

Peter A. Edelsbrunner

peter.edelsbrunner@ifv.gess.ethz.ch

ETH Zurich

Department of Humanities, Social and Political Sciences

Research on Learning and Instruction

RZ H 16

Clausiusstrasse 59

CH-8092 Zurich/Switzerland

Telephone: +41 44 632 46 46

Homepage: <http://bit.ly/PeterAEETH>

orcid: 0000-0001-9102-1090

CURRENT RESEARCH

Mixture modeling in educational and developmental research
Scientific thinking throughout the lifespan
Complexity in concept learning
Statistical and psychometric practices in educational and developmental research

EMPLOYMENT HISTORY

Since 2017 Postdoctoral Researcher & Lecturer: ETH Zurich, Switzerland.
2012 - 2017 Research Assistant & Lecturer: ETH Zurich, Switzerland.
2011 - 2012 Student teaching assistant: University of Graz, Department of Psychology.
2009 Social- and learning-caretaker: Association of Foster-Parents Graz, Austria.
2005 - 2012 Paramedic and ambulance driver. Austrian Red Cross.

EDUCATION

2012-2017 Doctoral studies in Learning and Instruction: ETH Zurich, Switzerland.
2007 - 2012 Diploma studies (MSc) in Psychology: University of Graz, Austria.
2012 Internship: Policy Research Group, University of Cambridge, UK.
2011 Semester Abroad: University of Padova, Italy.
2011 Internship: School Psychological Service Leibnitz, Austria.
2009 Internship: Cognitive Science Section, University of Graz, Austria.
2005 High-school diploma: Federal Gymnasium Kirchengasse, Graz, Austria.

TEACHING ACTIVITIES

2017 *Designing Learning Environments for School: Educational Foundations*: Lecture at ETH Zurich.
2015 - 2017 *Educational Science: Assessment and Support of Knowledge Development in the Classroom*: Seminar at ETH Zurich.
2014 - 2017 *Research Methods in Educational Science*: Seminar at ETH Zurich.
2013 - 2015 *Human Learning*: Lecture at ETH Zurich.
2011 - 2012 *Research Methods in Developmental Psychology, Health Psychology, Differential Psychology*: Seminars at University of Graz; teaching assistant.
Master Thesis Supervision (exp. 2017): Tamara Kruppenacher, University of Zurich.

PUBLICATIONS

- Ziegler, E., **Edelsbrunner, P. A.**, & Stern, E. (in press). The relative merits of explicit and implicit learning of contrasted algebra principles. *Educational Psychology Review*. doi:10.1007/s10648-017-9424-4
- Etz, A., Gronau, Q. F., Dablander, F., **Edelsbrunner, P. A.**, & Baribault, B. (2017). How to become a Bayesian in eight easy steps: An annotated reading list. *Psychonomic Bulletin & Review*. doi:10.3758/s13423-017-1317-5 PsyArXiv preprint available from <http://bit.ly/23RWN6y>
- Soyylmaz, D., Griffin, L. M., Hernández Martin, M., Kucharsky, Š., Peycheva, E. D., Vaupotič, N., & **Edelsbrunner, P. A.** (2017). Formal and informal learning and first-year Psychology students' development of scientific thinking: A two-wave panel study. *Frontiers in Psychology*, 8:133. doi:10.3389/fpsyg.2017.00133
- Edelsbrunner, P. A.**, Schalk, L., Schumacher, R., & Stern, E. (2015). Pathways of conceptual change: Investigating the influence of experimentation skills on conceptual knowledge development in early science education. *Proceedings of the 37th Annual Conference of the Cognitive Science Society*, 620-625. Austin: Texas.
- Agan, M. L. F., Costin, A. S., Deutz, M. H. F., **Edelsbrunner, P. A.**, Zalis, L. & Franken, A. (2015). Associations between risk behaviour and social status in European adolescents. *European Journal of Developmental Psychology*, 12, 189-203. doi:10.1080/17405629.2014.975790
- Edelsbrunner, P. A.**, & Schneider, M. (2013). Modelling for prediction vs. modelling for understanding: Commentary on Musso et al. (2013). *Frontline Learning Research*, 2, 99-101. doi:10.14786/flr.v1i2.74

SUBMITTED/IN PREPARATION

- Edelsbrunner, P. A.**, Schalk, L., Schumacher, R., & Stern, E. (submitted). Variable control and conceptual change: A large-scale quantitative study in primary school. PsyArXiv preprint available from <http://osf.io/preprints/psyarxiv/escqa/>
- Hickendorff, M., **Edelsbrunner, P. A.**, McMullen, J., Schneider, M., & Trezise, K.. (submitted). Informative Tools for Characterizing Individual Differences in Learning: Latent Class, Latent Profile, and Latent Transition Analysis. PsyArXiv preprint available from <http://osf.io/preprints/psyarxiv/jmtcv>
- Schalk, L., **Edelsbrunner, P. A.**, Deiglmayr, A., Schumacher, R., & Stern, E (submitted). Early inquiry-based science education matters beyond content learning.
- Ziegler, E., **Edelsbrunner, P. A.**, & Star, J. R. (submitted). Preventing interference: Reordering complexity in the learning of new concepts.
- Ziegler, E., **Edelsbrunner, P. A.**, & Stern, E. (submitted). Teacher-directed instruction outperforms self-directed learning of contrasted algebra concepts.
- Edelsbrunner, P. A.**, & Deiglmayr, A. (in preparation). Elementary school students' verbal and non-verbal knowledge about experimental design.
- Edelsbrunner, P. A.**, & Dablander, F. (in preparation). Psychometric issues in research on scientific reasoning.
- Kucharsky, Š., Griffin, L. M., Hernández Martin, M., Peycheva, E. D., Soyylmaz, D., Vaupotič, N., & **Edelsbrunner, P. A.** (in preparation). Misconceptions about Statistical Inference: Nature and Nurture in Psychology Students Across Europe.
- Soyylmaz, D., Griffin, L. M., Hernández Martin, M., Kucharsky, Š., Peycheva, E. D., Vaupotič, N., & **Edelsbrunner, P. A.** (in preparation). Developmental Interrelations in Scientific Thinking, Need For Cognition, Science Self-Efficacy, Formal and Informal Learning, and Research Aspirations in First-Year Psychology Students Across Europe.
- Vaci, N., **Edelsbrunner, P. A.**, Bilalic, F., Stern, E., Neubauer, A. C., & Grabner, R. (in preparation). Intelligence and the Development of Chess Expertise.
- Schwichow, M., **Edelsbrunner, P. A.** (in preparation). Associations of the Control-of-Variables Strategy with Science Content throughout Secondary School: An Integrated Variable- and Person-Focused Approach.

THESES

- Edelsbrunner, P. A.** (2017). *Domain-General and Domain-Specific Scientific Thinking in Childhood: Measurement and Educational Interplay*. Doctoral thesis, ETH Zurich.
- Edelsbrunner, P. A.** (2012). *The Assessment of Spatial Ability in Adolescence*. Diploma thesis, University of Graz.

NON-REFEREED PUBLICATIONS

- Edelsbrunner, P. A. (2017).** Introducing jamovi: Free and open statistical software combining ease of use with the power of R. *JEPS Bulletin* (Mar 23rd, 2017). Available from <http://blog.efpsa.org>.
- Edelsbrunner, P. A., & Thurn, C. (2015).** Structural Equation Modeling: What is it, what does it have in common with hippie music, and why does it eat cake to get rid of measurement error? *JEPS Bulletin* (Dec 14th, 2015). Available from <http://blog.efpsa.org>
- Edelsbrunner, P. A. (2014).** Bayesian Statistics: What is it and Why do we Need it? *JEPS Bulletin* (Nov 7th, 2014). Available from <http://blog.efpsa.org>
- Edelsbrunner, P. A. (2012).** Advice for the Next Generation of Researchers in Psychology from an Experienced Editor. *JEPS Bulletin* (Nov 30th, 2012). Available from <http://blog.efpsa.org>
- Edelsbrunner, P. A., & Bohak, S. (2012).** EFPSA-Kongress in Dänemark [The EFPSA-Congress in Denmark]. *Psychologie in Österreich, 32*, 224.
- Edelsbrunner, P. A. (2011).** Research as an international project. *JEPS Bulletin* (Dec 1st, 2011). Available from <http://blog.efpsa.org>

ACADEMIC SERVICES

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| Since 2016 | Associate editor: <i>Journal of European Psychology Students</i> . |
| Since 2014 | President: <i>Association of Scientific Staff</i> , ETH Zurich. |
| 2015 - 2017 | Coordinating Board: <i>EARLI Special Interest Group on Conceptual Change</i> . |
| 2014 - 2017 | Delegate: <i>Department Conference</i> , ETH Zurich. |
| 2015 - 2016 | Director: <i>Peer Mentoring Group for Methods and Statistics</i> . University of Zurich, Switzerland. |
| 2015 - 2016 | Working Group: <i>Good Scientific Practice</i> . ETH Zurich. |
| 2015 | Appointment committee: <i>Professor of Learning and Technology with a Focus on Higher STEM Education</i> . ETH Zurich. |
| 2011 – 2012 | Executive Board: <i>European Federation of Psychology Students' Associations</i> . |
| 2008 – 2010 | Freshmen's Tutor: Department of Psychology, University of Graz. |
| Review | Developmental Psychology, <i>European Journal of Psychological Assessment</i> , <i>Journal of European Psychology Students</i> , <i>Learning and Individual Differences</i> , <i>Mind, Brain & Education</i> , <i>CogSci Conference</i> , <i>EARLI Conference</i> , <i>JURE Conference</i> . |

MEMBERSHIPS

Friends of the Stanford Encyclopedia of Philosophy (SEP), John Dewey Society (JDS), Psychometric Society, EARLI SIG3

ORGANISATION OF CONFERENCES

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| 2018 | Organisation committee: <i>2nd PhD Summer School on Conceptual Change: Conceptual Change and Epistemic Cognition</i> . Klagenfurt, Austria. |
| 2016 | Organisation committee: <i>1st PhD Summer School & 10th Conference on Conceptual Change: Conceptual Change meets Other Disciplines</i> . Florina, Greece. |
| 2014 | Organisation committee: <i>8th EFPSA European Summer School: The Psychology of Work: Research on Occupation & Organisations</i> . Mellau, Austria. |
| 2012 | Organisation committee: <i>6th EFPSA European Summer School: The Biased Brain: Research in Decision-Making</i> . Vila Nova de Foz Côa, Portugal. |

GRANTS, SCHOLARSHIPS, AWARDS

2015	Project Grant: <i>Peer Mentoring Group for Methods and Statistics</i> . Graduate Campus.
2014	Project Grant: <i>Peer Mentoring Group for Methods and Statistics</i> . Graduate Campus.
2012	Merit Scholarship; Faculty of Natural Sciences, University of Graz.
2011	Scholarship; Erasmus Student Exchange Programme.
Travel grants	Swiss Academy for Humanities and Social Sciences; REASON Graduate School; ZIB Academy Kiel

ACADEMIC INVITATIONS

2017	Invited talk: <i>Modeling Scientific Reasoning: Psychometric Issues and Developmental Heterogeneity</i> . Department of Psychology, University of Amsterdam, Netherlands.
2017	Workshop: Improving Common Statistical Models in Psychology with Structural Equation Modeling. Junior Researcher Programme, University of Cambridge, UK.
2016	Invited talk: <i>General Factor Modelling in Psychology: Indeterminacy Problems and Alternative Routes</i> . Society for Cognitive Science and Philosophy, University of Brno, Czech Republic.
2016	Workshop: <i>Bayesian Statistics in Psychology: Theory and Application of Classical and Some Trendy Models</i> . Junior Researcher Programme, University of Cambridge, UK.
2016	Workshop: <i>Bayesian Statistics in Psychology: Theory and Application of Some Classical and Trendy Models, including SEM</i> . 5th Psihozjij Psychology Congress, University of Zagreb, Croatia.
2015	Invited talk: <i>Rasch Modeling Practices and Theory Development: Psychometric Issues in Research on Scientific Reasoning</i> . University of Trier, Germany.
2015	Invited talk: <i>Reductionist Practices in Research on Scientific Thinking. How much can the Rasch Model tell us?</i> University of Munster, Germany.
2015	Workshop: <i>Bayesian Statistics in Psychological Settings</i> (co-teaching with Fabian Dablander). Junior Researcher Programme, University of Cambridge, UK.
2015	Workshop: <i>The Bayesian Revolution: Why and How</i> (co-teaching with Fabian Dablander). 29th Congress of the European Federation of Psychology Students' Associations, Srní, Czech Republic.
2015	Workshop: <i>Structural Equation Modeling</i> . 29th Congress of the European Federation of Psychology Students' Associations, Srní, Czech Republic.
2014	Workshop: <i>Publication-Ready Graphics with R and ggplot2</i> . Association of Scientific Staff, ETH Zurich.
2014	Workshop: <i>Mixture Models in Psychology: Latent Class Analysis and Extensions</i> . Junior Researcher Programme, University of Cambridge, UK.
2013	Invited talk: <i>Die Modellierung quantitativer und qualitativer Wissensentwicklung im Kindesalter [Modelling Quantitative and Qualitative Knowledge Development in Childhood]</i> . University of Munster, Germany.
2013	Invited talk: <i>Konzeptwechsel in der Biologie [Conceptual change in biology]</i> . University of Zurich, Switzerland.

CONTRIBUTIONS TO CONFERENCES

- Edelsbrunner, P. A.**, Soyylmaz, D., Griffin, L. M., Hernández Martin, M., Kucharsky, Š., Peycheva, E. D., & Vaupotič, N., (2017). Misconceptions about Statistical Inference in Psychology Students from Four European Countries: Correlations with relevant Learning Experiences. Talk at the *Pedagogical and Developmental Psychology Meeting*. Munster, Germany.
- Edelsbrunner, P. A.**, & Deiglmayr, A. (2017). Argumentation about the Control of Variables-Strategy: A large-scale Study in Primary School. Talk at the *17th Biennial Conference of the European Association for Research in Learning and Instruction*. Tampere, Finland.
- Schalk, L., Stern, E., Kapur, M., Grabner, R. H., Kokkonen, T., **Edelsbrunner, P. A.**, Renkl, A., Greiff, S., & McGrane, J. (2017). From neurons to nations and back: Translating across levels of explanation in educational research. Roundtable at the *17th Biennial Conference of the European Association for Research in Learning and Instruction*. Tampere, Finland.
- Ziegler, E., **Edelsbrunner, P. A.**, & Star, J. (2017). Confronting confusion of similar algebraic concepts by teaching multiplication before addition. Talk at the *17th Biennial Conference of the European Association for Research in Learning and Instruction*. Tampere, Finland.
- Peteranderl, S., Deiglmayr, A., Stern, E., **Edelsbrunner, P. A.**, & Schumacher, R. (2017). Assessment of misconceptions about experimentation in primary school children. Talk at the *17th Biennial Conference of the European Association for Research in Learning and Instruction*. Tampere, Finland.
- Schumacher, R., **Edelsbrunner, P. A.**, Schalk, L., Deiglmayr, A., & Stern, E. (2017). How regular elementary school teachers can boost their student's conceptual knowledge in physics Talk at the *17th Biennial Conference of the European Association for Research in Learning and Instruction*. Tampere, Finland.
- Edelsbrunner, P. A.**, Soyylmaz, D., Griffin, L. M., Hernández Martin, M., Kucharsky, Š., Peycheva, E. D., & Vaupotič, N., & (2017). Scientific Thinking in Psychology Students: A two-wave panel study. Poster & Talk at the *6st Junior Researcher Programme Conference*, Cambridge, UK.
- Soyylmaz, D., Griffin, L. M., Hernández Martin, M., Kucharsky, Š., Peycheva, E. D., Vaupotič, N., & **Edelsbrunner, P. A.** (2017). Dare to Think Scientifically: A two-wave panel study. Poster at the *1st Junior Researcher Programme Meeting*, Madrid, Spain.
- Edelsbrunner, P. A.**, Deiglmayr, A., Schalk, L., Schumacher, R., & Stern, E. (2016). Eine grossangelegte Untersuchung des Verständnisses und der Argumentation zu experimentellen Designs bei Grundschulkindern [A large-scale investigation of primary school students' understanding and argumentation about experimental designs]. Talk at the *50th Conference of the German Association of Psychology*, Leipzig, Germany.
- Edelsbrunner, P. A.**, & Dablander, F. (2016). Psychometric Issues in Research on Scientific Thinking: What can the Rasch model tell us? Talk at the *50th Conference of the German Association of Psychology*, Leipzig, Germany.
- Stern, E., Schumacher, R., **Edelsbrunner, P. A.**, Schalk, L., & Deiglmayr, A. (2016). The impact of domain-specific learning in physics on scientific reasoning skills in elementary school children. Talk at the *31st International Congress of Psychology*, Yokohama, Japan.
- Edelsbrunner, P. A.** (2016). Quantitative Approaches to Scientific Thinking and Conceptual Change in Childhood. Talk at the *1st PhD Summer School on Conceptual Change*, Florina, Greece.
- Ziegler, E., **Edelsbrunner, P. A.**, & Stern, E. (2016). Instruction or discovering of crucial principles in mathematics learning. Talk at the *11th Biennial Conference EARLI SIG11- Teaching and Teacher Education: Diversity and Inclusion as a Challenge for Teacher Education*. Zurich, Switzerland.
- Edelsbrunner, P. A.**, & Dablander, F. (2016). Zugänge zur Rasch Modellierung in der Forschung zum Wissenschaftlichen Denken: Eine Review- und Simulationsstudie [Approaches to Rasch Modeling in research on scientific thinking: A review and simulation study]. Poster at the *12th Conference of the Austrian Association for Psychology*. Innsbruck, Austria.
- Edelsbrunner, P. A.**, Schalk, L., Schumacher, R., & Stern, E. (2015). Experimentation Skills and Conceptual Knowledge Development in Early Science Education: A Latent Transition Analysis. Talk at the *12th Meeting of the Interest Group Methods & Evaluation of the German Psychological Society*. Jena, Germany.
- Edelsbrunner, P. A.**, Schalk, L., Schumacher, R., & Stern, E. (2015). The influence of experimentation skills on the development of physics knowledge in primary school. Talk at the *16th Biennial Conference of the European Association for Research in Learning and Instruction*. Limassol, Cyprus.
- Stern, E., **Edelsbrunner, P. A.**, Schumacher, R., Schalk, L., & Deiglmayr, A. (2015) Physics instruction in elementary school can boost general experimentation skills. Talk at the *16th Biennial Conference of the European Association for Research in Learning and Instruction*. Limassol, Cyprus.

- Edelsbrunner, P. A.,** Schalk, L., Schumacher, R., & Stern, E. (2015). Pathways of Conceptual Change: Investigating the Influence of Experimentation Skills on Conceptual Knowledge Development in Early Science Education. Talk at the *37th Annual Conference of the Cognitive Science Society*. Pasadena, USA.
- Dablander, F., & **Edelsbrunner, P. A.** (2015). Item Response Theory Harming Research Progress? The Influence of Uninformed Statistical Practices on a Blooming Research Field. Poster at the *4th Junior Researcher Programme Conference*. Cambridge, UK.
- Edelsbrunner, P. A.,** & Dablander, F. (2015). Statistical and theoretical reductionism in research on scientific thinking: How much can the Rasch model tell us? Talk at the *13th European Conference on Psychological Assessment*. Zurich, Switzerland.
- Edelsbrunner, P. A.,** Deiglmayr, A., Schalk, L., Schumacher, R., & Stern, E. (2015). The Development of Physics Knowledge in Elementary School: Relations with Cognitive Skills. Poster at the *1st REASON Spring School on the Assessment of Scientific Reasoning and Argumentation*. Munich, Germany.
- Edelsbrunner, P. A.,** Schalk, L., & Stern, E. (2014). Abstract Reasoning in Maths and Non-Maths Students. Poster at the *15th Conference of the International Society for Intelligence Research*. Graz, Austria.
- Edelsbrunner, P. A.** (2014). Sustainability of Science Instruction in Childhood: Teaching Children About Air and Air Pressure. Poster at the *3rd EFPSA Junior Researcher Programme Conference*. Cambridge, UK.
- Edelsbrunner, P. A.** (2014). Psychometric Evaluation of a Questionnaire for Large-Scale Assessment of Basic Experimentation Skills in Childhood. Talk at the *18th Conference of the Junior Researchers of EARLI*. Nicosia, Cyprus.
- Edelsbrunner, P. A.** (2014). Development of an Instrument for Large-Scale Assessment of Experimentation Skills in Childhood. Talk at the *18th Conference of the Junior Researchers of EARLI*. Nicosia, Cyprus.
- Edelsbrunner, P. A.** (2014). Design und Interpretation von Versuchsplänen im Kindes- und Jugendalter: Entwicklung eines multiple-choice-Instruments [Design and interpretation of experimental designs in childhood and adolescence: Development of a multiple-choice instrument]. Talk at the *11th Conference of the Austrian Association for Psychology*. Vienna, Austria.
- Edelsbrunner, P. A.,** Deiglmayr, A., & Schalk, L. (2014). Experimentation skills: Shares of general and specific abilities. Poster at the *2nd Conference of the Society for Empirical Educational Research*. Frankfurt, Germany.
- Edelsbrunner, P. A.,** Schalk, L., Schumacher, R., & Stern, E. (2013). Short-term benefits of learning physics in elementary schools. Talk at the *15th Biennial Conference of the European Association for Research in Learning and Instruction*. Munich, Germany.
- Franken, A., Agan, M. L. F., Buzila, A. S., Deutz, M. H. F., **Edelsbrunner, P. A.,** & Zalis, L. (2013). Risk behaviour, classroom behaviour and social status in a european sample of late adolescents. Talk at the *2nd EFPSA Junior Researcher Programme Conference*. Cambridge, UK.
- Edelsbrunner, P. A.,** & Schalk, L. (2013). Exploring children's knowledge about hypothesis testing and control of variables. Poster at the *2nd EFPSA Junior Researcher Programme Conference*. Cambridge, UK.
- Franken, A., Agan, M. L. F., Buzila, A. S., Deutz, M. H. F., **Edelsbrunner, P. A.,** & Zalis, L. (2013). Risk Behaviour, Classroom Behaviour, and Social Status in European Adolescents. Poster presented at the *2nd EFPSA Junior Researcher Programme Conference*. Cambridge, UK.
- Edelsbrunner, P. A.,** Schalk, L., Schumacher, R., & Stern, E. (2013). Knowledge Structure Changes Towards Understanding Buoyancy Force. Poster at the *10th Congress of Licentiate- Master- and Doctorate Students (LiMaDoKo)*. University of Zurich, Switzerland.
- Franken, A., Agan, M. L. F., Buzila, A. S., Deutz, M. H. F., **Edelsbrunner, P. A.,** & Zalis, L. (2012). What Moderates the Association between Risk Behavior and Popularity in Adolescence? Talk at the *1st EFPSA Junior Researcher Programme Conference*. Cambridge, UK.
- Franken, A., Agan, M. L. F., Buzila, A. S., Deutz, M. H. F., **Edelsbrunner, P. A.,** Ralic, L., & Zalis, L. (2012). Associations between Popularity and Risk Behaviour in Adolescence: A European Study. Talk at the *26th Congress of the European Federation of Psychology Students' Associations (EFPSA)*. Lolland, Denmark.