REFERENCES

Anderson, J.R. (1980). *Cognitive psychology and its implications*. San Francisco, CA: W.H. Freeman and Company.

Arcavi, A. (1994). Symbol sense: Informal sense-making in formal mathematics. *For the Learning of Mathematics, 14*(3), 24–35.

Arcavi, A. (2005). Developing and using symbol sense in mathematics. *For the Learning of Mathematics*, *25*(2), 42–47.

Arcavi, A., Drijvers, P., & Stacey, K. (2017). *The teaching and learning of algebra: Ideas, insights and activities*. London / New York: Routledge.

Arievitch, I. M., & Haenen, J. P. (2005). Connecting sociocultural theory and educational practice: Galperin's approach. *Educational Psychologist*, *40*(3), 155–165.

Asiala, M., Cottrill, J., Dubinsky, E., & Schwingendorf, K. E. (1997). The development of students' graphical understanding of the derivative. *The Journal of Mathematical Behavior*, *16*(4), 399–431.

Ayalon, M., Watson, A., & Lerman, S. (2015). Functions represented as linear sequential data: Relationships between presentation and student responses. *Educational Studies in Mathematics*, *90*(3), 321–339.

Arzarello, F., Bazzini, L., & Chiappini, G. (2001). A model for analysing algebraic processes of thinking. In R. Sutherland, T. Rojano, A. Bell, & R. Lins (Eds.), *Perspectives on school algebra* (*Vol. 22,* pp. 61–81). Dordrecht, the Netherlands: Kluwer Academic Publishers.

Ball, L., Pierce, R., & Stacey, K. (2003). Recognising Equivalent Algebraic Expressions: An Important Component of Algebraic Expectation for Working with CAS. *International Group for the Psychology of Mathematics Education*, *4*, 15–22.

Barnard, A. D. & Tall, D. O. (1997). Cognitive units, connections and mathematical proof. In E. Pehkonen (Ed.), *Proceedings of the Twenty first International Conference for the Psychology of Mathematics Education (Vol.2,* pp. 41–48). Lahti, Finland.

Barsalou, L. W. (1992). Frames, concepts, and conceptual fields. In A. Lehrer & E. Kittay (Eds.), *Frames, fields, and contrasts: New essays in semantic and lexical organization.* (pp. 21–74). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Barsalou, L. W. (2008). Grounded cognition. *Annual Review of Psychology*, *59*, 617–645.

Bills, L, Dreyfus, T., Mason, J., Tsamir, P., Watson, A., & Zaslavsky, O. (2006, July). Exemplification in mathematics education. In J. Novotna, H. Moraova, M. Kratka, & N. Stehlikova (Eds.), *Proceedings of the 30th Conference of the International Group for the*

Psychology of Mathematics Education (*Vol. 1*, pp. 126–154). Prague, Czech Republic: Charles University.

Berliner, H., & Ebeling, C. (1989). Pattern knowledge and search: the SUPREM architecture. *Artificial Intelligence*, *38*(2), 161–198.

Bredeweg, B., & Forbus, K. D. (2003). Qualitative modeling in education. *AI magazine*, *24*(4), 35–35.

Breidenbach, D., Dubinsky, E., Hawks, J., & Nichols, D. (1992). Development of the process conception of function. *Educational Studies in Mathematics*, *23*(3), 247–285.

Burkhardt, H., & Swan, M. (2013). Task design for systemic improvement: principles and frameworks. In C. Margolinas (Ed.), *Task design in mathematics education*: *Proceedings of ICMI Study 22* (pp. 431–439). Oxford, United Kingdom: University of Oxford.

Campitelli, G., & Gobet, F. (2010). Herbert Simon's decision-making approach: Investigation of cognitive processes in experts. *Review of General Psychology*, *14*(4), 354–364.

Carlson, M., Jacobs, S., Coe, E., Larsen, S., & Hsu, E. (2002). Applying covariational reasoning while modeling dynamic events: A framework and a study. *Journal for Research in Mathematics Education*, *22*(5), 352–378.

Carlson, M. P., Madison, B., & West, R. D. (2015). A study of students' readiness to learn calculus. *International Journal of Research in Undergraduate Mathematics Education*, *1*(2), 209–233.

Chazan, D., & Yerushalmy, M. (2003). On appreciating the cognitive complexity of school algebra: Research on algebra learning and directions of curricular change. In J. Kilpatrick, W. G. Martin, & D. Shifter (Eds.), *A research companion to Principles and standards for school mathematics* (pp. 123–135). Reston, VA: NCTM.

Chi, M. T., Feltovich, P. J., & Glaser, R. (1981). Categorization and representation of physics problems by experts and novices. *Cognitive Science*, *5*(2), 121–152.

Chi, M. T., Glaser, R., & Rees, E. (1982). Expertise in problem solving. In R. Sternberg (Ed.), *Advances in the psychology of human intelligence* (pp.7–77). Hillsdale, NJ: Erlbaum.

Chi, M.T.H. (2006). Methods to assess the representations of experts' and novices' knowledge. In K. A. Ericsson, N. Charness, P. Feltovich, and R. R. Hoffman, R. R. (Eds.), *Cambridge handbook of expertise and expert performance* (pp. 223–242). Cambridge, United Kingdom: Cambridge University Press.

Chi, M. T. H. (2011). Theoretical perspectives, methodological approaches, and trends in the study of expertise. In Y. Li, & G. Kaiser (Eds.), *Expertise in mathematics instruction: Advancing* *research and practice from an international perspective* (pp. 17–39). New York, NY: Springer.

Collins, A. (2006). Cognitive apprenticeship. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (pp. 47–60). Cambridge, United Kingdom: Cambridge University Press.

Confrey, J., & Smith, E. (1995). Splitting, covariation, and their role in the development of exponential functions. *Journal for Research in Mathematics Education*, *26*(1), 66–86.

Crowley, L., & Tall, D. O. (1999). The roles of cognitive units, connections and procedures in achieving goals in college algebra. In O. Zaslavsky (Ed.), *Proceedings of the 23rd Conference of PME, (Vol. 2*, pp. 225–232). Rotterdam, the Netherlands: Sense.

Davis, R. B. (1983). Diagnosis and evaluation in mathematics instruction: Making contact with students' mental representations. In C. Smith (Ed.), *Essential knowledge for beginning educators* (pp. 101–111). Washington, DC: American Association of Colleges of Teacher Education.

De Corte, E. (2010). Historical developments in the understanding of learning. In D. Hanna, I. David, & B. Francisco (Eds.), *Educational research and innovation the nature of learning using research to inspire practice: Using research to inspire practice* (pp. 35–60). Paris, France: OECD Publishing.

De Groot, A. D. (1965). *Thought and choice in chess*. The Hague, The Netherlands: Mouton.

De Groot, A. D., Gobet, F., & Jongman, R. W. (1996). *Perception and memory in chess: Studies in the heuristics of the professional eye*. Assen, the Netherlands: Van Gorcum & Co.

De Jong, T., & Ferguson-Hessler, M. G. (1986). Cognitive structures of good and poor novice problem solvers in physics. *Journal of Educational Psychology*, *78*(4), 279–288.

Derry, S. J. (1996). Cognitive schema theory in the constructivist debate. *Educational Psychologist*, *31*(3-4), 163–174.

Drijvers, P. (1996). L'Hopital's weight problem and the TI-92. *The SAC Newsletter, 1*, 71–80.

Drijvers, P., & Doorman, M. (1996). The graphics calculator in mathematics education. *The Journal of Mathematical Behavior*, *15*(4), 425–440.

Drijvers, P. (2002). Learning mathematics in a computer algebra environment: obstacles are opportunities. *Zentralblatt für Didaktik der Mathematik*, *34*(5), 221–228.

Drijvers, P. (2003). *Learning algebra in a computer algebra environment: Design research on the understanding of the concept of parameter*. Utrecht, the Netherlands: CD Beta Press.

Drijvers, P., Goddijn, A., & Kindt, M. (2011). Algebra education: Exploring topics and themes. In P. Drijvers (Ed.), *Secondary algebra education. Revisiting topics and themes and exploring the unknown* (pp. 5–26). Rotterdam, Boston, Taipei: Sense Publishers.

Drijvers, P., Van Streun, A., & Zwaneveld, B. (Red.) (2012). *Handboek Wiskundedidactiek.* Utrecht, the Netherlands: Epsilon.

Drijvers., P., & Kop, P. (2012). Variabelen en vergelijkingen. In P. Drijvers, A. van Streun & B. Zwaneveld (Eds.), *Handboek wiskundedidactiek* (pp. 53–83). Amsterdam, the Netherlands: Epsilon.

Duval, R. (1999). Representation, vision and visualization: Cognitive functions in mathematical thinking. Basic issues for learning. In F. Hitt & M. Santos (Eds.), *Proceedings of the 21st annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 3–26). Cuernavaca, Morelos.

Duval, R. (2006). A cognitive analysis of problems of comprehension in a learning of mathematics. *Educational Studies in Mathematics*, *61*(1–2), 103–131.

Eisenberg, T., & Dreyfus, T. (1994). On understanding how students learn to visualize function transformations. In E. Dubinsky, A. Schoenfeld, & J. Kaput (Eds.), *Research in collegiate mathematics education* (*Vol. 1*, pp. 45–68). Providence, RI: American Mathematical Society.

Ericsson, K. A. (2006). Protocol analysis and expert thought: Concurrent verbalizations of thinking during experts' performance on representative tasks. In Ericsson, K.A. Charness, N., Feltovich, P.J., & Hoffman, R.R. (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 223–241). Cambridge, United Kingdom: Cambridge University Press.

Ernest, P. (1990). The meaning of mathematical expressions: Does philosophy shed any light on psychology? *British Journal for Philosophy of Science 41,* 443–460.

Even, R. (1998). Factors involved in linking representations of functions. *The Journal of Mathematical Behavior*, *17*(1), 105–121.

Eysenck, M. W., & Keane, M. T. (2015). *Cognitive psychology: A student's handbook*. Taylor & Francis, Philadelphia, PA.

Fey, J. T. (1990). 'Quantity', in L. A. Steen (Ed.), *On the shoulders of giants: New approaches to numeracy* (pp. 61–94). Washington, D.C.: National Academy Press.

Field, A. P. (2012). *Discovering statistics using SPSS (4th ed.).* London: Sage Publications Ltd.

Forbus, K. D. (1996). Qualitative Reasoning. In A. B. Tucker (Ed.), *The Computer Science and Engineering Handbook* (pp. 715–733). Boca Raton, FL: CRC.

Friedlander, A., & Arcavi, A. (2012). How to practice it: An integrated approach to algebraic skills. *Mathematics Teacher*, *105*(8), 608–614.

Gobet, F. (1997). A pattern-recognition theory of search in expert problem solving. *Thinking & Reasoning*, *3*(4), 291–313.

Gobet, F., & Simon, H. A. (1996). The roles of recognition processes and look-ahead search in time-constrained expert problem solving: Evidence from grand-master-level chess. *Psychological science*, *7*(1), 52–55.

Gobet, F. (1998). Chess players' thinking revisited. *Swiss Journal of Psychology, 57,*18–32.

Goldenberg, E. P. (1988). Mathematics, metaphors, and human factors: Mathematical, technical, and pedagogical challenges in the educational use of graphical representation of functions. *The Journal of Mathematical Behavior, 7*(2), 135–173.

Goldenberg, E., Lewis, P., O'Keefe, J. (1992). Dynamic representation and the development of a process understanding of function. In G. Harel & E. Dubinsky (Eds.), *The concept of function: Aspects of epistemology and pedagogy* (pp. 235–260). Mathematical Association of America, Washington, D.C.

Goldenberg, P., & Mason, J. (2008). Shedding light on and with example spaces. *Educational Studies in Mathematics*, *69*(2), 183–194.

Gray, E. M., & Tall, D. O. (1994). Duality, ambiguity, and flexibility: A "proceptual" view of simple arithmetic. *Journal for Research in Mathematics Education*, *25*(2), 116–140.

Heid, M. K., Thomas, M. O. J., & Zbiek, R. M. (2013). How might computer algebra systems change the role of algebra in the school curriculum. In A. J. Bishop, M. A. Clements, C. Keitel, J. Kilpatrick, & F. K. S. Leung (Eds.), *Third International Handbook of Mathematics Education* (pp. 597–641). New York, NY: Springer.

Hennessy, S., Fung, P., & Scanlon, E. (2001). The role of the graphic calculator in mediating graphing activity. *International Journal of Mathematical Education in Science and Technology*, *32*(2), 267–290.

Hoch, M., & Dreyfus, T. (2005). Students' difficulties with applying a familiar formula in an unfamiliar context. In H. L. Chick & J. L. Vincent (Eds.), *Proceedings of the 29th Conference of the International Group for the Psychology of Mathematics Education* (*Vol. 3*, pp. 145–152). Melbourne: PME.

Hoch, M., & Dreyfus, T. (2010). Developing Katy's algebraic structure sense, In V. Durand-Guerrier, S. Soury-Lavergne, & F. Arzarello (Eds.), *Proceedings of the 6th Congress of the European Society for Research in Mathematics* (pp. 529–538), Lyon: CERME.

Janvier, C. (1987). *Problems of representation in the teaching and learning mathematics*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Jonassen, D. H., Beissner, K., & Yacci, M. (1993). *Structural knowledge: Techniques for representing, conveying, and acquiring structural knowledge*. Hillsdale: Lawrence Erlbaum Associates.

Kaput, J. J. (1998). Representations, inscriptions, descriptions and learning: A kaleidoscope of windows. *The Journal of Mathematical Behavior*, *17*(2), 265–281.

Keller, B. J. (1994). *Symbol sense and its development in two computer algebra system environments*. (Western Michigan University, 1993). Dissertation Abstracts International, *54*: 5704.

Kenney, R. (2008) *The influence of symbols on pre-calculus students' problem solving goals and activities*. Doctoral dissertation. North Carolina State University. https://pqdtopen.proquest.com/doc/304553264.html?FMT=ABS.

Kieran, C. (2006). Research on the learning and teaching of algebra. In A. Gutiérrez & P. Boero (Eds.), *Handbook of research on the psychology of mathematics education: Past, present and Future* (pp. 11–49). Rotterdam: Sense.

Kieran, C., & Drijvers, P. (2006). The co-emergence of machine techniques, paper-and-pencil techniques, and theoretical reflection: A study of CAS use in secondary school algebra. *International Journal of Computers for Mathematical Learning*, *11*(2), 205–263.

Kilpatrick, J., & Izsak, A. (2008). A history of algebra in the school curriculum. In C.E. Greens & R. Rubenstein (Eds.), *Algebra and algebraic Thinking in school mathematics, seventieth yearbook* (pp. 3–18). Reston, VA: NCTM.

Kilpatrick, J., Swafford, J. O., & Findell, B. (Eds.). (2001). *Adding it up: Helping children learn mathematics*. Washington, D.C.: National Academy Press.

Kindt, M. (2011). Principles of practice. In P. Drijvers (Ed.), *Secondary algebra education. Revisiting topics and themes and exploring the unknown* (pp. 137–178). Rotterdam, Boston, Taipei: Sense Publishers.

Kirschner, P.A., & Van Merriënboer, J.J.G. (2008). Ten steps to complex learning: A new approach to instruction and instructional design. In T. L. Good (Ed.), *21st Century Education: A Reference Handbook* (pp. 244–253). Thousand Oaks, CA: Sage.

Knuth, E. J. (2000). Student understanding of the Cartesian connection: An exploratory study. *Journal for Research in Mathematics Education*, *31*(4), 500–507.

Kop, P., Janssen, F., Drijvers, P., Veenman, M., & Van Driel, J. (2015). Identifying a framework for graphing formulas from expert strategies. *The Journal of Mathematical Behavior*, *39*, 121–134.

Kop, P., Janssen, F., Drijvers, P., & van Driel, J. (2017). Graphing formulas: Unraveling experts' recognition processes. *The Journal of Mathematical Behavior*, *45*, 167–182.

Kop, P., Janssen, F., Drijvers, P., & van Driel, J. (2020a). Promoting insight into algebraic formulas through graphing by hand. *Mathematical Thinking and Learning*, 1-20. https://doi.org/10.1080/10986065.2020.1765078

Kop, P., Janssen, F., Drijvers, P., & van Driel, J. (2020b). The relation between graphing formulas by hand and students' symbol sense. *Educational Studies in Mathematics*. https://doi.org/10.1007/s10649-020-09970-3

Landa, L.N. (1983). Descriptive and prescriptive theories of learning and instruction: an analysis of their relationships and interactions. In C.M. Reigeluth (Ed.), *Instructional-design theories and models: An overview of their current status* (pp. 55–73). Hillsdale, NJ: Lawrence Erlbaum Associates.

Leinhardt, G., Zaslavsky, O., & Stein, M. K. (1990). Functions, graphs, and graphing: Tasks, learning, and teaching. *Review of Educational Research*, *60*(1), 1–64.

Lesh, R. (1999). The development of representational abilities in middle school mathematics. In I. E. Sigel (Ed.), *Development of Mental Representation: Theories and Application* (pp. 323–350). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Marshall, S. P. (1995). *Schemas in problem solving*. Cambridge, United Kingdom: Cambridge University Press.

Mason, J. (2002). *Researching your own practice: The discipline of noticing*. London, United Kingdom: Routledge.

Mason, J. (2003). On the structure of attention in the learning of mathematics. *Australian Mathematics Teacher, 59*(4), 17–25.

Mason, J. (2004/2008). Doing ≠ Construing and Doing + Discussing ≠ Learning: The Importance of the Structure of Attention. ICME 10 Regular Lecture. In M. Niss (Ed.), *Proceedings of ICME 10 CD*. Roskilde, Denmark: IMFUFA.

Merrill, M. D. (2013). *First principles of instruction: Identifying and designing effective, efficient and engaging instruction*. Hoboken, NJ: Pfeiffer/John Wiley & Sons.

Moore, K. C., & Thompson, P. W. (2015). Shape thinking and students' graphing activity. In T. Fukawa-Connelly, N. E. Infante, K. Keene, & M. Zandieh (Eds.), *Proceedings of the 18th Meeting of the MAA Special Interest Group on Research in Undergraduate Mathematics Education* (pp. 782–789). Pittsburgh, PA: RUME.

Moschkovich, J., Schoenfeld, A. H., & Arcavi, A. (1993). Aspects of understanding: On multiple perspectives and representations of linear relations and connections among them. In T. A. Romberg, E. Fennema, & T. P. Carpenter (Eds.), *Integrating research on the graphical representation of functions* (pp. 69–100). Hillsdale, NJ: Lawrence Erlbaum Associates.

NCTM–National Council of Teachers in Mathematics (2000). *Principles and standards for school mathematics*. http://www.nctm.org/standards.

Nistal, A. A., Van Dooren, W., Clarebout, G., Elen, J., & Verschaffel, L. (2009). Conceptualising, investigating and stimulating representational flexibility in mathematical problem solving and learning: a critical review. *ZDM—The International Journal on Mathematics Education*, *41*(5), 627–636.

Oehrtman, M., Carlson, M., & Thompson, P. W. (2008). Foundational reasoning abilities that promote coherence in students' function understanding. In M. P. Carlson & C. Rasmussen (Eds.), *Making the connection: Research and teaching in undergraduate mathematics education* (pp. 27–42). Washington, D.C.: Mathematical Association of America.

Philipp, R., & Martin, W. & Richgels, G. (1993). Curricular implications of graphical representations of functions. In T.A. Romberg, E. Fennema, & T. P. Carpenter (Eds.), *Integrating research on the graphical representation of functions* (pp. 239–278). Hillsdale, NJ: Lawrence Erlbaum Associates.

Pierce, R., & Stacey, K. (2004). Monitoring Progress in Algebra in a CAS Active Context: Symbol Sense, Algebraic Insight and Algebraic Expectation. *International Journal for Technology in Mathematics Education*, *11*(1), 3–11.

Pierce, R., & Stacey, K. (2007). Developing algebraic nsight. *Mathematics Teaching Incorporating Micromath*, *203*, 12–16.

Polya, G. (1945). *How to solve it*. Princeton, NJ: Princeton University Press.

Presmeg, N. C. (1998). Metaphoric and metonymic signification in mathematics. *The Journal of Mathematical Behavior*, *17*(1), 25–32.

Radford, L. (2004). Syntax and meaning. In M. J. Hoines & A. B. Fuglestad (Eds.), *Proceedings of the 28th Conference of the International Group for the Psychology of Mathematics Education* (*Vol. 1*, pp. 161–166). Bergen, Norway: PME.

Ruiz-Primo, M. A., & Shavelson, R. J. (1996). Problems and issues in the use of concept maps in science assessment. *Journal of Research in Science Teaching*, *33*(6), 569–600.

Ruthven, K. (1990). The influence of graphic calculator use on translation from graphic to symbolic forms. *Educational Studies in Mathematics, 21*(5), 431–450.

Ruthven, K., Deaney, R., & Hennessy, S. (2009). Using graphing software to teach about algebraic forms: A study of technology-supported practice in secondary-school mathematics. *Educational Studies in Mathematics*, *71*(3), 279–297.

Saariluoma, P. (1992). Error in chess: The apperception-restructuring view. *Psychological Research*, *54*(1), 17–26.

Sandefur, J., Mason, J., Stylianides, G. J., & Watson, A. (2013). Generating and using examples in the proving process. *Educational Studies in Mathematics*, *83*(3), 323–340.

Schoenfeld, A. H. (1978). Presenting a strategy for indefinite integration. *The American Mathematical Monthly*, *85*(8), 673–678.

Schoenfeld, A.H. (1985). Cognitive Science and Mathematics Education. In A. Schoenfeld (Ed.), *Cognitive Science and Mathematical Education*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Schoenfeld, A. H. (1992). Learning to think mathematically: Problem solving, metacognition, and sense making in mathematics. In D. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 334–370). New York, NY: Mcmillan.

Schwarz, B. B., & Hershkowitz, R. (1999). Prototypes: Brakes or levers in learning the function concept? The role of computer tools. *Journal for Research in Mathematics Education, 30*(4), 362–389.

Schwartz, J., & Yerushalmy, M. (1992). Getting students to function on and with algebra. In E. Dubinsky, & G. Harel (Eds.), *The concept of function: Aspects of epistemology and pedagogy* (pp. 261–289). Washington, DC: Mathematical Association of America. https://www.researchgate.net/publication/266439744.

Sfard, A. (1991). On the dual nature of mathematical conceptions: Reflections on processes and objects as different sides of the same coin. *Educational Studies in Mathematics*, *22*(1), 1–36.

Sfard, A. & Linchevski, L. (1994). The gains and the pitfalls of reification: The case of algebra. *Educational Studies in Mathematics, 26*, 191–228.

Slavit, D. (1997). An alternate route to the reification of function. *Educational Studies in Mathematics*, *33*(3), 259–281.

Star, J. R., & Stylianides, G.J. (2013). Procedural and Conceptual Knowledge: Exploring the Gap Between Knowledge Type and Knowledge Quality. *Canadian Journal of Science, Mathematics, and Technology Education, 13*(2), 169–181.

Stylianou, D.A. (2002). On the interaction of visualisation and analysis: the negotation of a visual representation in expert problem solving. *Journal of Mathematical Behavior, 21*, 303–317.

Stylianou, D. A., & Silver, E. A. (2004). The role of visual representations in advanced mathematical problem solving: An examination of expert-novice similarities and differences. *Mathematical Thinking and Learning*, *6*(4), 353–387.

Stylianou, D. A. (2011). An examination of middle school students' representation practices in mathematical problem solving through the lens of expert work: Towards an organizing scheme. *Educational Studies in Mathematics*, *76*(3), 265–280.

Swan, M. (2005). *Standards Unit-Improving learning in mathematics: challenges and strategies*. Nottingham, United Kingdom: University of Nottingham. https://www.ncetm.org.uk/files/224/improving_learning_in_mathematicsi.pdf.

Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction*, *4*(4), 295–312.

Sweller, J., van Merriënboer, J. J., & Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational Psychology Review, 31*(2), 1–32.

Tall, D., & Vinner, S. (1981). Concept image and concept definition in mathematics with particular reference to limits and continuity. *Educational Studies in Mathematics*, *12*(2), 151–169.

Thomas, M. O., Wilson, A. J., Corballis, M. C., Lim, V. K., & Yoon, C. (2010). Evidence from cognitive neuroscience for the role of graphical and algebraic representations in understanding function. *ZDM—The International Journal on Mathematics Education*, *42*(6), 607–619.

Thomas, M. O. J., & Hong, Y. Y. (2001). Representations as conceptual tools: Process and structural perspectives, In M. van den Heuvel-Panhuizen (Ed.), *Proceedings of The 25th Conference of the International Group for the Psychology of Mathematics Education* (pp. 257–264). Utrecht, the Netherlands.

Thompson, P. W. (2013). In the absence of meaning…. In Leatham, K. (Ed.), *Vital directions for mathematics education research* (pp. 57–93). New York, NY: Springer.

Thompson, P. W., & Carlson, M. P. (2017). Variation, covariation, and functions: Foundational ways of thinking mathematically. In J. Cai (Ed.), *Compendium for research in mathematics education* (pp. 421–456). Reston, VA: NCTM.

Tsamir, P., & Bazzini, L. (2004). Consistencies and inconsistencies in students' solutions to algebraic 'single-value' inequalities. *International Journal of Mathematical Education in Science and Technology*, *35*(6), 793–812.

Turşucu, S., Spandaw, J., & de Vries, M. J. (2018). Search for Symbol Sense Behavior: Students in Upper Secondary Education Solving Algebraic Physics Problems. *Research in Science Education, 48*(5), 1–27.

Van Merriënboer, J. J., Clark, R. E., & De Croock, M. B. (2002). Blueprints for complex learning: The 4C/ID-model. *Educational technology research and development*, *50*(2), 39–61.

Van Stiphout, I. M., Drijvers, P., & Gravemeijer, K. (2013). The development of students' algebraic proficiency. *International Electronic Journal of Mathematics Education*, *8*(2–3), 62–80.

Van Streun, A. (1989). *Heuristisch wiskunde onderwijs*. Dissertation. Groningen, the Netherlands: University Press.

Veenman, M. V., Van Hout-Wolters, B. H., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and Learning*, *1*(1), 3–14.

Vinner, S., & Dreyfus, T. (1989). Images and definitions for the concept of function. *Journal for Research in Mathematics Education, 20*(5), 356–366.

Watson, A., & Mason, J. (2002). Extending example spaces as a learning/teaching strategy in mathematics. In A. Cockburn & E. Nardi (Eds.). *Proceedings of the 26th Conference of the International Group for the Psychology of Mathematics Education* (*Vol. 4*, pp. 377–385). Norwich, United Kingdom: PME.

Watson, A., & Mason, J. (2005). *Mathematics as a constructive activity: Learners generating examples*. Mahwah, NJ: Lawrence Erlbaum, Inc.

Wijers, M & Kemme, S. (2000). Welke algebra heb je nodig in 4 VWO? *Nieuwe Wiskrant, 20*(1), 22–25.

Yerushalmy, M. (1997). Reaching the unreachable: Technology and the semantics of asymptotes. *International Journal of Computers for Mathematical Learning*, *2*(1), 1–25.

Yerushalmy, M., & Gafni, R. (1992). Syntactic manipulations and semantic interpretations in algebra: The effect of graphic representation. *Learning and Instruction*, *2*(4), 303–319.

Zandieh, M.J., & Knapp, J. (2006). Exploring the role of metonymy in mathematical understanding and reasoning: The concept of derivative as an example. *The Journal of Mathematical Behavior, 25*(1), 1–17.

Zbiek, R. M., & Heid, M. K. (2011). Using technology to make sense of symbols and graphs and to reason about general cases. In T. Dick & K. Hollebrands (Eds.), *Focus on reasoning and sense making: Technology to support reasoning and sense making* (pp. 19–31). Reston, VA: NCTM.