflict. Family Relations.

Self

Validates emotional regulation, sleep quality, and social support as internal load-bearing capacities that govern behaviour under pressure.

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. Review of General Psychology, 2(3), 271–299.

Gross, J. J. (1998). Antecedent- and response-focused emotion regulation. Journal of Personality and Social Psychology, 74(1), 224–237.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation. Journal of Psychopathology and Behavioural Assessment, 26(1), 41–54.

Hallion, L. S., Steinman, S. A., Tolin, D. F., & Diefenbach, G. J. (2018). Psychometric properties of the Difficulties in Emotion Regulation Scale. Frontiers in Psychology, 9, 539.

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. Science, 241(4865), 540–545.

Uchino, B. N. (2006). Social support and health. Journal of Behavioural Medicine, 29(4), 377–387.

Hasler, B. P., & Troxel, W. M. (2010). Couples' nighttime sleep efficiency and concordance. Psychosomatic Medicine, 72(8), 794–801.

Mortar

Corroborates the behavioural compounds of Mortar — Respect, Honesty, Reliability, Trustworthiness, Boundaries, and Effort — and how interaction patterns predict relational stability over time.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualised as an attachment process. Journal of Personality and Social Psychology, 52(3), 511–524.

Mikulincer, M., & Shaver, P. R. (2019). Attachment orientations and emotion regulation. Current Opinion in Psychology, 25, 6–10.

Mikulincer, M., & Shaver, P. R. (2020). Enhancing the 'broaden and build' cycle of attachment security in adulthood. International Journal of Environmental Research and Public Health, 17(6), 2054.

Shaver, P. R., Mikulincer, M., & Cassidy, J. (2019). Attachment, caregiving in couple relationships, and prosocial behaviour. Current Opinion in Psychology, 25, 16–20.

Camanto, O. J., & Campbell, L. (2025). Trust in close relationships revisited. Journal of Social and Personal Relationships, 42(9), 2516–2544.

Gottman, J. M., & Levenson, R. W. (1992). Marital processes predictive of later dissolution. Journal of Personality and Social Psychology, 63(2), 221–233.

Gottman, J. M., & Levenson, R. W. (1999). What predicts change in marital interaction over time? Family Process, 38(2), 143–158.

Reciprocity

Maps how couples manage shared stress through dyadic coping, and how chronic caregiving or impairment affects a relational system's structural load.

Falconier, M. K., & Kuhn, R. (2019). Dyadic coping in couples: A conceptual integration and review. Frontiers in Psychology, 10, 571.

Falconier, M. K., Jackson, J. B., Hilpert, P., & Bodenmann, G. (2015). Dyadic coping and relationship satisfaction: A meta-analysis. Clinical Psychology Review, 42, 28–46.

Weitkamp, K., & Bodenmann, G. (2022). Couples coping together: A scoping review. Frontiers in Psychology, 13, 876455.

Landolt, S. A., Weitkamp, K., Roth, M., Sisson, N. M., & Bodenmann, G. (2023). Dyadic coping and mental health in couples: A systematic review. Clinical Psychology Review, 106, 102344.

Bertschi, I. C., Meier, F., & Bodenmann, G. (2021). Disability as an interpersonal experience. Frontiers in Psychology, 12, 624609.

Weitkamp, K., Feger, F., Landolt, S. A., Roth, M., & Bodenmann, G. (2021). Dyadic coping in couples facing chronic physical illness. Frontiers in Psychology, 12, 722740.

Time

Validates Law 10 — Time Amplifies What Already Exists — and the bidirectional nature of couples' shared, time-linked processes.

Gottman, J. M., & Levenson, R. W. (1999). What predicts change in marital interaction over time? Family Process, 38(2), 143–158.

Gottman, J. M., & Levenson, R. W. (1992). Marital processes predictive of later dissolution. Journal of Personality and Social Psychology, 63(2), 221–233.

Hasler, B. P., & Troxel, W. M. (2010). Couples' nighttime sleep efficiency and concordance. Psychosomatic Medicine, 72(8), 794–801.

Meadows, R., Venn, S., Hislop, J., Stanley, N., & Arber, S. (2005). Investigating couples' sleep. Journal of Sleep Research, 14(4), 377–386.

The Rouse OS Equation™ (ROSE™)

The mathematical structure of ROSE™ — Base Pressure minus Resource Absorption minus Stabiliser Dampening — draws on foundational research in person-context dynamics, economic pressure modelling, and dyadic buffering.

Corroborated by: Bronfenbrenner (1979); Bronfenbrenner & Ceci (1994); Conger et al. (2002); Kavanaugh et al. (2018); French et al. (2018); Falconier et al. (2015); House et al. (1988); and Uchino (2006).

The Eleven Laws of Relational Physics

The eleven laws are corroborated across three groupings of the research above:

Pressure, Transfer, and Environment (Laws 1, 5, 8) — Bronfenbrenner (1979); Bronfenbrenner & Ceci (1994); Conger et al. (2002); French et al. (2018).

Structure, Strain, and Limits (Laws 2, 3, 6, 7, 9) — Gottman & Levenson (1992, 1999); Camanto & Campbell (2025).

Capacity, Concentration, Time, and Repair (Laws 4, 10, 11) — Gross (1998); Gratz & Roemer (2004); Falconier et al. (2015); Huang et al. (2023); Hasler & Troxel (2010).

Diagnostic Standards

The Integrated Structural Scan follows recognised standards for diagnostic accuracy and patient-reported outcome measurement:

Bossuyt, P. M., Reitsma, J. B., Bruns, D. E., et al. (2015). STARD 2015: An updated list of essential items for reporting diagnostic accuracy studies. BMJ, 351, h5527.

Cohen, J. F., Korevaar, D. A., Altman, D. G., et al. (2016). STARD 2015 guidelines for reporting diagnostic accuracy studies: Explanation and elaboration. BMJ Open, 6(11), e012799.

Terwee, C. B., Prinsen, C. A. C., Chiarotto, A., et al. (2018). COSMIN methodology for evaluating content validity of patient-reported outcome measures. Quality of Life Research, 27(5), 1159–1170.

A Note on Development, Synthesis, and Quantification

A note on independence: This bibliography documents convergence, not derivation. The ROS™ framework was not built from this literature — it was built from thirty years of direct observation, then checked against it. The alignment shown here is retroactive validation, not a citation trail.

A note on synthesis: No single study below proposes this unified structure. Each researcher mapped one regulator in isolation — environment, self, bonding, reciprocity, or time — within their own field, without reference to the others. The Honeycomb Model is the synthesis: the first framework to treat these as one interdependent structure rather than five separate, unconnected literatures.

A note on quantification: No study below produces a single, actionable output. Each measures correlation within its own domain — a finding for a journal, not a signal a system can act on. The Rouse OS Equation™ (ROSE™) is what makes AI and robotic integration possible at all: it collapses five disconnected literatures into one calculable number a machine can read and respond to in real time. This is the framework's most distinct contribution — not the discovery of the underlying psychology, but the first quantification of it.

PART 2

Human–Robot Interaction Validation Matrix

Appendix: HRI Research Domains and ROS™ Structural Alignment

This section demonstrates how established Human–Robot Interaction (HRI) research domains validate individual components of the Rouse Relational OS™ while highlighting the absence of a unified structural diagnostic model. Each framework below is supported by peer-reviewed literature and mapped to corresponding structural elements within the ROS™.

Framework / Programme	Primary Focus	Standalone Capability	Honeycomb Alignment	Gap Filled by Honeycomb	Programme Benefit from Honeycomb
Trust in HRI(Hancock et al., 2011; Sanders et al., 2019)	Trust formation and reliance	Identifies performance, predictability, and anthropomorphism as drivers of trust	Mortar (respect, reliability), Reciprocity, Time	No structural model of trust formation or failure	Defines trust as output of consistent behaviour over time
Perceived Safety(Akalin et al., 2023)	User safety perception	Separates objective vs perceived safety	Environment, Self capacity, Mortar receptivity	No dynamic pressure-based model	Maps safety to environmental load and capacity
Acceptance Models(Pinto et al., 2025)	Technology adoption	Predicts initial user adoption	Self, Reciprocity, Mortar	No longitudinal degradation model	Explains decline through load accumulation
Explainable AI(Stange et al., 2022)	Transparency of system decisions	Improves predictability	Mortar (honesty), Reciprocity	Does not connect to trust structurally	Positions explainability as bonding input
Human Agency(Schoeller et al., 2021)	User control and autonomy	Models perception of control	Self, Reciprocity, Environment	No strain propagation model	Links loss of control to system instability
Collaborative Robotics(Hopko et al., 2023)	Human-robot teamwork	Measures workload and coordination	Reciprocity, Environment	No overload threshold modelling	Defines strain thresholds
Healthcare Robotics(Esterwood & Robert, 2021)	Long-term care interaction	Evaluates trust and engagement	Self vulnerability, Mortar, Time	No unified multi-domain model	Integrates pressure sources
Educational HRI(Tekerek et al., 2026)	Learning and development	Studies trust over time	Self, Mortar, Time	No amplification model	Introduces time as amplifier

Social Presence(Christoforakos et al., 2021)	Human-like interaction	Enhances engagement	Mortar, Reciprocity	Focuses on perception only	Links behaviour to stability

PART 3

HRI Adoption Bibliography

Rouse Relational OS™ Alignment by Domain

Foundational HRI Field

Zhang & Doyle (2023). Frontiers in Robotics and AI.

Esterwood, C., & Robert, L. (2021). Frontiers in Robotics and AI.

Tekerek, M., et al. (2026). Humanities and Social Sciences Communications.

Trust

Hancock, P. A., et al. (2011). A meta-analysis of factors affecting trust in human-robot interaction. Human Factors.

Sanders, T. L., et al. (2019). Trust in automation. Human Factors.

Oksanen, A., et al. (2020). Frontiers in Psychology.

Christoforakos, L., et al. (2021). Social presence in HRI. Frontiers in Robotics and AI.

Cominelli, L., et al. (2021). Scientific Reports.

Safety

Akalin, N., et al. (2023). Perceived safety in human-robot interaction. International Journal of Social Robotics.

Haney, J., & Liang, F. (2024). IISE Transactions.

Acceptance

Pinto, R., et al. (2025). Acceptance of robotics systems. Journal of Intelligent & Robotic Systems.

Schirren, R., et al. (2023). IJCARS.

Mlakar, I., et al. (2025). npj Digital Medicine.

Autonomy

Schoeller, F., et al. (2021). Human agency in intelligent systems. Frontiers in Systems Neuroscience.

Explainability

Stange, S., et al. (2022). Explainable AI in robotics. Frontiers in AI.

Hao, et al. (2026). Scientific Reports.

Collaboration

Hopko, S., et al. (2023). Human-robot collaboration. Applied Ergonomics.

Healthcare

Esterwood, C., & Robert, L. (2021). Frontiers in Robotics and AI.

Kim, et al. (2020).

Education

Tekerek, M., et al. (2026). Humanities and Social Sciences Communications.

Di Dio, C., et al. (2020).

Social Presence

Christoforakos, L., et al. (2021). Frontiers in Robotics and AI.

Gamboa-Montero, J. J., et al. (2025).

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