

## Claudia D. van Borkulo

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- PERSONAL** Claudia Debora van Borkulo. Born March 16 1971, in Amsterdam, The Netherlands.
- EMPLOYMENT**
- 2020 – 2024. **Postdoctoral Research Fellow**, University of Amsterdam, Psychological Methods.
- 2019 – 2020. **Postdoctoral Research Fellow**, Academic Medical Center - AMC, The Centre for Urban Mental Health.
- 2016 – 2019. **Postdoctoral Research Fellow**, University of Amsterdam, Psychological Methods (group of Denny Borsboom).
- 2012 – 2016. **Ph.D. student**, University Medical Center Groningen & University of Amsterdam, Psychological Methods Group (*cum laude*). with supervisors Prof. dr. R. A. Schoevers (UMCG) and Prof. dr. D. Borsboom (UvA). Title dissertation: *Symptom network models in depression research: From methodological exploration to clinical application*.
- 2016, 2017. **Visiting scholar**, Harvard University, Department of Psychology, McNally Laboratory (several short stays). Collaborations with Prof. Richard J. McNally (Director of Clinical Training) and dr. Courtney Beard (Assistant Professor of Psychology, Harvard Medical School, Assistant Director Research, McLean Hospital).
- 2012 – 2013. **Teaching assistant** for the research master course *Scientific Writing and Presenting* of Prof. dr. Eric-Jan Wagenmakers, University of Amsterdam (40 students). Main activities: grading assignments, provide feedback (in writing and classical).
- 2011 – 2012. **Student assistant** for the first-year bachelor course *Research Methods and Statistics* of dr. Lourens Waldorp, University of Amsterdam (500 students). Main activities: making exams and tests, contributing to the *Statistiekfabriek* (a computer adaptive web application for education in statistics).
- EDUCATION**
- 2011 – 2012. **MSc Psychology** (*cum laude*), University of Amsterdam, with a specialization in Psychological Research Methods. Thesis: *Discovering the dynamics of mental disorders*, supervisor: dr. L. J. Waldorp.
- 2007 – 2011. **BSc Psychology** (*cum laude*), University of Amsterdam, with a specialization in Psychological Research Methods. Thesis: *An interactive simulation model for depression: A causal network perspective*, supervisor: Prof. dr. D. Borsboom.
- 1989 – 1996. **MSc Chemistry** (*with merit*), VU Amsterdam, with a specialization in Biochemistry and Molecular Biology, and a minor in Policy and management.
- ADDITIONAL COURSES**
2016. Workshop *Saving Time on Large-Scale Computations* (University of Amsterdam). By Terrence Jorgensen.

2015. *Generalized Latent Variable Modeling* (Tilburg University).

2014. *Optimization and Numerical Methods* (with certificate, Catholic University of Leuven).

2014. *Applied Bayesian Statistics* (with certificate, University of Utrecht).

2013. *PhD course Teaching in Higher Education* (with certificate, University of Amsterdam).

2013. *Internalizing disorders: mood disorder* (University of Amsterdam). Third-year bachelor course Clinical Psychology.

SUPERVISION PHD 2017 - 2021. **Co-promotor** of Ph.D. student Gaby Lunansky. Project title: Psychological resilience from a complexity perspective: Towards understanding individual dynamical trajectories.

2021 - 2025. **Co-promotor** of Ph.D. student Phuong Do Lan. Project title: Understanding and detecting early psychosis: A network approach.

SUPERVISION THESIS / INTERNSHIP 2014 - present. **Supervisor** of multiple Research Master, Behavioral Data Science Master, and Bachelor students. One resulted in a published paper in top-tier journal and was awarded the Unilever Research Award for high-quality scientific research (by Adela Isvoranu).

TEACHING 2020. **Lecturer** Methods for Research and Statistics for 250 first-year students Psychobiology at University of Amsterdam.

2019. **Lecturer** Methods for Research and Statistics for 200 first-year students Psychobiology at University of Amsterdam.

2019. **Lecturer** Network Analysis Course at University of Amsterdam.

2017. **Lecturer** in the Psychological Network Amsterdam Winter School (20 external participants, most at PhD level) at University of Amsterdam. Topic: From empirical data to a graphical model.

2016. **Lecturer** in the Psychological Network Amsterdam Summer School (25 external participants, most at PhD level) at University of Amsterdam. Topic: From empirical data to a graphical model.

2016. **Guest lecturer** in the research master course *Network Analysis* (40 students, University of Amsterdam). Topic: Markov Random Fields.

2016. **Lecturer** two workshops *Analyzing ESM data in R for clinical Psychology bachelor students* (12 students Clinical Psychology, University of Amsterdam).

2015. **Guest lecturer** in the research master course *Network Analysis* (40 students, University of Amsterdam). Topic: Discovering graphs from binary and gaussian data.

2015. **Lecturer** two workshops *NetwoRks for clinical Psychology students* (20 students Clinical Psychology, University of Amsterdam).

2014. **Guest lecturer** in the research master course *Psychiatric Epidemiology* with a practical (9 students, University of Groningen). Topic: Time for a new paradigm: a network perspective on psychopathology.

2014. **Guest lecturer** in the research master course *Network models* with a practical (20 students, University of Amsterdam). Topics: Graphs, probability, discovery, and causality.

2014. **Teaching assistant** for the research master course *Structural Equation Modeling* of dr. Mijke Rhemtulla, University of Amsterdam (45 students). Main activities: grading assignments, assisting practicals.

2013. **Guest lecturer** in the research master course *Psychiatric Epidemiology* with a practical (9 students, University of Groningen). Topic: A network perspective on psychopathology, including epidemiological models.

2013. **Guest lecturer** in the research master course *Network models* with a practical (22 students, University of Amsterdam). Topics: the Ising model, the contact process model.

2013. **Guest lecturer** in the bachelor course *Network models* with practicals (25 students, University of Amsterdam). Topics first lecture: Non-linear dynamical systems, hysteresis, early warning signals. Topic second lecture: NetLogo, an agent-based programming environment to model mental disorders.

2012. **Guest lecturer** in bachelor course *Controverses in psychology* with practical (9 students, University of Amsterdam). Topic: NetLogo, an agent-based programming environment to model mental disorders.

2011. **Guest lecturer** in first-year bachelor course *Research Methods and Statistics* (400 students, University of Amsterdam). Topic: confidence intervals.

INVITED  
PRESENTATIONS

2018. *Symptom network models in depression research: From methodological exploration to clinical application*. Presentation for the Royal Physics Society, Groningen, December 2018.

2016. *Psychopathology and resilience from a network perspective*. Resilience Symposium organized by Anne-Laura van Harmelen, Cambridge UK, December 2016.

2015. *Network Comparison Test: A validation study*. Presentation at conference of Interuniversity Graduate School of Psychometrics and Sociometrics (IOPS), December 2015.

2015. *Do symptom expression patterns matter?* 6th Lab meeting Network and time series models, Amsterdam, October 2015.

2015. *Do symptom expression patterns matter?* Presentation for a Masterclass with Professor Kenneth Kendler, Groningen, June 2015.

2014. *Fitting like a glove: a new method for constructing networks from binary data*. Poster presentation at conference of Interuniversity Graduate School of Psychometrics and Sociometrics (IOPS).

2014. *Time for a new paradigm: a network perspective on psychopathology*. Pre-

resentation for psychiatrists in training of GGZ Centraal, Ermelo, September 2014.

2014. *Een netwerk perspectief op psychopathologie*. Presentation for psychiatrists and board members of GGZ Friesland, Leeuwarden.

2014. *A network perspective on psychopathology*. Presentation for the NESDA day at University Medical Center Groningen.

2013. *Network simulations for mental disorders*. Presentation for the Scientific lunch at ParnassiaBavo Academy.

2013. *A network perspective on psychopathology*. Presentation for the PhD lunch at University Medical Center Groningen.

#### PRESENTATIONS

2017. *Is the network structure of obsessive and compulsive symptoms associated with recovery?* Presentation for the 29th APS Annual Convention, Boston, May 2017.

2017. *Vulnerability to develop psychopathology: A catastrophe?* Presentation for the 29th APS Annual Convention, Boston, May 2017.

2016. *Comparing network structures: Can you spot the differences?* Presentation for the 28th APS Annual Convention, Chicago, May 2016.

2016. *Symptom patterns and the course of depression*. Presentation for the 28th APS Annual Convention, Chicago, May 2016.

2016. *Do symptom association patterns matter?* Presentation for the 44th NVvP Voorjaarscongres (Nederlandse Vereniging voor Psychiatrie), March 2016.

2015. *Constructing networks from binary data*. Presentation for the 80th Annual Meeting of the Psychometric Society (IMPS), Beijing, July 2015.

2015. *Coming to grips with the complexity of psychopathology*. Presentation for the 1st International Convention of Psychological Science (ICPS, under auspices of Association for Psychological Science APS), Amsterdam, March 2015.

2014. *Depression as a network of symptoms*. Presentation for the 42th NVvP Voorjaarscongres (Nederlandse Vereniging voor Psychiatrie), April 2014.

2014. *Fitting like a glove: New method for constructing networks from psychometric data*. Presentation for Psychoco, Psychometric Computing, Tübingen, February 2014.

2013. *Predicting behavior in the long run: The contact process to model dynamics of mental disorders*. Presentation for the 78th Annual Meeting of the Psychometric Society (IMPS), Arnhem, The Netherlands, July 2013.

2013. *Network simulations for mental disorders*. Presentation for the 41th NVvP Voorjaarscongres (Nederlandse Vereniging voor Psychiatrie), April 2013.

#### AWARDS/GRANTS

2020. NWO Veni Grant (€250 K) to fund 3-year research project. *A multi-timescale network modelling framework: Integrating fast-changing mood states and slow-changing symptoms in mental disorders*

2020. Doc.CH programme of the Swiss National Science Foundation, SNF (CHF 216 K; as co-supervisor of Phuong Do Lan, University of Zurich; supervisor Prof. Birgit Kleim),

2020. NIMH Ruth Kirschenstein National Research Service Award, F31 Grant (\$84 K; as collaborator of PhD student Daniel Moriarity, Temple University; supervisor Lauren B. Alloy)

2018. Van Swinderen Price (second place, \$1000) of the Royal Physics Society in Groningen, December 2018.

2017. Co-applicant on secured Grant ZonMw (€300 K). Topic: Improving the recognition and treatment of suicidal patients by integrating graph theory with psychiatry. Main applicant: Derek de Beurs.

2016. Top Publication Award, Research Institute SHARE, November 2016.

2015. Travel Award (\$1000) for the International Meeting of the Psychometric Society (IMPS) in Beijing, July 2015.

2013. Winner of the NESDA Poster Presentation Award, May 2013.

2012. Second place winner of "Best Poster Award" at the University of Amsterdam Research Master Psychology graduate conference, October 2012.

#### MISCELLANEOUS

2017. Invited to the exclusive, multi-disciplinary expert meeting "dynamical systems, networks, and psychopathology", with among others the world-leading psychiatrist Kendler and Spinoza-prize winning ecologist Scheffer.

2017 - . Staff member of Psychosystems Group. Responsibility: primary contact for social organisational issues of the Psychosystems Group.

2016. Member of writing group concerning future research within NESDA (The Netherlands Study of Depression and Anxiety). Subtheme: EMA, rhythmicity, actigraphy, and sleep.

2015. Organizer of (accepted) Symposium. Mental disorders: what are they and how do they behave from a network perspective? For the 28th APS convention, Chicago, 2016.

2014. Member of the organizing committee for the 24th IOPS Winter Conference in Amsterdam.

2013 - . Student member of Inter-university Graduate School of Psychometrics and Sociometrics (IOPS).

2013. Advising master student on NetLogo, University of Leuven.

2013. Advising psychiatrist on multilevel analysis, University Center Psychiatry, Groningen.

2012 Methodology Shop Consultant. Helping and advising master students with methodological and statistical problems in their research.

## IN PRESS

Lunansky, G., **van Borkulo, C. D.**, Haslbeck, J. B. M., van der Linden, M. A., Garay, C. J., Etchevers, M. J., & Borsboom, D. (under review). The mental health ecosystem: Extending symptom networks with risk and protective factors. *Frontiers in Psychiatry*.

van der Wal, J. M., **van Borkulo, C. D.**, Deserno, M. K., Breedvelt J. J. F., Lees, M., Lokman, C., Borsboom, D., Denys, D., van Holst, R., Smidt, M., Stronks, K., Lucassen, P. J., van Weert, J. C. M., Sloot, P. M. A., Bockting\*, C. L. H., & Reinout W Wiers\* (2021). Advancing urban mental health research: from complexity to actionable targets for intervention. *Lancet Psychiatry*.

Moriarty, D. P., **van Borkulo, C.**, & Alloy, L. B. (2020). Inflammatory phenotype of depression symptom structure: A network perspective. *Brain, Behavior, and Immunity*. DOI: 10.1016/j.bbi.2020.12.005.

## PUBLISHED

\* shared first authorship in alphabetical order

Lunansky, G., **van Borkulo, C. D.**, & Borsboom, D. (2020). Personality, resilience, and psychopathology: A model for the interaction between slow and fast network processes in the context of mental health. *European Journal of Personality*, 34(6), 969-987.

Fried, E. I., **van Borkulo, C. D.**, & Epskamp, S. (2020). On the importance of estimating parameter uncertainty in network psychometrics: A response to Forbes et al.(2019). *Multivariate behavioral research*, 1-6.

Schoevers, R. A., **van Borkulo, C. D.\***, Lamers, F., Servaas, M. N., Bastiaansen, J. A., Beekman, A. T. F., van Hemert, A. M., Smit, J. H., Penninx, B. W. J. H., Riese, H. (2020). Affect fluctuations examined with ecological momentary assessment in patients with current or remitted depression and anxiety disorders. *Psychological medicine*, 1-10.

Fritz, F., Stochl, J., Fried, E. I., Goodyer, I. M., **van Borkulo, C. D.**, Wilkinson, P. O., van Harmelen, A.-L. (2019). Unravelling the complex nature of resilience factors and their changes between early and later adolescence. *BMC medicine*, 17(1), 1-16.

De Beurs, D., Vancayseele, N., **van Borkulo, C.**, Portzky, G., & van Heeringen, K. (2018). The association between motives, perceived problems and current thoughts of self-harm following an episode of self-harm. A network analysis. *Journal of affective disorders*, 240, 262-270.

Epskamp, S., Fried, E. I., **van Borkulo, C. D.**, Robinaugh, D. J., Marsman, M., Dalege, J., Rhemtulla, M., & Cramer, A. O. J. (2018). Investigating the Utility of Fixed-margin Sampling in Network Psychometrics. *Multivariate Behavioral Research*, 2018, DOI: 10.1080/00273171.2018.1489771

Van Bork, R., **van Borkulo, C. D.\***, Waldorp, L.J., Cramer, A.O.J., & Borsboom, D. (2018). Network Models for Clinical Psychology. *Stevens' Handbook of Experimental Psychology and Cognitive Neuroscience (Fourth Ed)*, Volume 5,

Borsboom, D., Robinaugh, D. J., Epskamp, Fried, E. I., Waldorp, L. J., **van Borkulo, C. D.**, van der Maas, H. L. J., Rhemtulla, M., Cramer, A. O. J. (2018). Robustness and replicability of psychopathology networks. *World Psychiatry*, 17(2), 143-144.

Epskamp, S., **van Borkulo, C. D.**, Van der Veen, D.C., Servaas, M.N., Isvoranu, A., Riese, H., Cramer, A.O.J. (2018). Personalized Network Modeling in Psychopathology: The Importance of Contemporaneous and Temporal Connections. *Clinical Psychological Science*, 6(3), 416-427.

Schweren, L., **van Borkulo, C. D.**, Fried, E. I., Goodyer, I. M. (2017). Assessment of symptom network density as a prognostic marker of treatment response in adolescent depression. *JAMA Psychiatry*. DOI: 10.1001/jamapsychiatry.2017.3561.

Borsboom, D., Fried, E. I., Epskamp, S., Waldorp, L. J., **van Borkulo, C. D.**, van der Maas, J. L. J., Cramer, A. O. J. (2017). False alarm? A comprehensive reanalysis of "Evidence that psychopathology symptom networks have limited replicability" by Forbes, Wright, Markon, and Krueger (2017). *Journal of Abnormal Psychology*, 126(7), 989-999. doi: 10.1037/abn0000306.

Van Loo, H. M., **van Borkulo, C. D.**, Peterson, R. E., Fried, E. I., Aggen, S. H., Borsboom, D., Kendler, K. S. (2017). Robust symptom networks in recurrent major depression across different levels of genetic and environmental risk. *Journal of Affective Disorders*, 227, 313-322. doi: 10.1016/j.jad.2017.10.038.

van Rooijen, G., Isvoranu, A.M., Kruijt, O.H., **van Borkulo, C. D.**, Meijer, C.J., Wigman, J.T.W., Ruh, H.G., de Haan, L., GROUP investigators. (2017). A state-independent network of depressive, negative and positive symptoms in male patients with schizophrenia spectrum disorders. *Schizophrenia Research*, 193, 232-239. doi: 10.1016/j.schres.2017.07.035.

De Beurs, D., **van Borkulo, C. D.**, O'Connor, R.C. (2017). Association between suicidal symptoms and repeated suicidal behaviour within a sample of hospital-treated suicide attempters. *British Journal of Psychiatry Open*, 3(3), 120-126. doi: 10.1192/bjpo.bp.116.004275.

Klippel, A., Viechtbauer, W., Reininghaus, U., Wigman, J., **van Borkulo, C. D.**, MERGE, Myin-Germeys, I., Wichers, M. (2017). The cascade of stress: A network approach to explore differential dynamics in populations varying in familial risk for psychosis. *Schizophrenia Bulletin*, DOI: 10.1093/schbul/sbx037.

Van Rooijen, G., Isvoranu, A., Meijer, C.J., **van Borkulo, C. D.**, Ruhé, H.G., De Haan, L., GROUP investigators. (2017). A Symptom Network Structure of the Psychosis Spectrum. *Schizophrenia Research*, 189, 75-83. doi: 10.1016/j.schres.2017.02.018.

Isvoranu, A. M., **van Borkulo, C. D.**, Boyette, L. L., Borsboom, D., Wigman, H. J. T. W., Vinkers, C. H., & Group Investigators. (2017). A network approach to psychosis: Pathways between childhood trauma and psychotic symptoms. *Schizophrenia Bulletin*, 43 (1), 187-196.

Fried, E. I., **van Borkulo, C. D.\***, Cramer, A. O. J., Boschloo, L., Schoeffer, R. A., Borsboom, D. (2017). Mental disorders as symptom networks of problems: A review of recent insights. *Social Psychiatry and Psychiatric Epidemiology*, 52 (1), 1-10.

Cramer, A. O. J., **van Borkulo, C. D.**, Giltay, E. J., van der Maas, H. L. J., Kendler, S. K., Scheffer, M., & Borsboom, D. (2016). Major depression as a complex dynamic system. *PLoS ONE*, 11(12):e0167490.

Bekhuis. E., R.A. Schoevers, **van Borkulo, C. D.**, Rosmalen, J.G.M., & Boschloo, L. (2016). The network structure of major depressive disorder, generalized anxiety disorder and somatic symptomatology. *Psychological Medicine*, 46(14), 2989-2998.

Bekhuis. E., R.A. Schoevers, **van Borkulo, C. D.**, Rosmalen, J.G.M., & Boschloo, L. (2016).

The Network Structure of Depressive, Anxiety and Somatic Symptoms. *Journal of Psychosomatic Research*, 85, 55-55. DOI: 10.1016/j.jpsychores.2016.03.134.

Boschloo, L., **van Borkulo, C. D.**, Borsboom, D., & Schoevers, R. A. (2016). A prospective study on how symptoms in a network predict the onset of depression. *Psychotherapy and Psychosomatics*, 85 (3), 183-184.

Boschloo, L., Schoevers, R. A., **van Borkulo, C. D.**, Borsboom, D., & Oldehinkel, A. J. The network structure of psychopathology in a community sample of preadolescents. (2016). *Journal of Abnormal Psychology*, 125(4), 599-606.

**van Borkulo, C. D.**, Borsboom, & Schoevers, R.A. (2016). Group-Level Symptom Networks in Depression — Reply. (2016). *JAMA Psychiatry*, 73 (4); DOI: 10.1001/jamapsychiatry.2015.3157.

Fried, E. I., **van Borkulo, C. D.**, Epskamp, S., Schoevers, R. A., Tuerlinckx, F., & Borsboom, D. (2016). Measuring Depression Over Time . . . or not? Lack of Unidimensionality and Longitudinal Measurement Invariance in Four Common Rating Scales of Depression. *Psychological Assessment*. DOI: 10.1037/pas0000275.

Kossakowski, J.J., Epskamps, S., Kieffer, J.M., **van Borkulo, C. D.**, Rhemtulla, M.T., & Borsboom, D. (2016). The application of a network approach to health-related quality of life (HRQoL): Introducing a new method for assessing HRQoL in healthy adults and cancer patients. *Quality of Life Research*, 25(4), 781-792.

**van Borkulo, C. D.**, Boschloo, L., Borsboom, D., Penninx, B.W.J.H., & Schoevers, R.A. (2015). Association of symptom network structure and the course of depression. *JAMA Psychiatry*, 72 (12), 1219-1226.

Boschloo, L., **van Borkulo, C. D.**, Rhemtulla, M., Keyes, K. M., Borsboom, D., & Schoevers, R. A. (2015). The network structure of symptoms of the Diagnostic and Statistical Manual of Mental Disorders. *PLOS ONE*; DOI: 10.1371/journal.pone.0137621.

Fried, E. I., Boschloo, L., **van Borkulo, C. D.**, Schoevers, R. A., Romeijn, J-W., Wichers, M., de Jonge, P., Nesse, R. M., Tuerlinckx, F., & Borsboom, D. (2015). Commentary: "Consistent superiority of selective serotonin reuptake inhibitors over placebo in reducing depressed mood in patients with major depression". *Frontiers of Psychiatry* 6:117; DOI: 10.3389/fpsy.2015.00117.

**van Borkulo, C. D.**, Borsboom, D., Epskamp, S., Blanken, B. W., Boschloo, L., Schoevers, R. A., & Waldorp, L. J. (2014). A new method for constructing networks from psychometric data. *Scientific Reports* 4, 5918; DOI:10.1038/srep05918.

## PRE-PRINTS

\* shared first authorship in alphabetical order

**van Borkulo, C. D.**, van Bork, R., Boschloo, L., Kossakowski, J., Tio, P., L., Schoevers, R.A., Borsboom, D., & Waldorp, L. J. (2017). Comparing network structures on three aspects: A permutation test. DOI: 10.13140/RG.2.2.29455.38569.

**van Borkulo, C. D.**, Wichers, M.C., Boschloo, L., Schoevers, R.A., Kamphuis, J. H., Borsboom, D. & Waldorp, L. J. (2015). The contact process as a model for predicting network dynamics of psychopathology.



NON PEER-REVIEWED  
PUBLICATIONS

**van Borkulo, C. D.** A tutorial on R package NetworkComparisonTest (NCT). Symptom network models in depression research: From methodological exploration to clinical application. Appendix E, 249-257.

**van Borkulo, C. D.** Persistentie van depressie mogelijk bepaald door specifieke patronen in symptoomassociaties. Tijdschrift voor Psychiatrie, 58, 328-328 (2016).

**van Borkulo, C. D.** Wat zegt de netwerkstructuur van symptomen over het verloop van depressie? NESDA kerstnieuwsbrief (2015).

**van Borkulo, C.D.,** van der Maas, H.L.J., Borsboom, D., & Cramer, A.O.J. (2014). NetLogo Vulnerability to Depression. [http://ccl.northwestern.edu/netlogo/models/community/Vulnerability\\_to\\_Depression](http://ccl.northwestern.edu/netlogo/models/community/Vulnerability_to_Depression). Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.

**van Borkulo, C. D.,** Borsboom, D., Nivard, M.G., & Cramer, A. O. J. (2011). NetLogo Symptom Spread model. [http://ccl.northwestern.edu/netlogo/models/community/Symptom\\_Spread\\_Model](http://ccl.northwestern.edu/netlogo/models/community/Symptom_Spread_Model). Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.

MEDIA

Overal netwerken van A naar B. Interview on AmsterdamFM, Radio Swammerdam, June 11, 2017. <https://soundcloud.com/swammerdam/overal-netwerken-van-a-naar-b>

Berkhout, K. Veel symptomen maken depressie hardnekkiger. NRC, November 14th 2015.

Specific symptom associations may determine persistence of depression. Interview on MedicalResearch.com. <http://medicalresearch.com/mental-health-research/depression/specific-symptom-associations-may-determine-persistence-of-depression/19352/>