

Claudio Zandonella Callegher, Ph.D.

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Research Interests

Application of Bayesian approach and new statistical methods in psychology:

- Bayesian model comparison to evaluate and compare informative hypotheses
- Formalization of models and prior distributions according to theoretical and research hypotheses
- Elicitation of experts' knowledge to formalize priors about effects of interest
- Evaluation of statistical inference errors in the case of underpowered studies (small sample size)
- Use of STAN programming language for Bayesian analysis

Education

- 2018 – 📖 **Ph.D. in Psychological Sciences**, University of Padua, Italy.
Project: *Predicting social-emotional adjustment in childhood: a Bayesian approach with informative priors*. Supervisors: Gianmarco Altoè, Livio Finos.
- 2016 – 2018 📖 **M.Sc. Psychology (with honors)**, University of Padua, Italy.
Thesis title: *Analyzing the role of father attachment in middle childhood: a Bayesian approach*.
Supervisor: Gianmarco Altoè.
- 2013 – 2016 📖 **B.Sc. Psychological sciences and techniques (with honors)**, University of Padua, Italy.
Thesis title: *Proximity: evidence of possession in childhood*. Supervisor: Teresa Farroni.

Research Publications

Journal Articles

- 1 Altoè, G., Bertoldo, G., **Zandonella Callegher, C.**, Toffalini, E., Calcagnì, A., Finos, L. & Pastore, M. (2020). Enhancing Statistical Inference in Psychological Research via Prospective and Retrospective Design Analysis. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.02893>
- 2 Benavides-Varela, S., **Zandonella Callegher, C.**, Fagiolini, B., Leo, I., Altoè, G. & Lucangeli, D. (2020). Effectiveness of digital-based interventions for children with mathematical learning difficulties: A meta-analysis. *Computers & Education*, 157, 103953. <https://doi.org/10.1016/j.compedu.2020.103953>
- 3 Valori, I., McKenna-Plumley, P. E., Bayramova, R., **Zandonella Callegher, C.**, Altoè, G. & Farroni, T. (2020). Proprioceptive accuracy in Immersive Virtual Reality: A developmental perspective (A. Senju, Ed.). *PLOS ONE*, 15(1), e0222253. <https://doi.org/10.1371/journal.pone.0222253>
- 4 **Zandonella Callegher, C.** & Altoè, G. (2020). Data and supplemental material of the paper “Effectiveness of digital-based interventions for children with mathematical learning difficulties: A meta-analysis”. *Data in Brief*, 31, 105976. <https://doi.org/10.1016/j.dib.2020.105976>

Journal Articles (Submitted)

- 1 Agnoli, F., Melchiorre, F., **Zandonella Callegher, C.** & Altoè, G. (n.d.). Stereotype Threat Effects on Italian Girls' Mathematics Performance: A Failure to Replicate. *Developmental Psychology*.

- 2 Bayramova, R., Valori, I., McKenna-Plumley, P. E., **Zandonella Callegher, C.** & Farroni, T. (n.d.). Integration of Vision and Proprioception Facilitates Encoding but not Storage: An Immersive Virtual Reality Study. *Psychological Research*.
- 3 Bertoldo, G., **Zandonella Callegher, C.** & Altoè, G. (n.d.). Designing Studies and Evaluating Research Results: Type M and Type S Errors for Pearson Correlation Coefficient. *Meta-Psychology*.
- 4 Fadda, D., Pellegrini, M., Vivanet, G. & **Zandonella Callegher, C.** (n.d.). Effects of digital games on student motivation in mathematics: A meta-analysis in K-12. *Educational Research*.

Conference Proceedings

- 1 Altoè, G., **Zandonella Callegher, C.**, Toffalini, E. & Pastore, M. (2020). Incorporating Expert Knowledge in Structural Equation Models: Applications in Psychological Research, In *50th Scientific Meeting of the Italian Statistical Society*, Pisa, Italy. In preparation.

Software

- 1 **Zandonella Callegher, C.**, Pastore, M., Andreella, A., Vesely, A., Toffalini, E., Bertoldo, G. & Altoè, G. (2020). *PRDAbeta: Prospective and Retrospective Design Analysis* (Version 0.1.900). <http://doi.org/10.5281/zenodo.3630733>
- 2 **Zandonella Callegher, C.**, Toffalini, E. & Altoè, G. (2019c). *Eliciting Effect Size - Shiny App*. <http://doi.org/10.5281/zenodo.2564852>

Talks

- 1 **Zandonella Callegher, C.**, Marci, T. & Altoè, G. (2020). *Verba volant, mathematica manent: Formalizing psychological theories as models*. Cognitive Science Arena (7-8 February 2020; Brixen, Italy).
- 2 **Zandonella Callegher, C.** (2019). *Experts' Elicitation*. Psicostat seminar at the Department of Statistical Sciences, University of Bologna (7 May 2019; Bologna, Italy).
- 3 **Zandonella Callegher, C.**, Toffalini, E. & Altoè, G. (2019a). *Elicitazione e utilizzo del parere degli esperti (transl. Elicitation and formalization of experts' knowledge)*. XXV AIP National Congress Experimental section, Italian association of psychology (18-20 September 2019; Milan, Italy).
- 4 **Zandonella Callegher, C.**, Toffalini, E. & Altoè, G. (2019d). *Heights Elicitation*. International Winter School "Beyond $p < .05$: Modern statistical approaches in psychological science" (18-22 February 2019; Padova, Italy).

Posters

- 1 **Zandonella Callegher, C.**, Vesely, A., Andreella, A., Bertoldo, G., Toffalini, E., Altoè, G. & Pastore, M. (2020). PRDA package: Enhancing Statistical Inference via Prospective and Retrospective Design Analysis. useR!2020 (July, 2020; Munich, Germany).
- 2 Valori, I., McKenna-Plumley, P. E., Bayramova, R., **Zandonella Callegher, C.**, Altoè, G. & Farroni, T. (2019a). Accuratezza Propriocettiva nella Realtà Virtuale Immersiva: Una Prospettiva Evolutiva (transl. Proprioceptive Accuracy in Immersive Virtual Reality: An Evolutionary Perspective). Giornate di aggiornamento sull'uso degli strumenti in Psicologia Clinica dello Sviluppo (8-9 March 2019; Bologna, Italy).
- 3 Valori, I., McKenna-Plumley, P. E., Bayramova, R., **Zandonella Callegher, C.**, Altoè, G. & Farroni, T. (2019b). Visione e Propriocezione nella Realtà Virtuale Immersiva: Una Prospettiva Evolutiva (transl. Vision and Proprioception in Immersive Virtual Reality: An Evolutionary Perspective). Brains meet Digital Enterprises (20 October 2019; Padua, Italy).
- 4 **Zandonella Callegher, C.**, Marci, T. & Altoè, G. (2019). The role of mother and father attachment in children's socioemotional-adjustment: A Bayesian model comparison approach. XIX European Conference on Developmental Psychology (Athens, Greece, 29 August-1 September 2019).

- 5 **Zandonella Callegher, C.**, Toffalini, E. & Altoè, G. (2019b). Eliciting and formalizing experts' knowledge about effect sizes. Conference, Society for the Improvement of Psychological Science (7-9 July, 2019; Rotterdam, the Netherlands).
- 6 **Zandonella Callegher, C.**, Toffalini, E. & Altoè, G. (2019e). Quantificare l'effetto di interesse (trad. Quantify plausible effect size). National Conference (4 October, 2019; Padua, Italy).
- 7 **Zandonella Callegher, C.**, Marci, T. & Altoè, G. (2018). Relazioni tra attaccamento paterno e problemi emotivo-comportamentali nella media infanzia: Un'analisi bayesiana (transl. Relation between father attachment and socio-emotional problems in the middle childhood: A Bayesian approach). XXV AIP National Congress section of Developmental and Educational Psychology, Italian association of psychology (17-19 September 2019; Turin, Italy).

Courses and Conferences

Courses

- 2020 ▶ *Introduction to Generalized Additive Models with R and mgcv* (30 July, 2020; webinar).
- ▶ *Best Practices for Writing Reproducible Code* (11 March, 2020; Utrecht, the Netherlands).
- 2019 ▶ *Summer School on Statistical Methods for Linguistics and Psychology*. Advanced Bayesian methods using Stan: hierarchical modeling, multinomial processing trees, measurement error models, modeling censored data, finite mixture models, model selection and hypothesis testing (9-13 September 2019; Potsdam, Germany).
- ▶ *StanCon2019*, Tutorial for hierarchical modeling and model selection with Stan. Tutorial for Population and ODE-based models using Stan and Torsten (20-21 August 2019; Cambridge, UK).
- ▶ *Theory and Methods of Inference*. PhD course held by Prof. A. Salvan at the doctoral programme in Statistics at University of Padua (64 hours).
- ▶ *Sheffield ELicitation Framework (SHELF) Training*. Training held by Prof. T. O'Hagan about elicitation of probability distributions for uncertain quantities from experts (8-9 April 2019; Sheffield, UK).
- ▶ *Beyond $p < .05$: Modern statistical approaches in psychological science*. International Winter School about recent perspectives on statistical methods in psychological science: critical aspects of Null Hypothesis Significance Testing, open science, pre-registered studies, Bayesian approach, data mining and big data (18-22 February 2019; Padova, Italy).
- 2018 ▶ *Functional Analysis*. PhD course held by Prof. A. Cesaroni at the doctoral programme in Statistics at University of Padua (24 hours).

Conferences

- 2020 ▶ *useR!2020* (July 2020; Munich, Germany)
- ▶ *European R users meeting* (eRum; 17-20 June 2020; Milan, Italy)
- ▶ *Cognitive Science Arena* (7-8 February 2020; Brixen, Italy).
- ▶ *Bayesian Non-parametrics for Complex Data* (24 January 2020; Padua, Italy).
- 2019 ▶ *I Psychometrics (M-PSI/03) National Conference* (4 October, 2019; Padua, Italy).
- ▶ *XXV AIP National Congress Experimental section*, Italian association of psychology (18-20 September 2019; Milan, Italy).
- ▶ *IV SIPS International Conference*, Society for the Improvement of Psychological Science (7-9 July, 2019; Rotterdam, the Netherlands).
- 2018 ▶ *XXV AIP National Congress section of Developmental and Educational Psychology*, Italian association of psychology (17-19 September 2019; Turin, Italy).

Experience in Research and Teaching

- 2019 ▶ Supplementary teaching (10 hours) in the course held by Prof. A. Calcagni, Psychological Testing (PSP6075525) A.Y. 2019/20, University of Padua, Italy.
- 2018 ▶ Member of the organizing committee of the International Winter School 2019, *Beyond $p < .05$: Modern statistical approaches in psychological science*, University of Padua, Italy.
 - ▶ Pre-graduate internship (4 months) at Medè SNC of Boscolo Casella Vassilaki, via Monte Lungo 3, Padova. Study of clinical cases concerning psychopathology in childhood and adolescence.
- 2016 ▶ Pre-graduation internship (5 months) at the Department of Developmental Psychology and Socialization, University of Padua under the supervision of Professor Teresa Farroni. Study of indices of possession in childhood through visual preference. Data collection and analysis.

Miscellaneous Experience

Awards and Achievements

- 2018 ▶ Winner of a PhD scholarship in Psychological Sciences (XXIV cycle, 2018-2021), funded by the University of Padua, Italy (€ 15,343.28 yearly).
 - ▶ Winner of "Bando Mille e un lode 2017/2018" (€ 1,000), University of Padua, Italy.
- 2014 ▶ Winner of "Erasmus+ School of Psychology" (€ 2,800), University of Padua, Italy. Host university University of Chester, UK.
- 2012 ▶ Winner of "Concorso n.40 borse di studio, 2 borse aggiuntive e n.40 premi per l'iscrizione ai corsi di laurea in Matematica a.a. 2012-13" (€ 400), Istituto di Alta Matematica F. Severi (INdAM).

Skills

Languages	Italian - mother tongue; English - excellent listening and reading, good speaking and writing (C1); German: basic listening and reading (A1).
Coding	R, Tidyverse, Shiny, STAN, R-markdown, \LaTeX , Git, <code>sQL</code> , Docker, Python.
Data analysis	Experience in classic statistical methods and Bayesian approach.
Web Dev	Hugo, Go, <code>HTML</code> , <code>CSS</code> .

References

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Padova, 18th August 2020

SIGNATURE*

*In compliance with the GDPR and the Italian Legislative Decree no. 196 dated 30/06/2003, I hereby authorize you to use and process my personal details contained in this document

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