

Supplementary Material D

Mood and anxiety disorders within the Research Domain Criteria framework of Positive and Negative Valence Systems: a scoping review

Sarah Jane Böttger*, Bernd R. Förstner, Laura Szalek, Kristin Koller-Schlaud, Michael A. Rapp and Mira Tschorn

* Correspondence: Sarah Jane Böttger: sboettger@uni-potsdam.de

1 Sources excluded following title and abstract screening

- Al Zoubi, O., Ki Wong, C., Kuplicki, R. T., Yeh, H.-W., Mayeli, A., Refai, H., et al. (2018). Predicting Age From Brain EEG Signals-A Machine Learning Approach. *Front Aging Neurosci* 10, 184. doi: 10.3389/fnagi.2018.00184
- Al-Khalil, K., Vakamudi, K., Witkiewitz, K., and Claus, E. D. (2021). Neural Correlates of Alcohol Use Disorder Severity among Non-Treatment Seeking Heavy Drinkers: An Examination of the Incentive Salience and Negative Emotionality Domains of the Alcohol and Addiction Research Domain Criteria. *Alcohol Clin Exp Res.* doi: 10.1111/acer.14614
- Altimir, C., La Cerdá, C. de, and Dagnino, P. (2021). “The functional domain of affect regulation,” in *Depression and personality dysfunction: An integrative functional domains perspective*, eds. G. de La Parra, P. Dagnino, and A. Behn (Cham: Springer Nature Switzerland AG), 33–69.
- Alvarez-Fernandez, S., Brown, H. R., Zhao, Y., Raithel, J. A., Bishop, S. L., Kern, S. B., et al. (2017). Perceived social support in adults with autism spectrum disorder and attention-deficit/hyperactivity disorder. *Autism Res* 10, 866–877. doi: 10.1002/aur.1735
- Bailey, J., and Baker, S. T. (2020). A synthesis of the quantitative literature on autistic pupils’ experience of barriers to inclusion in mainstream schools. *JOURNAL OF RESEARCH IN SPECIAL EDUCATIONAL NEEDS* 20, 291–307. doi: 10.1111/1471-3802.12490
- Barch, D. M., Pagliaccio, D., and Luking, K. (2019). “Positive valence system dysregulation in psychosis: A comparative analysis,” in *The Oxford handbook of positive emotion and psychopathology*, ed. J. Gruber (New York, NY: Oxford University Press), 253–283.
- Barch, D. M., Pagliaccio, D., and Luking, K. R. (2018). “Motivational impairments in psychotic and depressive pathology: Psychological and neural mechanisms,” in *Neurobiology of abnormal emotion and motivated behaviors: Integrating animal and human research*, eds. S. Sangha, and D. Foti (San Diego, CA: Elsevier Academic Press), 279–304.
- Beaudreau, S. A., Hantke, N. C., Mashal, N., Gould, C. E., Henderson, V. W., and O’Hara, R. (2017). Unlocking Neurocognitive Substrates of Late-Life Affective Symptoms Using the Research Domain Criteria: Worry Is an Essential Dimension. *Front Aging Neurosci* 9, 380. doi: 10.3389/fnagi.2017.00380
- Bebko, G., Bertocci, M., Chase, H., Dwojak, A., Bonar, L., Almeida, J., et al. (2015). Decreased amygdala-insula resting state connectivity in behaviorally and emotionally dysregulated youth. *Psychiatry Res* 231, 77–86. doi: 10.1016/j.psychresns.2014.10.015
- Bergsholm, P. (2016). Is schizophrenia disappearing? The rise and fall of the diagnosis of functional psychoses: an essay. *BMC Psychiatry* 16, 387. doi: 10.1186/s12888-016-1101-5
- Bernard, J. A., and Mittal, V. A. (2015). Updating the research domain criteria: the utility of a motor dimension. *Psychol Med* 45, 2685–2689. doi: 10.1017/S0033291715000872

- Biele, G., Overgaard, K. R., Friis, S., Zeiner, P., and Aase, H. (2022). Cognitive, emotional, and social functioning of preschoolers with attention deficit hyperactivity problems. *BMC Psychiatry* 22, 78. doi: 10.1186/s12888-021-03638-9
- Blom, E. H., Duncan, L. G., Ho, T. C., Connolly, C. G., LeWinn, K. Z., Chesney, M., et al. (2014). The development of an RDoC-based treatment program for adolescent depression: 'Training for Awareness, Resilience, and Action' (TARA). *Front Hum Neurosci* 8. doi: 10.1037/t55280-000.
- Blom, E. H., Tymofiyeva, O., Chesney, M. A., Ho, T. C., Moran, P., Connolly, C. G., et al. (2017). Feasibility and preliminary efficacy of a novel RDoC-based treatment program for adolescent depression: 'Training for Awareness Resilience and Action' (TARA)—A pilot study. *Front Psychiatry* 7. doi: 10.1037/t02080-000;
- Bluett, R. J. *The Endocannabinoid, 2-arachidonoylglycerol, Regulates Resilience to Stress-induced Anxiety*. ProQuest Information & Learning.
- Brotman, M. A., Sharif-Askary, B., Dickstein, D. P., and Leibenluft, E. (2016). "Biological factors In bipolar disorder in childhood and adolescence," in *Bipolar disorders: Basic mechanisms and therapeutic implications.*, 3rd ed, eds. J. C. Soares, and A. H. Young (New York, NY: Cambridge University Press), 219–233.
- Brückl, T. M., Spoormaker, V. I., Sämann, P. G., Brem, A.-K., Henco, L., Czamara, D., et al. (2020). The biological classification of mental disorders (BeCOME) study: a protocol for an observational deep-phenotyping study for the identification of biological subtypes. *BMC Psychiatry* 20, 213. doi: 10.1186/s12888-020-02541-z
- Budde, M., Anderson-Schmidt, H., Gade, K., Reich-Erkelenz, D., Adorjan, K., Kalman, J. L., et al. (2019). A longitudinal approach to biological psychiatric research: The PsyCourse study. *Am J Med Genet B Neuropsychiatr Genet* 180, 89–102. doi: 10.1002/ajmg.b.32639
- Buffard, S. J., Dyson, M. W., Hernandez, I. G., and Wakschlag, L. S. (2016). "Explicating the 'developmental' in preschool psychopathology," in *Developmental psychopathology: Maladaptation and psychopathology.*, Vol. 3, 3rd ed, ed. D. Cicchetti (Hoboken, NJ: John Wiley & Sons, Inc), 152–186.
- Capuron, L., and Castanon, N. (2017). Role of Inflammation in the Development of Neuropsychiatric Symptom Domains: Evidence and Mechanisms. *Curr Top Behav Neurosci* 31, 31–44. doi: 10.1007/7854_2016_14
- Carvalho, A. F., Dimellis, D., Gonda, X., Vieta, E., McIntrye, R. S., and Fountoulakis, K. N. (2014). Rapid cycling in bipolar disorder: a systematic review. *J Clin Psychiatry* 75, e578-86. doi: 10.4088/JCP.13r08905
- Clinton, S. M., Shupe, E. A., Glover, M. E., Unroe, K. A., McCoy, C. R., Cohen, J. L., et al. (2021). Modeling heritability of temperamental differences, stress reactivity, and risk for anxiety and depression: Relevance to research domain criteria (RDoC). *Eur J Neurosci.* doi: 10.1111/ejn.15158
- Cohen, A. S., Najolia, G. M., Kim, Y., and Dinzeo, T. J. (2012). On the boundaries of blunt affect/alogia across severe mental illness: implications for Research Domain Criteria. *Schizophr Res* 140, 41–45. doi: 10.1016/j.schres.2012.07.001
- Cope, Z. A., Powell, S. B., and Young, J. W. (2016). Modeling neurodevelopmental cognitive deficits in tasks with cross-species translational validity. *Genes Brain Behav* 15, 27–44. doi: 10.1111/gbb.12268
- Craighead, W. E. (2013). Editor's final comments. *Clin Psychol (New York)* 20, 359–360. doi: 10.1111/cpsp.12046
- Crocq, M.-A. (2017). The history of generalized anxiety disorder as a diagnostic category. *Dialogues Clin Neurosci* 19, 107–116. doi: 10.31887/DCNS.2017.19.2/macrocq
- Da Silva, S., Apatsidou, A., Saperia, S., Siddiqui, I., Jeffay, E., Voineskos, A. N., et al. (2018). An Examination of the Multi-Faceted Motivation System in Healthy Young Adults. *Front Psychiatry* 9, 191. doi: 10.3389/fpsyg.2018.00191
- Di Cerbo, A. (2021). Letter to the Editor: CONVERGENCES AND DIVERGENCES IN THE ICD-11 VS. DSM-5 CLASSIFICATION OF MOOD DISORDERS. *Turk Psikiyatri Derg* 32, 293–295. doi: 10.5080/u26899

- Dieterich, A. *Chronic stress exposure impairs reward and motivation behaviors in mice*. ProQuest Information & Learning.
- Doom, J. R., Rozenman, M., Fox, K. R., Phu, T., Subar, A. R., Seok, D., et al. (2021). The Transdiagnostic Origins of Anxiety and Depression During the Pediatric Period: Linking NIMH Research Domain Criteria (RDoC) Constructs to Ecological Systems. *Dev Psychopathol* 33, 1599–1619. doi: 10.1017/s0954579421000559
- Draps, M., Sescousse, G., Wilk, M., Obarska, K., Szumska, I., Żukrowska, W., et al. (2021). An empirical study of affective and cognitive functions in Compulsive Sexual Behavior Disorder. *J Behav Addict* 10, 657–674. doi: 10.1556/2006.2021.00056
- Dwyer, K. R. *White matter connectivity and social cognitive impairment in a transdiagnostic sample*. ProQuest Information & Learning.
- Edelstyn, N., Di Rosa, E., and Martini, A. (2023). Identifying the Basic Dimensions of Medication-Triggered Impulsive Compulsive Behaviours in Parkinson's Disease. *Eur Neurol*, 1–4. doi: 10.1159/000528900
- Ekbäck, E., Granåsen, G., Svärling, R., Blomqvist, I., and Henje, E. (2021). Clinical Effectiveness of Training for Awareness Resilience and Action Online Compared to Standard Treatment for Adolescents and Young Adults With Depression: Study Protocol and Analysis Plan for a Pragmatic, Multi-Center Randomized Controlled Superiority Trial. *Front Psychiatry* 12, 674583. doi: 10.3389/fpsyg.2021.674583
- Ekhtiari, H., Kuplicki, R., Yeh, H.-W., and Paulus, M. P. (2019). Physical characteristics not psychological state or trait characteristics predict motion during resting state fMRI. *Sci Rep* 9, 419. doi: 10.1038/s41598-018-36699-0
- Fanselow, M. S. (2022). Negative valence systems: sustained threat and the predatory imminence continuum. *Emerg Top Life Sci* 6, 467–477. doi: 10.1042/ETLS20220003
- Fawcett, J. (2011). Nature, nurture, and treatment specificity. *Psychiatr Ann* 41, 517. doi: 10.3928/00485713-20111017-01
- Feld, G. B., and Feige, B. (2021). Arousal and regulatory systems in the system of research domain criteria. *Nervenarzt* 92, 907–914. doi: 10.1007/s00115-021-01160-7
- Fernandez, K. C., Morrison, A. S., and Gross, J. J. (2019). “Emotion regulation,” in *The Cambridge handbook of anxiety and related disorders*, ed. B. O. Olatunji (New York, NY: Cambridge University Press), 282–305.
- Fung, L. K., and Reiss, A. L. (2016). Moving Toward Integrative, Multidimensional Research in Modern Psychiatry: Lessons Learned From Fragile X Syndrome. *Biol Psychiatry* 80, 100–111. doi: 10.1016/j.biopsych.2015.12.015
- Gandy, K., Kim, S., Sharp, C., Dindo, L., Maletic-Savatic, M., and Calarge, C. (2017). Pattern Separation: A Potential Marker of Impaired Hippocampal Adult Neurogenesis in Major Depressive Disorder. *Front Neurosci* 11, 571. doi: 10.3389/fnins.2017.00571
- Gao, M. M., Ostlund, B., Brown, M. A., Kaliush, P. R., Terrell, S., Vlisides-Henry, R. D., et al. (2021). Prenatal maternal transdiagnostic, RDoC-informed predictors of newborn neurobehavior: Differences by sex. *Dev Psychopathol*, 1–12. doi: 10.1017/S0954579420002266
- Geller, W. N. *Resting-state functional connectivity in anhedonic depression*. ProQuest Information & Learning.
- Giménez-Llort, L., Santana-Santana, M., and Bayascas, J. R. (2020). The Impact of the PI3K/Akt Signaling Pathway in Anxiety and Working Memory in Young and Middle-Aged PDK1 K465E Knock-In Mice. *Front Behav Neurosci* 14, 61. doi: 10.3389/fnbeh.2020.00061
- Girgis, F., Lee, D. J., Goodarzi, A., and Ditterich, J. (2018). Toward a Neuroscience of Adult Cognitive Developmental Theory. *Front Neurosci* 12, 4. doi: 10.3389/fnins.2018.00004
- Glannon, W. (2015). Neuromodulation and the mind-brain relation. *Front Integr Neurosci* 9.

- Goodwin, G. M., Holmes, E. A., Andersson, E., Browning, M., Jones, A., Lass-Hennemann, J., et al. (2018). From neuroscience to evidence based psychological treatments - The promise and the challenge, ECNP March 2016, Nice, France. *Eur Neuropsychopharmacol* 28, 317–333. doi: 10.1016/j.euroneuro.2017.10.036
- Grant, B. R., O'Loughlin, K., Holbrook, H. M., Althoff, R. R., Kearney, C., Perepletchikova, F., et al. (2020). A multi-method and multi-informant approach to assessing post-traumatic stress disorder (PTSD) in children. *Int Rev Psychiatry* 32, 212–220. doi: 10.1080/09540261.2019.1697212
- Gur, R. E., Moore, T. M., Calkins, M. E., Ruparel, K., and Gur, R. C. (2017). Face Processing Measures of Social Cognition: A Dimensional Approach to Developmental Psychopathology. *Biol Psychiatry Cogn Neurosci Neuroimaging* 2, 502–509. doi: 10.1016/j.bpsc.2017.03.010
- Hasratian, A. M., Nordberg, H. O., Meuret, A. E., and Ritz, T. (2021). Fear and Coping in Students during the Early Stages of the COVID-19 Pandemic: A Combined Cross-Sectional and Longitudinal Study. *Int J Environ Res Public Health* 18. doi: 10.3390/ijerph18126551
- Hegerl, U., and Hensch, T. (2017). Why do stimulants not work in typical depression? *Aust N Z J Psychiatry* 51, 20–22. doi: 10.1177/0004867416676369
- Henry, C., Bigot, M., Masson, M., Siopi, E., and Dargel, A. A. (2018). Animal models of bipolar disorders: Towards new perspectives. *ANNALES MEDICO-PSYCHOLOGIQUES* 176, 200–204. doi: 10.1016/j.amp.2017.12.006
- Herrington, J. D., Maddox, B. B., McVey, A. J., Franklin, M. E., Yerys, B. E., Miller, J. S., et al. (2017). Negative Valence in Autism Spectrum Disorder: The Relationship Between Amygdala Activity, Selective Attention, and Co-occurring Anxiety. *Biol Psychiatry Cogn Neurosci Neuroimaging* 2, 510–517. doi: 10.1016/j.bpsc.2017.03.009
- Hofmann, S. G. (2014). Interpersonal Emotion Regulation Model of Mood and Anxiety Disorders. *Cognit Ther Res* 38, 483–492. doi: 10.1007/s10608-014-9620-1
- Huey, E. D., Lee, S., Lieberman, J. A., Devanand, D. P., Brickman, A. M., Raymont, V., et al. (2016). Brain Regions Associated With Internalizing and Externalizing Psychiatric Symptoms in Patients With Penetrating Traumatic Brain Injury. *J Neuropsychiatry Clin Neurosci* 28, 104–111. doi: 10.1176/appi.neuropsych.15060150
- Hur, J., Smith, J. F., DeYoung, K. A., Anderson, A. S., Kuang, J., Kim, H. C., et al. (2020). Anxiety and the Neurobiology of Temporally Uncertain Threat Anticipation. *J Neurosci* 40, 7949–7964. doi: 10.1523/JNEUROSCI.0704-20.2020
- Ito, M., Miyamae, M., Yokoyama, C., Yamashita, Y., Ueno, O., Maruo, K., et al. (2019). Augmentation of Positive Valence System-Focused Cognitive Behavioral Therapy by Inaudible High-Frequency Sounds for Anhedonia: A Trial Protocol for a Pilot Study. *JAMA Netw Open* 2, e1915819. doi: 10.1001/jamanetworkopen.2019.15819
- Jackson, M. G., and Robinson, E. S. J. (2022). The importance of a multidimensional approach to the preclinical study of major depressive disorder and apathy. *Emerg Top Life Sci* 6, 479–489. doi: 10.1042/ETLS20220004
- Jagadapillai, R., Qiu, X., Ojha, K., Li, Z., El-Baz, A., Zou, S., et al. (2022). Potential Cross Talk between Autism Risk Genes and Neurovascular Molecules: A Pilot Study on Impact of Blood Brain Barrier Integrity. *Cells* 11. doi: 10.3390/cells11142211
- Jagannath, V., Theodoridou, A., Gerstenberg, M., Franscini, M., Heekeren, K., Correll, C. U., et al. (2017). Prediction Analysis for Transition to Schizophrenia in Individuals at Clinical High Risk for Psychosis: The Relationship of DAO, DAOA, and NRG1 Variants with Negative Symptoms and Cognitive Deficits. *Front Psychiatry* 8, 292. doi: 10.3389/fpsyg.2017.00292
- Javanbakht, A. (2018). A Theory of Everything: Overlapping Neurobiological Mechanisms of Psychotherapies of Fear and Anxiety Related Disorders. *Front Behav Neurosci* 12, 328. doi: 10.3389/fnbeh.2018.00328

- Johnson, A., Rainville, J. R., Rivero-Ballon, G. N., Dhimitri, K., and Hodes, G. E. (2021). Testing the Limits of Sex Differences Using Variable Stress. *Neuroscience* 454, 72–84. doi: 10.1016/j.neuroscience.2019.12.034
- Kalanthroff, E., Anholt, G. E., and Simpson, H. B. (2017). “Research domain criteria and OCD: An oxymoron?” in *Obsessive-compulsive disorder: Phenomenology, pathophysiology, and treatment*, ed. C. Pittenger (New York, NY: Oxford University Press), 689–701.
- Kanchanatawan, B., Sriswasdi, S., Thika, S., Stoyanov, D., Sirivichayakul, S., Carvalho, A. F., et al. (2018). Towards a new classification of stable phase schizophrenia into major and simple neuro-cognitive psychosis: Results of unsupervised machine learning analysis. *J Eval Clin Pract* 24, 879–891. doi: 10.1111/jep.12945
- Kangas, B. D., Der-Avakanian, A., and Pizzagalli, D. A. (2022). Probabilistic Reinforcement Learning and Anhedonia. *Curr Top Behav Neurosci* 58, 355–377. doi: 10.1007/7854_2022_349
- Karalunas, S. L., Antovich, D., Goh, P. K., Martel, M. M., Tipsord, J., Nousen, E. K., et al. (2021). Longitudinal network model of the co-development of temperament, executive functioning, and psychopathology symptoms in youth with and without ADHD. *Dev Psychopathol* 33, 1803–1820. doi: 10.1017/s0954579421000900
- Kaye, J. T., Bradford, D. E., and Curtin, J. J. (2016). Psychometric properties of startle and corrugator response in NPU, affective picture viewing, and resting state tasks. *Psychophysiology* 53, 1241–1255. doi: 10.1111/psyp.12663
- Khalsa, S. S., Adolphs, R., Cameron, O. G., Critchley, H. D., Davenport, P. W., Feinstein, J. S., et al. (2018). Interoception and Mental Health: A Roadmap. *Biol Psychiatry Cogn Neurosci Neuroimaging* 3, 501–513. doi: 10.1016/j.bpsc.2017.12.004
- Kircanski, K., Zhang, S., Stringaris, A., Wiggins, J. L., Towbin, K. E., Pine, D. S., et al. (2017). Empirically derived patterns of psychiatric symptoms in youth: A latent profile analysis. *J Affect Disord* 216, 109–116. doi: 10.1016/j.jad.2016.09.016
- Konicar, L., Prillinger, K., Klöbl, M., Lanzenberger, R., Antal, A., and Plener, P. L. (2022). Brain Stimulation for Emotion Regulation in Adolescents With Psychiatric Disorders: Study Protocol for a Clinical-Transdiagnostical, Randomized, Triple-Blinded and Sham-Controlled Neurotherapeutic Trial. *Front Psychiatry* 13, 840836. doi: 10.3389/fpsyg.2022.840836
- Kramer, L., Sander, C., Bertsch, K., Gescher, D. M., Cackowski, S., Hegerl, U., et al. (2019). EEG-vigilance regulation in Borderline Personality Disorder. *Int J Psychophysiol* 139, 10–17. doi: 10.1016/j.ijpsycho.2019.02.007
- Kujawa, A., and Burkhouse, K. L. (2017). Vulnerability to Depression in Youth: Advances from Affective Neuroscience. *Biol Psychiatry Cogn Neurosci Neuroimaging* 2, 28–37. doi: 10.1016/j.bpsc.2016.09.006
- Kupferberg, A., Bicks, L., and Hasler, G. (2016). Social functioning in major depressive disorder. *Neurosci Biobehav Rev* 69, 313–332. doi: 10.1016/j.neubiorev.2016.07.002
- Latzman, R. D., Young, L. J., and Hopkins, W. D. (2016). Displacement behaviors in chimpanzees (Pan troglodytes): A neurogenomics investigation of the RDoC Negative Valence Systems domain. *Psychophysiology* 53, 355–363. doi: 10.1111/psyp.12449
- Lebowitz, E. R., Gee, D. G., Pine, D. S., and Silverman, W. K. (2018). Implications of the Research Domain Criteria project for childhood anxiety and its disorders. *Clin Psychol Rev* 64, 99–109. doi: 10.1016/j.cpr.2018.01.005
- Lee, M., Aggen, S. H., Carney, D. M., Hahn, S., Moroney, E., Machlin, L., et al. (2017). Latent structure of negative valence measures in childhood. *Depress Anxiety* 34, 742–751. doi: 10.1002/da.22656
- Leibold, N. K., van den Hove, D. L. A., Viechtbauer, W., Buchanan, G. F., Goossens, L., Lange, I., et al. (2016). CO₂ exposure as translational cross-species experimental model for panic. *Transl Psychiatry* 6, e885. doi: 10.1038/tp.2016.162

- Leventhal, A. M., Strong, D. R., Sussman, S., Kirkpatrick, M. G., Unger, J. B., Barrington-Trimis, J. L., et al. (2016). Psychiatric comorbidity in adolescent electronic and conventional cigarette use. *J Psychiatr Res* 73, 71–78. doi: 10.1016/j.jpsychires.2015.11.008
- Loerinc, A. G. *Examining the effectiveness and feasibility of a self-guided version of positive affect treatment.* ProQuest Information & Learning.
- Lowery-Gionta, E. G., DiBerto, J., Mazzone, C. M., and Kash, T. L. (2018). GABA neurons of the ventral periaqueductal gray area modulate behaviors associated with anxiety and conditioned fear. *Brain Struct Funct* 223, 3787–3799. doi: 10.1007/s00429-018-1724-z
- Luoma, J. (2011). Member update on 2011 NIMH research priorities and advances. *Behav Ther (N Y N Y)* 34, 93–94.
- Macpherson, T., and Hikida, T. (2019). Response to ‘mood and affect’. *Psychiatry Clin Neurosci* 73, 347. doi: 10.1111/pcn.12845
- Masand, P. S., and Pae, C.-U. (2015). Cognitive dysfunction in psychiatric illness: A neglected domain. *J Clin Psychiatry* 76, e375–e377. doi: 10.4088/JCP.15com09780
- Mason, B. L., Brown, E. S., and Croarkin, P. E. (2016). Historical Underpinnings of Bipolar Disorder Diagnostic Criteria. *Behav Sci (Basel)* 6. doi: 10.3390/bs6030014
- McEvoy, P. M., Carleton, R. N., Correa, K., Shankman, S. A., and Shihata, S. (2019). “Intolerance of uncertainty,” in *The Cambridge handbook of anxiety and related disorders*, ed. B. O. Olatunji (New York, NY: Cambridge University Press), 196–226.
- McIntyre, R. S., Johe, K., Rong, C., and Lee, Y. (2017). The neurogenic compound, NSI-189 phosphate: a novel multi-domain treatment capable of pro-cognitive and antidepressant effects. *Expert Opin Investig Drugs* 26, 767–770. doi: 10.1080/13543784.2017.1324847
- Molnar, C. (2020). Michael J. Kozak (1952–2019). *Am Psychol* 75, 123. doi: 10.1037/amp0000518
- Monteleone, A. M., Cascino, G., Ruzzi, V., Pellegrino, F., Carfagno, M., Raia, M., et al. (2020). Multiple levels assessment of the RDoC “system for social process” in Eating Disorders: Biological, emotional and cognitive responses to the Trier Social Stress Test. *J Psychiatr Res* 130, 160–166. doi: 10.1016/j.jpsychires.2020.07.039
- Moreno-Montoya, M., Olmedo-Córdoba, M., and Martín-González, E. (2022). Negative valence system as a relevant domain in compulsivity: review in a preclinical model of compulsivity. *Emerg Top Life Sci* 6, 491–500. doi: 10.1042/ETLS20220005
- Moser, J. S., Durbin, C. E., Patrick, C. J., and Schmidt, N. B. (2015). Combining neural and behavioral indicators in the assessment of internalizing psychopathology in children and adolescents. *J Clin Child Adolesc Psychol* 44, 329–340. doi: 10.1080/15374416.2013.865191
- Muecke-Heim, I.-A. von, Ries, C., Urbina, L., and Deussing, J. M. (2021). P2X7R antagonists in chronic stress-based depression models: a review. *Eur Arch Psychiatry Clin Neurosci* 271, 1343–1358. doi: 10.1007/s00406-021-01306-3
- Nguyen, T. N. B., Ely, B. A., Pick, D., Patel, M., Xie, H., Kim-Schulze, S., et al. (2022). Clenbuterol attenuates immune reaction to lipopolysaccharide and its relationship to anhedonia in adolescents. *Brain Behav Immun* 106, 89–99. doi: 10.1016/j.bbi.2022.07.163
- Nicholson, J. R., and Sommer, B. (2018). The research domain criteria framework in drug discovery for neuropsychiatric diseases: focus on negative valence. *Brain Neurosci Adv* 2, 2398212818804030. doi: 10.1177/2398212818804030
- Norholm, S. D., Glover, E. M., Stevens, J. S., Fani, N., Galatzer-Levy, I. R., Bradley, B., et al. (2015). Fear load: The psychophysiological over-expression of fear as an intermediate phenotype associated with trauma reactions. *Int J Psychophysiol* 98, 270–275. doi: 10.1016/j.ijpsycho.2014.11.005
- Northoff, G. (2020). “Brain and mind in psychiatry? Presuppositions of cognitive ontology,” in *Levels of analysis in psychopathology: Cross-disciplinary perspectives*, eds. K. S. Kendler, J. Parnas, and P. Zachar (New York, NY: Cambridge University Press), 78–85.

- Oikonomidis, L., Santangelo, A. M., Shiba, Y., Clarke, F. H., Robbins, T. W., and Roberts, A. C. (2017). A dimensional approach to modeling symptoms of neuropsychiatric disorders in the marmoset monkey. *Dev Neurobiol* 77, 328–353. doi: 10.1002/dneu.22446
- Owens, M., and Gibb, B. E. (2017). Brooding rumination and attentional biases in currently non-depressed individuals: an eye-tracking study. *Cogn Emot* 31, 1062–1069. doi: 10.1080/02699931.2016.1187116
- Paris, J., and Bayes, A. (2019). “Differentiating bipolar II disorder from personality-based dysregulation disorders,” in *Bipolar II disorder: Modelling, measuring and managing.*, 3rd ed, ed. G. Parker (New York, NY: Cambridge University Press), 77–90.
- Park, S.-C., and Kim, Y.-K. (2019). A Novel Bio-Psychosocial-Behavioral Treatment Model of Panic Disorder. *Psychiatry Investig* 16, 4–15. doi: 10.30773/pi.2018.08.21.1
- Paschali, M., Kiss, O., Zhao, Q., Adeli, E., Podhajsky, S., Müller-Oehring, E. M., et al. (2022). Detecting negative valence symptoms in adolescents based on longitudinal self-reports and behavioral assessments. *J Affect Disord* 312, 30–38. doi: 10.1016/j.jad.2022.06.002
- Paschali, M., Zhao, Q., Adeli, E., and Pohl, K. M. (2022). Bridging the Gap between Deep Learning and Hypothesis-Driven Analysis via Permutation Testing. *Predict Intell Med* 13564, 13–23. doi: 10.1007/978-3-031-16919-9_2
- Phan, K. L. (2015). “Neurobiology and neuroimaging of fear and anxiety circuitry,” in *Anxiety disorders: Translational perspectives on diagnosis and treatment*, eds. K. J. Ressler, D. S. Pine, and B. O. Rothbaum (New York, NY: Oxford University Press), 33–45.
- Phillips, A. G., and Ahn, S. (2022). Anticipation: An Essential Feature of Anhedonia. *Curr Top Behav Neurosci* 58, 305–323. doi: 10.1007/7854_2022_317
- Pollack, L. O. *Examination of non-facial emotion recognition in adolescents with anorexia nervosa*. ProQuest Information & Learning.
- Premo, J. E., Liu, Y., Bilek, E. L., Phan, K. L., Monk, C. S., and Fitzgerald, K. D. (2020). Grant Report on Anxiety-CBT: Dimensional Brain Behavior Predictors of CBT Outcomes in Pediatric Anxiety. *J Psychiatr Brain Sci* 5. doi: 10.20900/jpbs.20200005
- Puryear, C. B., Brooks, J., Tan, L., Smith, K., Li, Y., Cunningham, J., et al. (2020). Opioid receptor modulation of neural circuits in depression: What can be learned from preclinical data? *Neurosci Biobehav Rev* 108, 658–678. doi: 10.1016/j.neubiorev.2019.12.007
- Putnam, K. T., Wilcox, M., Robertson-Blackmore, E., Sharkey, K., Bergink, V., Munk-Olsen, T., et al. (2017). ‘Clinical phenotypes of perinatal depression and time of symptom onset: analysis of data from an international consortium’: Correction. *Lancet Psychiatry* 4, 436. doi: 10.1016/S2215-0366(17)30213-4
- Riboni, F. V., and Belzung, C. (2017). Stress and psychiatric disorders: from categorical to dimensional approaches. *CURRENT OPINION IN BEHAVIORAL SCIENCES* 14, 72–77. doi: 10.1016/j.cobeha.2016.12.011
- Rodriguez, G., Moore, S. J., Neff, R. C., Glass, E. D., Stevenson, T. K., Stinnett, G. S., et al. (2020). Deficits across multiple behavioral domains align with susceptibility to stress in 129S1/SvImJ mice. *Neurobiol Stress* 13, 100262. doi: 10.1016/j.ynstr.2020.100262
- Rohan, K. J., Franzen, P. L., Roecklin, K. A., Siegle, G. J., Kolko, D. J., Postolache, T. T., et al. (2022). Elucidating treatment targets and mediators within a confirmatory efficacy trial: study protocol for a randomized controlled trial of cognitive-behavioral therapy vs. light therapy for winter depression. *Trials* 23, 383. doi: 10.1186/s13063-022-06330-9
- Roma, P. G., Schneiderman, J. S., Schorn, J. M., Whiting, S. E., Landon, L. B., and Williams, T. J. (2021). Assessment of Spaceflight Medical Conditions’ and Treatments’ Potential Impacts on Behavioral Health and Performance. *Life Sci Space Res (Amst)* 30, 72–81. doi: 10.1016/j.lssr.2021.05.006
- Rondon, M. B., and Stewart, D. E. (2017). Disentangling the heterogeneity of perinatal depression. *Lancet Psychiatry* 4, 432–433. doi: 10.1016/S2215-0366(17)30192-X

- Ross, C. A., and Margolis, R. L. (2019). Research Domain Criteria: Strengths, Weaknesses, and Potential Alternatives for Future Psychiatric Research. *Mol Neuropsychiatry* 5, 218–236. doi: 10.1159/000501797
- Rosso, I. M., Dillon, D. G., Pizzagalli, D. A., and Rauch, S. L. (2015). “Translational perspectives on anxiety disorders and the research domain criteria construct of potential threat,” in *Anxiety disorders: Translational perspectives on diagnosis and treatment*, eds. K. J. Ressler, D. S. Pine, and B. O. Rothbaum (New York, NY: Oxford University Press), 17–29.
- Santana-Santana, M., Bayascas, J.-R., and Giménez-Llorente, L. (2021). Fine-Tuning the PI3K/Akt Signaling Pathway Intensity by Sex and Genotype-Load: Sex-Dependent Homozygotic Threshold for Somatic Growth but Feminization of Anxious Phenotype in Middle-Aged PDK1 K465E Knock-In and Heterozygous Mice. *Biomedicines* 9. doi: 10.3390/biomedicines9070747
- Schettino, M., Ghezzi, V., Ang, Y.-S., Duda, J. M., Fagioli, S., Mennin, D. S., et al. (2021). Perseverative Cognition in the Positive Valence Systems: An Experimental and Ecological Investigation. *Brain Sci* 11. doi: 10.3390/brainsci11050585
- Schmidt, U., and Vermetten, E. (2018). Integrating NIMH Research Domain Criteria (RDoC) into PTSD Research. *Curr Top Behav Neurosci* 38, 69–91. doi: 10.1007/7854_2017_1
- Seager, I., Rowley, A. M., and Ehrenreich-May, J. (2014). Targeting Common Factors Across Anxiety and Depression Using the Unified Protocol for the Treatment of Emotional Disorders in Adolescents. *JOURNAL OF RATIONAL-EMOTIVE AND COGNITIVE-BEHAVIOR THERAPY* 32, 67–83. doi: 10.1007/s10942-014-0185-4
- Seok, D., Smyk, N., Jaskir, M., Cook, P., Elliott, M., Girelli, T., et al. (2020). Dimensional connectomics of anxious misery, a human connectome study related to human disease: Overview of protocol and data quality. *Neuroimage Clin* 28, 102489. doi: 10.1016/j.nicl.2020.102489
- Severus, E., Ebner-Priemer, U., Beier, F., Mühlbauer, E., Ritter, P., Hill, H., et al. (2019). Ambulatory monitoring and digital phenotyping in the diagnostics and treatment of bipolar disorders. *Nervenarzt* 90, 1215–1220. doi: 10.1007/s00115-019-00816-9
- Shalev, I. (2018). Use of a Self-Regulation Failure Framework and the NIMH Research Domain Criterion (RDoC) to Understand the Problem of Procrastination. *Front Psychiatry* 9. doi: 10.3389/fpsyg.2018.00213
- Shankman, S. A., Katz, A. C., and Langenecker, S. A. (2016). Taking an RDoC lens to the study of panic disorder: A commentary on Hamm et al. and other thoughts on RDoC. *Psychophysiology* 53, 328–331. doi: 10.1111/psyp.12590
- Sill, J., Popov, T., Schauer, M., and Elbert, T. (2020). Rapid brain responses to affective pictures indicate dimensions of trauma-related psychopathology in adolescents. *Psychophysiology* 57, e13353. doi: 10.1111/psyp.13353
- Smith, N. J., Markowitz, S. Y., Hoffman, A. N., and Fanselow, M. S. (2022). Adaptation of Threat Responses Within the Negative Valence Framework. *Front Syst Neurosci* 16, 886771. doi: 10.3389/fnsys.2022.886771
- Stewart, J. G., Polanco-Roman, L., Duarte, C. S., and Auerbach, R. P. (2019). Neurocognitive Processes Implicated in Adolescent Suicidal Thoughts and Behaviors: Applying an RDoC Framework for Conceptualizing Risk. *Curr Behav Neurosci Rep* 6, 188–196. doi: 10.1007/s40473-019-00194-1
- Stringaris, A., Vidal-Ribas Belil, P., Artiges, E., Lemaitre, H., Gollier-Briant, F., Wolke, S., et al. (2015). The brain’s response to reward anticipation and depression in adolescence: Dimensionality, specificity, and longitudinal predictions in a community-based sample. *Am J Psychiatry* 173, 1215–1223. doi: 10.1037/t01528-000;
- Tozzi, L., Staveland, B., Holt-Gosselin, B., Chesnut, M., Chang, S. E., Choi, D., et al. (2020). The human connectome project for disordered emotional states: Protocol and rationale for a research domain criteria study of brain connectivity in young adult anxiety and depression. *Neuroimage* 214, 116715. doi: 10.1016/j.neuroimage.2020.116715

- Trucco, E. M., Villafuerte, S., Hussong, A., Burmeister, M., and Zucker, R. A. (2018). Biological underpinnings of an internalizing pathway to alcohol, cigarette, and marijuana use. *J Abnorm Psychol* 127, 79–91. doi: 10.1037/abn0000310
- Vaidyanathan, U., and Pacheco, J. (2017). Research domain criteria constructs: Integrative reviews and empirical perspectives. *J Affect Disord* 216, 1–2. doi: 10.1016/j.jad.2017.05.028
- Vargas, T. G., and Mittal, V. A. (2021). Testing whether implicit emotion regulation mediates the association between discrimination and symptoms of psychopathology in late childhood: An RDoC perspective. *Dev Psychopathol* 33, 1634–1647. doi: 10.1017/S0954579421000638
- Victor, T. A., Khalsa, S. S., Simmons, W. K., Feinstein, J. S., Savitz, J., Aupperle, R. L., et al. (2018). Tulsa 1000: a naturalistic study protocol for multilevel assessment and outcome prediction in a large psychiatric sample. *BMJ Open* 8, e016620. doi: 10.1136/bmjopen-2017-016620
- Vogel, A. C., Tillman, R., El-Sayed, N. M., Jackson, J. J., Perlman, S. B., Barch, D. M., et al. (2021). Trajectory of emotion dysregulation in positive and negative affect across childhood predicts adolescent emotion dysregulation and overall functioning. *Dev Psychopathol* 33, 1722–1733. doi: 10.1017/s0954579421000705
- Walther, S., Bernard, J. A., Mittal, V. A., and Shankman, S. A. (2019). The utility of an RDoC motor domain to understand psychomotor symptoms in depression. *Psychol Med* 49, 212–216. doi: 10.1017/S0033291718003033
- Warren, S. L., Zhang, Y., Duberg, K., Mistry, P., Cai, W., Qin, S., et al. (2020). Anxiety and Stress Alter Decision-Making Dynamics and Causal Amygdala-Dorsolateral Prefrontal Cortex Circuits During Emotion Regulation in Children. *Biol Psychiatry* 88, 576–586. doi: 10.1016/j.biopsych.2020.02.011
- Weinberg, A., Meyer, A., Hale-Rude, E., Perlman, G., Kotov, R., Klein, D. N., et al. (2016). Error-related negativity (ERN) and sustained threat: Conceptual framework and empirical evaluation in an adolescent sample. *Psychophysiology* 53, 372–385. doi: 10.1111/psyp.12538
- Wielgosz, J., Goldberg, S. B., Kral, T. R. A., Dunne, J. D., and Davidson, R. J. (2019). Mindfulness Meditation and Psychopathology. *Annu Rev Clin Psychol* 15, 285–316. doi: 10.1146/annurev-clinpsy-021815-093423
- Williams, L. M., Goldstein-Piekarski, A. N., Chowdhry, N., Grisanzio, K. A., Haug, N. A., Samara, Z., et al. (2016). Developing a clinical translational neuroscience taxonomy for anxiety and mood disorder: protocol for the baseline-follow up Research domain criteria Anxiety and Depression ("RAD") project. *BMC Psychiatry* 16, 68. doi: 10.1186/s12888-016-0771-3
- Yang, Z., Oathes, D. J., Linn, K. A., Bruce, S. E., Satterthwaite, T. D., Cook, P. A., et al. (2018). Cognitive Behavioral Therapy Is Associated With Enhanced Cognitive Control Network Activity in Major Depression and Posttraumatic Stress Disorder. *Biol Psychiatry Cogn Neurosci Neuroimaging* 3, 311–319. doi: 10.1016/j.bpsc.2017.12.006
- Young, J. W., Winstanley, C. A., Brady, A. M., and Hall, F. S. (2017). Research Domain Criteria versus DSM V: How does this debate affect attempts to model corticostriatal dysfunction in animals? *Neurosci Biobehav Rev* 76, 301–316. doi: 10.1016/j.neubiorev.2016.10.029
- Zainal, N. H., Newman, M. G., and Hong, R. Y. (2021). Cross-Cultural and Gender Invariance of Transdiagnostic Processes in the United States and Singapore. *Assessment* 28, 485–502. doi: 10.1177/1073191119869832
- Zhou, A. J., Lee, Y., Salvadore, G., Hsu, B., Fonseka, T. M., Kennedy, S. H., et al. (2017). Sirukumab: A Potential Treatment for Mood Disorders? *Adv Ther* 34, 78–90. doi: 10.1007/s12325-016-0455-x
- Zilverstand, A., Parvaz, M. A., and Goldstein, R. Z. (2017). Neuroimaging cognitive reappraisal in clinical populations to define neural targets for enhancing emotion regulation. A systematic review. *Neuroimage* 151, 105–116. doi: 10.1016/j.neuroimage.2016.06.009

2 Sources excluded following full-text review

- Alexopoulos, G. S., and Arean, P. (2014). A model for streamlining psychotherapy in the RDoC era: the example of 'Engage'. *Mol Psychiatry* 19, 14–19. doi: 10.1038/mp.2013.150
- Arditte, K. A. *Cognitive vulnerability for social anxiety and depression: A transdiagnostic investigation of repetitive negative thinkers*. ProQuest Information & Learning.
- Bauer, E. A., Wilson, K. A., Phan, K. L., Shankman, S. A., and MacNamara, A. (2023). A Neurobiological Profile Underlying Comorbidity Load and Prospective Increases in Dysphoria in a Focal Fear Sample. *Biol Psychiatry* 93, 352–361. doi: 10.1016/j.biopsych.2022.08.009
- Bedwell, J. S., Gooding, D. C., Chan, C. C., and Trachik, B. J. (2014). Anhedonia in the age of RDoC. *Schizophr Res* 160, 226–227. doi: 10.1016/j.schres.2014.10.028
- Broome, M. R., He, Z., Iftikhar, M., Eyden, J., and Marwaha, S. (2015). Neurobiological and behavioural studies of affective instability in clinical populations: a systematic review. *Neurosci Biobehav Rev* 51, 243–254. doi: 10.1016/j.neubiorev.2015.01.021
- Gros, D. F. (2015). Design challenges in transdiagnostic psychotherapy research: Comparing Transdiagnostic Behavior Therapy (TBT) to existing evidence-based psychotherapy in veterans with affective disorders. *Contemp Clin Trials* 43, 114–119. doi: 10.1016/j.cct.2015.05.011
- Gururajan, A., Clarke, G., Dinan, T. G., and Cryan, J. F. (2016). Molecular biomarkers of depression. *Neurosci Biobehav Rev* 64, 101–133. doi: 10.1016/j.neubiorev.2016.02.011
- Hasratian, A. M., Meuret, A. E., Chmielewski, M., and Ritz, T. (2022). An Examination of the RDoC Negative Valence Systems Domain Constructs and the Self-Reports Unit of Analysis. *Behav Ther* 53, 1092–1108. doi: 10.1016/j.beth.2022.04.009
- Jauhar, S., Nour, M. M., Veronese, M., Rogdaki, M., Bonoldi, I., Azis, M., et al. (2017). A Test of the Transdiagnostic Dopamine Hypothesis of Psychosis Using Positron Emission Tomographic Imaging in Bipolar Affective Disorder and Schizophrenia. *JAMA Psychiatry* 74, 1206–1213. doi: 10.1001/jamapsychiatry.2017.2943
- Kelly, J. R., Gillan, C. M., Prenderville, J., Kelly, C., Harkin, A., Clarke, G., et al. (2021). Psychedelic Therapy's Transdiagnostic Effects: A Research Domain Criteria (RDoC) Perspective. *Front Psychiatry* 12, 800072. doi: 10.3389/fpsyg.2021.800072
- Kim, J. U., Bessette, K. L., Westlund-Schreiner, M., Pocius, S., Dillahunt, A. K., Frandsen, S., et al. (2022). Relations of gray matter volume to dimensional measures of cognition and affect in mood disorders. *Cortex* 156, 57–70. doi: 10.1016/j.cortex.2022.06.019
- Kirsch, J. L., and Ehlers, S. L. (2022). Factor Analysis of the Beck Depression Inventory-II and Long-Term Hematopoietic Stem Cell Transplantation Survival Using the Research Domain Criteria Framework. *Transplant Cell Ther.* doi: 10.1016/j.jtct.2022.12.012
- Kiyar, M., Lommen, M. J. J., Krebs, R. M., Daniels, J. K., and Mueller, S. C. (2021). Reward prospect improves inhibitory control in female university students with a history of childhood sexual and physical abuse. *J Behav Ther Exp Psychiatry* 71, 101629. doi: 10.1016/j.jbtep.2020.101629
- Klemanski, D. H., Curtiss, J., McLaughlin, K. A., and Nolen-Hoeksema, S. (2017). Emotion Regulation and the Transdiagnostic Role of Repetitive Negative Thinking in Adolescents with Social Anxiety and Depression. *Cognit Ther Res* 41, 206–219. doi: 10.1007/s10608-016-9817-6
- Kong, J., Xu, H., Ji, X., Zhang, J., Yang, H., Zhang, Y., et al. (2020). Attribution Retraining Group Therapy and SSRIs Affect Differing Facets of Anxiety Among Chinese Patients with Various Diagnoses: A Single-Center, Prospective Study. *PSYCHIATRY AND CLINICAL PSYCHOPHARMACOLOGY* 30, 97–106. doi: 10.5455/PCP.20200530013456
- Lang, P. J., McTeague, L. M., and Bradley, M. M. (2017). The Psychophysiology of Anxiety and Mood Disorders. *ZEITSCHRIFT FÜR PSYCHOLOGIE-JOURNAL OF PSYCHOLOGY* 225, 175–188. doi: 10.1027/2151-2604/a000302

- Langenecker, S. A., Mickey, B. J., Eichhammer, P., Sen, S., Elverman, K. H., Kennedy, S. E., et al. (2019). Cognitive Control as a 5-HT(1A)-Based Domain That Is Disrupted in Major Depressive Disorder. *Front Psychol* 10, 691. doi: 10.3389/fpsyg.2019.00691
- Li, J. J., Zhang, Q., Wang, Z., and Lu, Q. (2022). Research Domain Criteria (RDoC) mechanisms of transdiagnostic polygenic risk for trajectories of depression: From early adolescence to adulthood. *J Psychopathol Clin Sci* 131, 567–574. doi: 10.1037/abn0000659
- Liu, H., Lieberman, L., Stevens, E. S., Auerbach, R. P., and Shankman, S. A. (2017). Using a cultural and RDoC framework to conceptualize anxiety in Asian Americans. *J Anxiety Disord* 48, 63–69. doi: 10.1016/j.janxdis.2016.09.006
- Liu, Y., Meng, J., Wang, K., Zhuang, K., Chen, Q., Yang, W., et al. (2021). Morphometry of the Hippocampus Across the Adult Life-Span in Patients with Depressive Disorders: Association with Neuroticism. *Brain Topogr* 34, 587–597. doi: 10.1007/s10548-021-00846-0
- Lu, S., Zhang, Y., Liu, T., Leung, D. K. Y., Kwok, W.-W., Luo, H., et al. (2022). Associations between depressive symptom clusters and care utilization and costs among community-dwelling older adults. *Int J Geriatr Psychiatry* 37. doi: 10.1002/gps.5636
- Magaraggia, I., Kuiper, Z., and Schreiber, R. (2021). Improving cognitive functioning in major depressive disorder with psychedelics: A dimensional approach. *Neurobiol Learn Mem* 183, 107467. doi: 10.1016/j.nlm.2021.107467
- Mareckova, K., Holsen, L., Admon, R., Whitfield-Gabrieli, S., Seidman, L. J., Buka, S. L., et al. (2017). Neural - hormonal responses to negative affective stimuli: Impact of dysphoric mood and sex. *J Affect Disord* 222, 88–97. doi: 10.1016/j.jad.2017.06.050
- Mareckova, K., Holsen, L. M., Admon, R., Makris, N., Seidman, L., Buka, S., et al. (2016). Brain activity and connectivity in response to negative affective stimuli: Impact of dysphoric mood and sex across diagnoses. *Hum Brain Mapp* 37, 3733–3744. doi: 10.1002/hbm.23271
- McKay, D., and Tolin, D. F. (2017). Empirically supported psychological treatments and the Research Domain Criteria (RDoC). *J Affect Disord* 216, 78–88. doi: 10.1016/j.jad.2016.10.018
- Park, S.-C., and Kim, Y.-K. (2021). Challenges and Strategies for Current Classifications of Depressive Disorders: Proposal for Future Diagnostic Standards. *Adv Exp Med Biol* 1305, 103–116. doi: 10.1007/978-981-33-6044-0_7
- Podlogar, M. C., Rogers, M. L., Stanley, I. H., Hom, M. A., Chiurliza, B., and Joiner, T. E. (2018). Anxiety, depression, and the suicidal spectrum: a latent class analysis of overlapping and distinctive features. *Cogn Emot* 32, 1464–1477. doi: 10.1080/02699931.2017.1303452
- Portugal, L. C. L., Schrouff, J., Stiffler, R., Bertocci, M., Bebko, G., Chase, H., et al. (2019). Predicting anxiety from wholebrain activity patterns to emotional faces in young adults: a machine learning approach. *Neuroimage Clin* 23, 101813. doi: 10.1016/j.nicl.2019.101813
- Putnam, K. T., Wilcox, M., Robertson-Blackmore, E., Sharkey, K., Bergink, V., Munk-Olsen, T., et al. (2017). Clinical phenotypes of perinatal depression and time of symptom onset: analysis of data from an international consortium. *Lancet Psychiatry* 4, 477–485. doi: 10.1016/S2215-0366(17)30136-0
- Rzepa, E., and McCabe, C. (2019). Dimensional anhedonia and the adolescent brain: reward and aversion anticipation, effort and consummation. *BJP Psych Open* 5, e99. doi: 10.1192/bjo.2019.68
- Seok, D., Beer, J., Jaskir, M., Smyk, N., Jaganjac, A., Makhoul, W., et al. (2022). Differential Impact of Anxious Misery Psychopathology on Multiple Representations of the Functional Connectome. *Biol Psychiatry Glob Open Sci* 2, 489–499. doi: 10.1016/j.bpsgos.2021.11.004
- Shackman, A. J., and Fox, A. S. (2016). Contributions of the Central Extended Amygdala to Fear and Anxiety. *J Neurosci* 36, 8050–8063. doi: 10.1523/JNEUROSCI.0982-16.2016
- Sharp, C., Kim, S., Herman, L., Pane, H., Reuter, T., and Strathearn, L. (2014). Major depression in mothers predicts reduced ventral striatum activation in adolescent female offspring with and without depression. *J Abnorm Psychol* 123, 298–309. doi: 10.1037/a0036191

- Sharp, P. B., Miller, G. A., and Heller, W. (2015). Transdiagnostic dimensions of anxiety: Neural mechanisms, executive functions, and new directions. *Int J Psychophysiol* 98, 365–377. doi: 10.1016/j.ijpsycho.2015.07.001
- Souza, A. M. F. L. P. de, Nonohay, R. G. de, and Gauer, G. (2018). Frustrating feedback effects on Error-Related Negativity (ERN) as a dimensional marker of negative affect. *CLINICAL NEUROPSYCHIATRY* 15, 275–283. doi: 10.1037/t06070-000
- Sumner, J. A., Powers, A., Jovanovic, T., and Koenen, K. C. (2016). Genetic influences on the neural and physiological bases of acute threat: A research domain criteria (RDoC) perspective. *Am J Med Genet B Neuropsychiatr Genet* 171B, 44–64. doi: 10.1002/ajmg.b.32384
- Swardfager, W., Rosenblat, J. D., Benlamri, M., and McIntyre, R. S. (2016). Mapping inflammation onto mood: Inflammatory mediators of anhedonia. *Neurosci Biobehav Rev* 64, 148–166. doi: 10.1016/j.neubiorev.2016.02.017
- Talati, A., van Dijk, M. T., Pan, L., Hao, X., Wang, Z., Gameroff, M., et al. (2022). Putamen Structure and Function in Familial Risk for Depression: A Multimodal Imaging Study. *Biol Psychiatry* 92, 932–941. doi: 10.1016/j.biopsych.2022.06.035
- van Meter, A. R., and Youngstrom, E. A. (2015). A tale of two diatheses: Temperament, BIS, and BAS as risk factors for mood disorder. *J Affect Disord* 180, 170–178. doi: 10.1016/j.jad.2015.03.053
- Walter, H., Daniels, A., and Wellan, S. A. (2021). Positive cognitive neuroscience : Positive valence systems of the Research Domain Criteria initiative. *Nervenarzt* 92, 878–891. doi: 10.1007/s00115-021-01167-0
- Ward, J., Strawbridge, R. J., Bailey, M. E. S., Graham, N., Ferguson, A., Lyall, D. M., et al. (2017). Genome-wide analysis in UK Biobank identifies four loci associated with mood instability and genetic correlation with major depressive disorder, anxiety disorder and schizophrenia. *Transl Psychiatry* 7, 1264. doi: 10.1038/s41398-017-0012-7
- Watson, D., Stanton, K., and Clark, L. A. (2017). Self-report indicators of negative valence constructs within the research domain criteria (RDoC): A critical review. *J Affect Disord* 216, 58–69. doi: 10.1016/j.jad.2016.09.065
- Wei, M., and Roodenrys, S. (2021). A scoping review on the extent and nature of anxiety-related research within the research domain criteria (RDoC) framework: Limited coverage using non-disorder-specific search terms. *New Ideas Psychol* 63. doi: 10.1016/j.newideapsych.2021.100901
- Wu, M.-J., Mwangi, B., Bauer, I. E., Passos, I. C., Sanches, M., Zunta-Soares, G. B., et al. (2017). Identification and individualized prediction of clinical phenotypes in bipolar disorders using neurocognitive data, neuroimaging scans and machine learning. *Neuroimage* 145, 254–264. doi: 10.1016/j.neuroimage.2016.02.016
- Xie, J., Fang, P., Zhang, Z., Luo, R., and Dai, B. (2021). Behavioral Inhibition/Activation Systems and Depression Among Females With Substance Use Disorder: The Mediating Role of Intolerance of Uncertainty and Anhedonia. *Front Psychiatry* 12, 644882. doi: 10.3389/fpsyt.2021.644882
- Yaseen, Z. S., Galynker, I. I., Briggs, J., Freed, R. D., and Gabbay, V. (2016). Functional domains as correlates of suicidality among psychiatric inpatients. *J Affect Disord* 203, 77–83. doi: 10.1016/j.jad.2016.05.066

3 Sources included in synthesis

- Alexopoulos, G. S., Raue, P. J., Gunning, F., Kiosses, D. N., Kanellopoulos, D., Pollari, C., et al. (2016). "Engage" Therapy: Behavioral Activation and Improvement of Late-Life Major Depression. *Am J Geriatr Psychiatry* 24, 320–326. doi: 10.1016/j.jagp.2015.11.006
- Alexopoulos, G. S., Raue, P. J., Kiosses, D. N., Seirup, J. K., Banerjee, S., and Arean, P. A. (2015). Comparing engage with PST in late-life major depression: a preliminary report. *Am J Geriatr Psychiatry* 23, 506–513. doi: 10.1016/j.jagp.2014.06.008

- Barch, D. M., Pagliaccio, D., and Luking, K. (2016). Mechanisms Underlying Motivational Deficits in Psychopathology: Similarities and Differences in Depression and Schizophrenia. *Curr Top Behav Neurosci* 27, 411–449. doi: 10.1007/7854_2015_376
- Baskin-Sommers, A. R., and Foti, D. (2015). Abnormal reward functioning across substance use disorders and major depressive disorder: Considering reward as a transdiagnostic mechanism. *Int J Psychophysiol* 98, 227–239. doi: 10.1016/j.ijpsycho.2015.01.011
- Boecker, L., and Pauli, P. (2019). Affective startle modulation and psychopathology: Implications for appetitive and defensive brain systems. *Neurosci Biobehav Rev* 103, 230–266. doi: 10.1016/j.neubiorev.2019.05.019
- Cochran, A. L., Pingeton, B. C., Goodman, S. H., Laurent, H., Rathouz, P. J., Newport, D. J., et al. (2020). A transdiagnostic approach to conceptualizing depression across the perinatal period in a high-risk sample. *J Abnorm Psychol* 129, 689–700. doi: 10.1037/abn0000612
- Ellingson, J. M., Richmond-Rakerd, L. S., Statham, D. J., Martin, N. G., and Slutske, W. S. (2016). Most of the genetic covariation between major depressive and alcohol use disorders is explained by trait measures of negative emotionality and behavioral control. *Psychol Med* 46, 2919–2930. doi: 10.1017/S0033291716001525
- Ethridge, P., Freeman, C., Sandre, A., Banica, I., Dirks, M. A., and Weinberg, A. (2021). Intergenerational transmission of depression risk: Mothers' neural response to reward and history of depression are associated with daughters' neural response to reward across adolescence. *J Abnorm Psychol*. doi: 10.1037/abn0000662
- Fettes, P., Schulze, L., and Downar, J. (2017). Cortico-Striatal-Thalamic Loop Circuits of the Orbitofrontal Cortex: Promising Therapeutic Targets in Psychiatric Illness. *Front Syst Neurosci* 11, 25. doi: 10.3389/fnsys.2017.00025
- Förstner, B. R., Tschorl, M., Reinoso-Schiller, N., Marićić, L. M., Röcher, E., Kalman, J. L., et al. (2022). Mapping Research Domain Criteria using a transdiagnostic mini-RDoC assessment in mental disorders: a confirmatory factor analysis. *Eur Arch Psychiatry Clin Neurosci*. doi: 10.1007/s00406-022-01440-6
- Gibb, B. E., McGahey, J. E., and Beevers, C. G. (2016). Attentional biases to emotional stimuli: Key components of the RDoC constructs of sustained threat and loss. *Am J Med Genet B Neuropsychiatr Genet* 171B, 65–80. doi: 10.1002/ajmg.b.32383
- Gruber, J., Mennin, D. S., Fields, A., Purcell, A., and Murray, G. (2015). Heart rate variability as a potential indicator of positive valence system disturbance: A proof of concept investigation. *Int J Psychophysiol* 98, 240–248. doi: 10.1016/j.ijpsycho.2015.08.005
- Guineau, M. G., Ikani, N., Rinck, M., Collard, R. M., van Eijndhoven, P., Tendolkar, I., et al. (2022). Anhedonia as a transdiagnostic symptom across psychological disorders: a network approach. *Psychol Med*, 1–12. doi: 10.1017/S0033291722000575
- Gunzler, D., Sehgal, A. R., Kauffman, K., Davey, C. H., Dolata, J., Figueroa, M., et al. (2020). Identify depressive phenotypes by applying RDOC domains to the PHQ-9. *Psychiatry Res* 286, 112872. doi: 10.1016/j.psychres.2020.112872
- Hamm, A. O., Richter, J., Pané-Farré, C., Westphal, D., Wittchen, H.-U., Vossbeck-Elsebusch, A. N., et al. (2016). Panic disorder with agoraphobia from a behavioral neuroscience perspective: Applying the research principles formulated by the Research Domain Criteria (RDoC) initiative. *Psychophysiology* 53, 312–322. doi: 10.1111/psyp.12553
- Janiri, D., Moser, D. A., Doucet, G. E., Luber, M. J., Rasgon, A., Lee, W. H., et al. (2020). Shared Neural Phenotypes for Mood and Anxiety Disorders: A Meta-analysis of 226 Task-Related Functional Imaging Studies. *JAMA Psychiatry* 77, 172–179. doi: 10.1001/jamapsychiatry.2019.3351
- Khazanov, G. K., Ruscio, A. M., and Forbes, C. N. (2020). The Positive Valence Systems Scale: Development and Validation. *Assessment* 27, 1045–1069. doi: 10.1177/1073191119869836

- Klumpp, H., and Shankman, S. A. (2018). Using Event-Related Potentials and Startle to Evaluate Time Course in Anxiety and Depression. *Biol Psychiatry Cogn Neurosci Neuroimaging* 3, 10–18. doi: 10.1016/j.bpsc.2017.09.004
- Lang, P. J., Herring, D. R., Duncan, C., Richter, J., Sege, C. T., Weymar, M., et al. (2018). The Startle-Evoked Potential: Negative Affect and Severity of Pathology in Anxiety/Mood Disorders. *Biol Psychiatry Cogn Neurosci Neuroimaging* 3, 626–634. doi: 10.1016/j.bpsc.2017.07.006
- Lang, P. J., McTeague, L. M., and Bradley, M. M. (2016). RDoC, DSM, and the reflex physiology of fear: A bidimensional analysis of the anxiety disorders spectrum. *Psychophysiology* 53, 336–347. doi: 10.1111/psyp.12462
- Langenecker, S. A., Jacobs, R. H., and Passarotti, A. M. (2014). Current Neural and Behavioral Dimensional Constructs across Mood Disorders. *Curr Behav Neurosci Rep* 1, 144–153. doi: 10.1007/s40473-014-0018-x
- Langenecker, S. A., Westlund Schreiner, M., Thomas, L. R., Bessette, K. L., DelDonno, S. R., Jenkins, L. M., et al. (2022). Using Network Parcels and Resting-State Networks to Estimate Correlates of Mood Disorder and Related Research Domain Criteria Constructs of Reward Responsiveness and Inhibitory Control. *Biol Psychiatry Cogn Neurosci Neuroimaging* 7, 76–84. doi: 10.1016/j.bpsc.2021.06.014
- MacNamara, A., Klumpp, H., Kennedy, A. E., Langenecker, S. A., and Phan, K. L. (2017). Transdiagnostic neural correlates of affective face processing in anxiety and depression. *Depress Anxiety* 34, 621–631. doi: 10.1002/da.22631
- McTeague, L. M., Rosenberg, B. M., Lopez, J. W., Carreon, D. M., Huemer, J., Jiang, Y., et al. (2020). Identification of Common Neural Circuit Disruptions in Emotional Processing Across Psychiatric Disorders. *Am J Psychiatry* 177, 411–421. doi: 10.1176/appi.ajp.2019.18111271
- Medeiros, G. C., Rush, A. J., Jha, M., Carmody, T., Furman, J. L., Czysz, A. H., et al. (2020). Positive and negative valence systems in major depression have distinct clinical features, response to antidepressants, and relationships with immunomarkers. *Depress Anxiety* 37, 771–783. doi: 10.1002/da.23006
- Nakonezny, P. A., Morris, D. W., Greer, T. L., Byerly, M. J., Carmody, T. J., Grannemann, B. D., et al. (2015). Evaluation of anhedonia with the Snaith-Hamilton Pleasure Scale (SHAPS) in adult outpatients with major depressive disorder. *J Psychiatr Res* 65, 124–130. doi: 10.1016/j.jpsychires.2015.03.010
- Nusslock, R., and Alloy, L. B. (2017). Reward processing and mood-related symptoms: An RDoC and translational neuroscience perspective. *J Affect Disord* 216, 3–16. doi: 10.1016/j.jad.2017.02.001
- Nusslock, R., Walden, K., and Harmon-Jones, E. (2015). Asymmetrical frontal cortical activity associated with differential risk for mood and anxiety disorder symptoms: An RDoC perspective. *Int J Psychophysiol* 98, 249–261. doi: 10.1016/j.ijpsycho.2015.06.004
- Olino, T. M., McMakin, D. L., and Forbes, E. E. (2018). Toward an empirical multidimensional structure of anhedonia, reward sensitivity, and positive emotionality: An exploratory factor analytic study. *Assessment* 25, 679–690. doi: 10.1177/1073191116680291
- Paulus, M. P., Stein, M. B., Craske, M. G., Bookheimer, S., Taylor, C. T., Simmons, A. N., et al. (2017). Latent variable analysis of positive and negative valence processing focused on symptom and behavioral units of analysis in mood and anxiety disorders. *J Affect Disord* 216, 17–29. doi: 10.1016/j.jad.2016.12.046
- Peng, Y., Knotts, J. D., Taylor, C. T., Craske, M. G., Stein, M. B., Bookheimer, S., et al. (2021). Failure to Identify Robust Latent Variables of Positive or Negative Valence Processing Across Units of Analysis. *Biol Psychiatry Cogn Neurosci Neuroimaging* 6, 518–526. doi: 10.1016/j.bpsc.2020.12.005
- Ross, R. A., Foster, S. L., and Ionescu, D. F. (2017). The Role of Chronic Stress in Anxious Depression. *Chronic Stress (Thousand Oaks)* 1, 2470547016689472. doi: 10.1177/2470547016689472
- Sambuco, N., Bradley, M., Herring, D., Hillbrandt, K., and Lang, P. J. (2020). Transdiagnostic trauma severity in anxiety and mood disorders: Functional brain activity during emotional scene processing. *Psychophysiology* 57, e13349. doi: 10.1111/psyp.13349

- Savage, J. E., Sawyers, C., Roberson-Nay, R., and Hettema, J. M. (2017). The genetics of anxiety-related negative valence system traits. *Am J Med Genet B Neuropsychiatr Genet* 174, 156–177. doi: 10.1002/ajmg.b.32459
- Silveira, Érico de M Jr, and Kauer-Sant'Anna, M. (2015). Rumination in bipolar disorder: a systematic review. *Braz J Psychiatry* 37, 256–263. doi: 10.1590/1516-4446-2014-1556
- Swope, A. K., Fredrick, J. W., Becker, S. P., Burns, G. L., Garner, A. A., Jarrett, M. A., et al. (2020). Sluggish cognitive tempo and positive valence systems: Unique relations with greater reward valuation but less willingness to work. *J Affect Disord* 261, 131–138. doi: 10.1016/j.jad.2019.10.006
- Taylor, W. D., Zald, D. H., Felger, J. C., Christman, S., Claassen, D. O., Horga, G., et al. (2022). Influences of dopaminergic system dysfunction on late-life depression. *Mol Psychiatry* 27, 180–191. doi: 10.1038/s41380-021-01265-0
- Terbeck, S., Akkus, F., Chesterman, L. P., and Hasler, G. (2015). The role of metabotropic glutamate receptor 5 in the pathogenesis of mood disorders and addiction: combining preclinical evidence with human Positron Emission Tomography (PET) studies. *Front Neurosci* 9, 86. doi: 10.3389/fnins.2015.00086
- Toups, M., Carmody, T., Greer, T., Rethorst, C., Grannemann, B., and Trivedi, M. H. (2017). Exercise is an effective treatment for positive valence symptoms in major depression. *J Affect Disord* 209, 188–194. doi: 10.1016/j.jad.2016.08.058
- Trøstheim, M., Eikemo, M., Meir, R., Hansen, I., Paul, E., Kroll, S. L., et al. (2020). Assessment of Anhedonia in Adults With and Without Mental Illness: A Systematic Review and Meta-analysis. *JAMA Netw Open* 3, e2013233. doi: 10.1001/jamanetworkopen.2020.13233
- Vaidyanathan, U., Nelson, L. D., and Patrick, C. J. (2012). Clarifying domains of internalizing psychopathology using neurophysiology. *Psychol Med* 42, 447–459. doi: 10.1017/S0033291711001528
- Wenzel, E. S., Eisenlohr-Moul, T., Nagelli, U., Bernabé, B. P., and Maki, P. M. (2022). Using self-report RDoC measures to identify transdiagnostic translational targets for perinatal affective disorders. *Arch Womens Ment Health* 25, 411–420. doi: 10.1007/s00737-021-01190-9
- Woody, M. L., and Gibb, B. E. (2015). Integrating NIMH Research Domain Criteria (RDoC) into Depression Research. *Curr Opin Psychol* 4, 6–12. doi: 10.1016/j.copsyc.2015.01.004