

# SANDER VAN DE CRUYS

## PERSONAL INFORMATION

*Born in Belgium, 19 March 1982*

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## LEITMOTIV

One of the reasons I get up in the morning (or stay up late at night) is to gain fundamental insight in the sane and insane mind, and in the brain that realizes it. In my scientific work I'm guided by the view of the brain as a prediction engine, continuously and proactively anticipating incoming sensory inputs. I use it to better understand our emotions, our sense of curiosity and aesthetics, and our goal-directed behavior. My other, intersecting fascination is with internet technology and the new possibilities it provides in connecting people to each other and to accessible, reliable information. I'm particularly interested in how humans interact with increasingly intelligent (and predictive) technology, and in how this interaction (re)ignites questions about what it means to be human. I love to write about all these topics, both for laymen and expert audiences.

## WORK & RESEARCH EXPERIENCE

	<i>2019–now</i>	Post-doctoral researcher, BRAIN & COGNITION
<i>KU Leuven</i>		Funded by a Methusalem grant to Johan Wagemans (METH/14/02) Project title: "Preferences need inferences: The role of exposure, learning and curiosity in (aesthetic) appreciation"; Skills developed: see next item.
	<i>2015–2019</i>	FWO Post-doctoral fellow, BRAIN & COGNITION
<i>KU Leuven</i>		FWO Post-doctoral fellow (Funded by the Flanders Research Fund) Project title: "Deficits in uncertainty processing in autism? Testing a new cognitive theory for autism based on high, inflexible precision of prediction errors". Skills developed: Teaching workshops on programming (python, R) · Programming interactive visual experiments in python and javascript (online) · Carrying out cognitive and affective tests with human participants · Writing scientific papers · Data manipulation, visualization and (oral) presentation · Data-analysis (generalized linear mixed models, Bayesian analysis, signal detection analysis, psychophysiological signal processing) · Coordinating collaborative research projects · Master student supervisions · Teaching (Methods in Psychology) · Outreach: Editor of the Leuven Autism Research consortium (LAuRes) newsletter · Peer-reviewing for multiple academic journals (Nature Communications, Psychological Bulletin, Psychological Review, Cortex, Cognition, Cognition & Emotion, PLOS One, Proceedings of the Royal Society B: Biology, Vision Research, Nature Scientific Reports, Philosophical Psychology, Clinical Psychological Science, i-Perception, Developmental Science, Art & Perception, Autism journal, Autism Research)
	<i>2015–2015</i>	Researcher, BRAIN & COGNITION

KU Leuven

Post-doctoral researcher (KU Leuven PDM funding)

2008–2014      Researcher, LABORATORY OF EXPERIMENTAL  
PSYCHOLOGY

KU Leuven

Full time research to obtain a PhD in Psychology. Doctoral Thesis: *To err and err, but less and less – Predictive coding and affective value in perception, art, and autism*

Advisor: Prof. Dr. Johan WAGEMANS

2010–2011      Research Intern, CENTER FOR VISUAL  
COGNITION

Copenhagen  
University

Full time research internship as part of the master in psychology (Erasmus exchange program).

2007–2008      Web designer, KU LEUVEN

KU Leuven

Design and implementation of the website of the Institute for International and European Policy.

## EDUCATION

Computational  
Psychiatry Course

2016      University of Zurich, Switzerland

Organized by the Translational Neuromodeling Unit

2008–2014      University of Leuven, Belgium

Doctor of  
Psychology (PhD)

Doctoral Thesis: *To err and err, but less and less – Predictive coding and affective value in perception, art, and autism*

Advisor: Prof. Dr. Johan WAGEMANS

Master of  
Psychology

2004–2008      University of Leuven, Belgium

MAGNA CUM LAUDE · *Specialization: Theory and research*

Research internship: 8 months at the Center for Visual Cognition in Copenhagen University, Denmark. Advisors: Prof. Dr. Claus BUNDESEN, Prof. Dr. G  ry VAN OUTRYVE D'YDEWALLE

Master's thesis: Pharmacological research with mice on the effect of an NMDA receptor antagonist (AP5) on fear learning, extinction (conditioned emotional response) and anxiety/exploration tests (elevated plus maze).

Advisor: Prof. Dr. Rudi D'HOOGHE

Extra course credits: artificial intelligence (neural networks) ·

object-oriented programming · cognitive modelling (PhD course in Copenhagen, Denmark) · philosophy of neuroscience · summer school in affective sciences (Chandolin, Switzerland).

Master of Social  
and Cultural  
Anthropology

2002–2004      University of Leuven, Belgium

CUM LAUDE

Master's thesis: *Viruses of the mind? Cognitive and evolutionary approaches in the study of religion*

Advisor: Prof. Dr. Valeer NECKEBROUCK

Bachelor of  
Psychology

2000–2002      University of Leuven, Belgium

CUM LAUDE

Secondary diploma

1994-2000

Sint-Lambertusscholen, Westerlo, Belgium

Latin-Mathematics

#### COMPUTER SKILLS

Basic

C, JAVA, PHP, vector graphics (Inkscape), machine learning & data mining, UX design, data journalism

Intermediate

L<sup>A</sup>T<sub>E</sub>X, CMS (Drupal, Wordpress), photo/video editing

Advanced

PYTHON (NUMPY, PANDAS, SCIPY, PSYCHOPY), R Statistical Computing, data wrangling, Linux, CSS, HTML5, JAVASCRIPT

#### OTHER INFORMATION

Languages

DUTCH · Mothertongue

ENGLISH · Advanced

FRENCH · Intermediate

GERMAN · Basics

Interests

Guitar/mandolin playing · (Dog) walking · Reading · IT

#### PUBLICATIONS AND TALKS

Preprints under  
review

- **Van de Cruys, S.**, Damiano, C., Boddez, Y., Król, M., Goetschalckx, L., & Wagemans, J. (2020). Visual affects: Linking curiosity, aha-Erlebnis, and memory through information gain. *Cognition*
- Moors, A., **Van de Cruys, S.**, & Pourtois, G. (2020). Comparison of the determinants for positive and negative affect proposed by appraisal theories, goal-directed theories, and predictive processing theories. *Current Opinion in Psychology*. Invited paper
- **Van de Cruys, S.**, Lemmens, L., Sapey-Triomphe, L-A, Chetverikov, A., Noens, I., & Wagemans, J. (2020). Structural and contextual priors affect visual search in children with and without autism. *Autism Research*
- van Dessel, P., & **Van de Cruys, S.** (2020) Mental distress through the prism of predictive processing. *Current Opinion in Psychology*. Invited paper

Feel free to **contact me** for full texts of these preprints.

Peer-reviewed  
journal articles

- **Van de Cruys, S.**, Friston, K. J., & Clark, A. (2020). **Controlled optimism**. Trends in Cognitive Sciences. doi: 10.1016/j.tics.2020.05.012
- **Van de Cruys, S.** (2020). **De opkomst van het orakelend brein**. Karakter tijdschrift van wetenschap.
- **Van de Cruys, S.** (2020). **De ontsnapping uit de donkere kamer**. Karakter tijdschrift van wetenschap.
- Bervoets, J. & **Van de Cruys, S.** (2020). **Autistische breinen praten over het autistische brein**. *Wetenschappelijk Tijdschrift Autisme*.

- **Van de Cruys S., & Heylighen, F. (2019).** *The dark side of thinking through other minds.* Behavioral and Brain Sciences. doi: 10.1017/S0140525X19002796
- Boddez, Y., Descheemaeker, M., Mertens, G., Truys, A., & **Van de Cruys, S. (2019).** *Like what you see: Generalization of social learning determines art appreciation.* Acta Psychologica, 196, 18-25.
- **Van de Cruys, S., Perrykkad, K. & Hohwy, J. (2019).** *Explaining hyper-sensitivity and hypo-responsivity in autism with a common predictive coding-based mechanism.* Cognitive Neuroscience, 10(3), 164-166.
- **Van de Cruys, S., Vanmarcke, S., Steyaert, J., & Wagemans, J. (2018).** *Intact perceptual bias in autism contradicts the decreased normalization model.* Scientific reports, 8(1), 12559.
- Fekete, T., **Van de Cruys, S.**, Ekroll, V., & van Leeuwen, C. (2018). *the interest of saving time - a critique of discrete perception.* Neuroscience of Consciousness.
- Constant, A., Bervoets, J., Hens, K., **Van de Cruys, S. (2018).** *Precise worlds for certain minds: An ecological perspective on the relational self in autism.* Topoi. doi: 10.1007/s11245-018-9546-4
- **Van de Cruys, S., Vanmarcke, S., Van de put, I., Wagemans, J. (2018).** *The use of prior knowledge for perceptual inference is preserved in ASD.* Clinical Psychological Science, 6 (3), 382-393. doi: 10.1177/2167702617740955
- Goris, J., Braem, S., Nijhof, A., Rigoni, D., Deschrijver, E., **Van de Cruys, S., Wiersema, R., Brass, M (in press).** *Sensory prediction errors are less modulated by global context in autism spectrum disorder.* Biological Psychiatry: Cognitive Neuroscience and Neuroimaging.
- **Van de Cruys, S., Evers, K., & Wagemans, J. (2018).** *Omgaan met onzekerheid binnen autisme.* Wetenschappelijk Tijdschrift Autisme.
- **Van de Cruys, S. (2018).** *Upgrading Gestalt psychology with variational neuroethology: The case of perceptual pleasures: Comment on “Answering Schrödinger’s question: A free-energy formulation” by M.J. Desormeau Ramstead et al.* Physics of Life Reviews. doi: 10.1016/j.plrev.2018.01.002
- Chamberlain, R., Van der Hallen, R., Huygelier, H., **Van de Cruys, S., & Wagemans, J. (2017).** *Local-global processing bias in not a unitary individual difference in visual processing.* Vision Research.
- **Van de Cruys S., Chamberlain R., Wagemans J. (2017).** *Tuning in to art: A predictive processing account of negative emotion in art.* Behavioral and Brain Sciences, 40, Art.No. e377, doi: 10.1017/S0140525X17001868.
- **Van de Cruys, S. (2017).** *Affective value in the predictive mind.* In T. K. Metzinger & W. Wiese (Eds.), Philosophy and Predictive Processing (pp. 1-21). Frankfurt am Main, Germany: MIND Group. doi: 10.15502/9783958573253
- van Ee, R., **Van de Cruys, S., Schlangen, L.J.M., Vlaskamp, B.N.S. (2016).** *Circadian-Time Sickness: Time-of-Day Cue-Conflicts Directly Affect Health.* Trends in Neurosciences.
- **Van de Cruys, S., Van der Hallen, R., Wagemans, J. (2016).** *Disentangling signal and noise in autism spectrum disorder.* Brain and Cognition.
- **Van de Cruys, S., Ekroll, V., Wagemans, J. (2015).** *The put-and-fetch ambiguity: How magicians exploit the principle of exclusive allocation of movements to intentions.* i-Perception, 6(2), 86-90.
- **Van de Cruys, S., Evers, K., Van der Hallen, R., Van Eylen, L., Boets, B., de-Wit, L., Wagemans (2014).** *Precise minds in uncertain worlds: Predictive coding in autism.* Psychological Review, 121(4), 649-675.

- **Van de Cruys, S.**, de-Wit, L., Evers, K., Boets, B., Wagemans, J. (2013). **Weak priors versus overfitting of predictions in autism: Reply to Pellicano and Burr (TICS 2012).** *i-Perception*, 4(2), 95-97.
- **Van de Cruys, S.**, Schouten, B., Wagemans, J. (2013). **An anxiety-induced bias in the perception of a bistable point-light walker.** *Acta Psychologica*, 144(3), 548-553.
- **Van de Cruys, S.**, Wagemans, J. (2011). **Putting reward in art: A tentative prediction error account of visual art.** *i-Perception*, (special issue on Art & Perception), 2(9), 1035-1062.
- **Van de Cruys, S.**, Wagemans, J. (2011). **Gestalts as predictions: Some reflections and an application to art.** *Gestalt Theory*, 33(3-4), 325-344.

See my [Google Scholar profile](#) for citations and full texts.

#### Talks & Conference presentations

- **Van de Cruys, S.** (2020). Curiosity and pleasure as expected and actual predictive progress. Invited keynote at 6th Visual Properties Driving Visual Preference (VPDVP) workshop.
- **Van de Cruys, S.**, & Wagemans, J. (2018). Confronting predictive processing with alternative information processing accounts of autism. Invited symposium talk at Budapest CEU Conference on Cognitive Development. Budapest, Hungary.
- Van Overwalle, J., Vettori, S., Sapey-Triomphe, L. -A., **Van de Cruys, S.**, Boets, B., & Wagemans, J. (2019). Fast Periodic Visual Stimulation during EEG as a means to pinpoint to individual differences in perception.. In MMDAutism-3: Third international MM Delacroix workshop on autism research. Brussels, Belgium.
- Lemmens, L., **Van de Cruys, S.**, Sapey-Triomphe, L. -A., Noens, I., & Wagemans, J. (2019). Visual Perceptual Inference in Children With Autism Spectrum Disorder: A Global Motion Direction Estimation Task. In PERCEPTION (Vol. 48, pp. 44).
- Sapey-Triomphe, L. -A., & **Van de Cruys, S.** (2019). Introduction of the Symposium "Investigating Predictive Coding in Autism and Schizophrenia". In PERCEPTION (Vol. 48, pp. 19).
- Van Overwalle, J., Desplenter, L., **Van de Cruys, S.**, Boets, B., & Wagemans, J. (2019). Fast Periodic Visual Stimulation EEG as an Implicit Measure for Perceptual. Discrimination and Categorization in ASD?. In European Conference on Visual Perception (ECPV). Leuven, Belgium.
- Van Overwalle, J., **Van de Cruys, S.**, Boets, B., & Wagemans, J. (2019). EEG as an implicit measure for perceptual discrimination, categorization and generalization.. In Organization for Human Brain Mapping (OHBM) Annual Meeting. Rome, Italy.
- Van Overwalle, J., Van der Donck, S., **Van de Cruys, S.**, Boets, B., & Wagemans, J. (2019). Fast Periodic Visual Stimulation EEG as an implicit measure for perceptual discrimination and categorization of mid-level objects.. In Vision Science Society Meeting (VSS). St. Pete Beach (FL), USA.
- Van Overwalle, J., **Van de Cruys, S.**, Boets, B., & Wagemans, J. (2019). Fast Periodic Visual Stimulation EEG as an implicit measure for perceptual discrimination, categorization and generalization of mid-level stimuli. In f-Tales: Neuro Sense Sense ability - Sensing and data processing technology for the brain. Leuven, Belgium.
- **Van Overwalle, J.**, Buhre, C., Van der Donck, S., Van de Cruys, S., Boets, B., & Wagemans, J. (2018). Fast periodic visual stimulation electroencephalography as a measure for perceptual discrimination and categorization. In European Conference on Visual Perception. Trieste, Italy.

- **Van de Cruys, S.** (2017) Dealing with uncertainty in autism: from neuro-cognitive model to lived reality. Invited talk at the symposium *Living autism*, Autism Ethics Network, University of Antwerp.
- **Van de Cruys, S.** (2016) The place of affective value in the predictive brain. Invited talk at the MIND23 workshop on *Philosophy & Predictive Processing*, Frankfurt Institute for Advanced Studies.
- **Van de Cruys, S.** (2015) Can predictive coding provide a viable single deficit account of ASD? Invited talk at the mini-symposium on ASD in the Donders Institute, Radboud University Nijmegen.
- de-Wit, L., **Van de Cruys, S.**, Verhoogen, L., & Wagemans, J. (2012). Is there a common underlying factor in global vs local biases in perceptual organization? European Conference on Visual Perception.
- **Van de Cruys, S.**, Schouten, B., Wagemans, J. (2012). Ne me quitte pas: An anxiety-induced bias in the perception of a bistable walker?. *Perception*: vol. 41. European Conference on Visual Perception. Alghero, Italy, 2-6 September 2012, 151-151, Abstract No. 103.
- **Van de Cruys, S.** (2012). The pleasure of prediction error: Testing a predictive coding approach to visual art. Invited talk at the fiArt et perceptionfi symposium in Paris, France.
- Wagemans, J., Vancleef, K., Koole, M., **Van de Cruys, S.**, Porters, K., Van Laere, K. (2011). Neural correlates of creative drawing by artists and non-artists. 2011 Abstract Viewer/Itinerary Planner (On-line). Annual Meeting of the Society for Neuroscience. Washington, DC, 12-16 November 2011, Abstract No. 510.09.
- Wagemans, J., Vancleef, K., Amand, F., Koole, M., **Van de Cruys, S.**, Dirix, S., Steukers, M., Porters, K., Vanderghinste, D., Van Laere, K. (2010). The visual artist's creative brain: An H<sub>2</sub> 15O PET study of creative drawing. Annual Meeting of the Organization for Human Brain Mapping. Barcelona, Spain, 6-10 June 2010.
- **Van de Cruys, S.**, Wagemans, J. (2010). Putting reward in art: A tentative prediction error account of visual art. *Visual Perception and Visual Arts*. Brussels, Belgium, November 2010.
- **Van de Cruys, S.**, Wagemans, J. (2009). Affect and Gestalt. International Society for Research on Emotion (ISRE). Leuven, Belgium, August 2009.

*Popular media in  
Dutch*

- **Van de Cruys, S.** (2012) *De cybersuicides: de stille pijn achter statistieken*. Eos Magazine (december 2012).
- **Van de Cruys, S.** (2012) *Zeg eens Goooooooooogle!* voor Breinwijzer.
- Van Laere, K., Wagemans, J., Vancleef, K., Dirix, S., **Van de Cruys, S.**, Amand, F., Koole, M., Vanderghinste, D., Steukers, M., Porters, K., Goffin, K. (2010). Cross-over studie "Kunst en creativiteit": Is er een onderliggende neurobiologische basis?. In: Doove E. (Eds.), *Cahiers van het IvOK: Parallelepiped* boek. Leuven: Acco, 137-143.

January 5, 2021