

Translational Research and School Neuropsychology

Alessandra Gotuzo Seabra¹, Roberto Lent², Debbie Gooch³, Emily K. Farran³

¹ Mackenzie Presbyterian University, São Paulo, São Paulo, Brazil

² Federal University of Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil

³ University of Surrey, Guildford, Surrey, United Kingdom

Author Note

Alessandra G. Seabra  <https://orcid.org/0000-0002-8373-7897>

Roberto Lent  <https://orcid.org/0000-0002-8989-4009>

Debbie Gooch  <https://orcid.org/0000-0002-1242-4754>

Emily K. Farran  <https://orcid.org/0000-0001-6409-0875>

Correspondence regarding this article should be sent to Alessandra G. Seabra, PPG-Ciências do Desenvolvimento Humano, prédio 28, Rua da Consolação, 930, São Paulo, SP, 01302-907. Email: alessandra.seabra@mackenzie.br

In recent decades, there has been a growing interest in translational research as a tool to reduce the distance between science and practice. Translational research is defined as the process of converting basic research discoveries into effective applications that generate benefits to the population (Woolf, 2008). This process is understood as a continuum that ranges from identifying fundamental mechanisms (e.g. biological, neural, cognitive or environmental mechanisms) in a given area to applying them in public policies, practice, processes, and products accessible to society (Sigman et al., 2014).

Although there is no full consensus regarding the stages that constitute translational research, it is common to classify them into four non-linear but interactive phases, allowing for a bidirectional flow in which research and practice inform one another (Rubio et al., 2010):

- T1 – From basic research to proof of concept: bringing initial experimental discoveries into pilot interventions;
- T2 – From proof of concept to evidence of efficacy: testing interventions in controlled studies and experimental trials;
- T3 – From efficacy to implementation: adapting effective interventions to real-world contexts, considering the diversity of application environments;
- T4 – Population-level impact evaluation: assessing large-scale effects and impacts at the level of public policy.

Although the term has emerged in the biomedical field, the application of the concept of translational research in education and neuropsychology is promising, especially in view of the need to base pedagogical interventions on scientific evidence (Guimarães & Lent, 2024). One possible area of translational research is educational neuropsychology, which involves asking how neuropsychological findings can be adapted and implemented through pedagogical activities in classrooms, respecting school and sociocultural reality.

Translating neuropsychology findings into school practices requires: a) Contextual adaptation of programs based on scientific evidence to local socioeconomic realities; b) Teacher training and professional development to ensure adequate use of the pedagogical practices developed based on neuropsychology; c) Systematic monitoring of the effects of the intervention in different school contexts; and d) Interdisciplinary collaboration between universities, schools, policy makers and other stakeholders at different stages of the process.

The phases of translational research described above do not all need to be carried out by a single individual or research group. They are best thought of as a collective and social enterprise, bringing together several protagonists to create a truly multidisciplinary ecosystem (Stokes, 2005). This requires involvement of key players in public policy and compatible funding to bring together research groups whose collective work will progress the four phases of translational research.

Translational transposition faces several barriers, such as the scarcity of material and human resources, the lack of continuous teacher training and the need for longitudinal evaluations (Fixsen et al., 2005). Newbury et al. (2023) highlight challenges with communication

and availability of robust assessment tools in some contexts and the importance of community engagement and ownership which can affect acceptability, fidelity and sustainability of an intervention. Additionally, as highlighted by Manches et al. (2025), translational research should consider factors such as a possible perceived lack of relevance of the research to the daily life of the classroom, difficulties in adapting the resources suggested by the researchers in the school context, lack of support or time for this implementation, and possible contextual differences. It is always necessary to consider the fundamental role of teachers, since the process of implementing research findings in a school context depends on how well the translational efforts make use of multi-disciplinary teams to link the science of learning to classroom activities and avoid oversimplifying scientific evidence/theory to enable teachers to interpret and adapt information as intended (Seidenberg et al. 2020). Also, a great challenge is to leverage the evidence-based interventions to a systemic (state, country) level, since this requires convincement of politicians and policymakers.

Despite the challenges, translational research can potentially produce results of great relevance, such as the development of university-school partnerships in the creation of culturally sensitive and evidence-based educational programs. In this sense, translational research can not only innovate, but also contribute to reducing inequalities in the country's educational system. It should be noted that several translational research initiatives have been carried out in Brazil (CpE Network, 2024; Ramacciotti et al., 2023; Seabra et al., 2025) and in the UK (Centre for Educational Neuroscience: <https://www.educationalneuroscience.org.uk/>; Wilkinson et al., 2019; Farran et al., 2024, 2025).

Translational research offers a conceptual and methodological framework which links scientific findings to classroom practice and helps develop knowledge of what can be done, when, and for which learners. There is substantial potential to use research findings to improve children's educational outcomes, but this remains largely unrealised. In Elementary School, for example, translating knowledge about reading, writing, mathematics, executive functions and other skills into pedagogical practices can improve learning for all, but may also contribute to equity in education through counteracting effects of socioeconomic disadvantage. Translational research also has the potential to further understand what can be done in early learning contexts prior to the start of formal education, given that many children are at risk of poor outcomes as soon as they start school due to environmental disadvantage and/or familial risk of learning differences. It is essential that public policies are based on practices supported by scientific evidence, so that teacher training, investment in education and pedagogical practices can, in fact, help transform the educational reality.

References

- Farran, E., McCarthy, S., Gilligan-Lee, K.A., Bates, K., Gripton, C. (2024). Translating Research to Practice: Practitioner Use of the Spatial Reasoning Toolkit. *Gifted Child Today*, 47. <https://doi.org/10.1177/10762175241242494>
- Farran, E. K., Gilligan-Lee, K., Mareschal, D., Zivkovic, M., Bartusevica, S., Bell, D. Jay, T., & Gilmore, C. (2025). Teacher delivered block construction training improves children's mathematics performance. *Mind, Brain, and Education*. <http://dx.doi.org/10.1111/mbe.70006>
- Fixsen, D. L., Naoom, S. F., Blase, K. A., Friedman, R. M., & Wallace, F. (2005). Implementation research: A synthesis of the literature. University of South Florida.
- Guimarães, M.Z. and Lent, R., orgs. (2024). Education has science. How Science Can Contribute to Education. Unesco Chair of Science for Education. Available in <https://www.catedraunescoce.org>
- Manches, A., Nygren, M., Price, S., & Roux, A. R. (2025). Challenges of translational education research: Teachers' interpretations of embodied learning. *Cogent Education*, 12(1), 2490443. <https://doi.org/10.1080/2331186X.2025.2490443>
- National Science Network for Education (CpE Network) (2024). 10 Years of Research in the Area of Science for Education. Available in <https://cienciaparaeducacao.org/producoes/da-rede-cpe/>
- Newbury, D. F., Mesa, C., Puglisi, M., Nash, M., Nag, S., Hulme, C., & Snowling, M. J., (2023) Challenges for implementation in diverse settings: reflections on two randomized controlled trials of educational interventions in South American communities, *Research Papers in Education*, 38:6, 966–986. DOI: 10.1080/02671522.2022.2065526
- Ramacciotti, M. C. C., Sousa, H., Silveira, H. G., Hulme, C., Snowling, M. J., Newbury, D. F., & Puglisi, M. L. (2023). Scaling up early language intervention in educational settings: First steps matter. *Oxford Review of Education*, 49(1), 29–47. <https://doi.org/10.1080/03054985.2022.2088488>
- Rubio, D. M., Schoenbaum, E. E., Lee, L. S., Schteingart, D. E., Marantz, P. R., Anderson, K. E., & Esposito, K. (2010). Defining translational research: Implications for training. *Academic Medicine*, 85(3), 470–475. <https://doi.org/10.1097/ACM.0b013e3181ccd618>
- Seabra, A. G., León, C. B. R., Gooch, D., Delorenzi, L., Carreiro, L. R. R., Teixeira, M. C. T. V., Becker, N., Dias, N. M., Fonseca, R. P., & Blascovi-Assis, S. M. (2025). Programa de intervenção interdisciplinar para Ensino Fundamental I (PIEEF-I): Conceitos teóricos (edição revisada). Memnon. <https://memnon.com.br/produto-detalle/programa-de-intervencao-interdisciplinar-para-ensino-fundamental-i-pieef-i-conceitos-teoricos>
- Seidenberg, M. S., Cooper Borkenhagen, M., & Kearns, D. M. (2020). Lost in translation? Challenges in connecting reading science and educational practice. *Reading Research Quarterly*, 55, S119–S130. <https://doi.org/10.1002/rrq.341>
- Sigman, M., Peña, M., Goldin, A. P., & Ribeiro, S. (2014). Neuroscience and education: Prime time to build the bridge. *Nature Neuroscience*, 17(4), 497–502. <http://dx.doi.org/10.1038/nn.3672>
- Stokes, D. E. (2005) *The Pasteur Quadrant: Basic Science and Technological Innovation*, Editora Unicamp, 248 pp.
- Wilkinson, H.R., Smid, C. Morris, S., Farran, E.K., Dumontheil, I., Mayer, S., Tolmie, A., Bell, D., Porayska-Pomsta, K., Holmes, W., Mareschal, D., Thomas, M.S.C. (2019). Domain-specific inhibitory control training to improve children's learning of counterintuitive concepts in mathematics and science. *Journal of Cognitive Enhancement*. <https://doi.org/10.1007/s41465-019-00161-4>
- Woolf, S. H. (2008). The meaning of translational research and why it matters. *JAMA*, 299(2), 211–213. <https://doi.org/10.1001/jama.2007.26>