

BIOGRAPHICAL SKETCH

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NAME: Leyro, Teresa Maria

eRA COMMONS USER NAME (credential, e.g., agency login): TLEYRO

POSITION TITLE: Associate Professor of Psychology

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Colby College, Waterville, ME	B.A.	05/2004	Psychology
University of California, San Francisco, San Francisco, CA	Internship	06/2012	Clinical Psychology
University of Vermont, Burlington, VT	Ph.D.	09/2012	Clinical Psychology
University of California, San Francisco, San Francisco, CA;	Postdoctoral	12/2013	Drug Abuse Treatment and Services Research/Emotion, Health, and Psychophysiology Lab

A. Personal Statement

I am an Associate professor in the Department of Psychology at Rutgers University and the director of the Affective and Biological Underpinnings of Anxiety and Substance Use (ABUSA) lab. My translational program of work leverages experimental paradigms to understand basic processes that can then be translated to intervention. My lab is housed within the Addiction Health Behavior Center (AHBC), where I serve as co-director, and uses various methodologies to identify underlying cognitive-affective and physiological parameters of co-occurring emotional symptomatology and health risk behaviors. Our center has a robust research infrastructure that supports the recruitment of clinical participants for six NIH funded studies. I have served as a consultant and primary mentor to former and current NRSA recipient (PI: Borges; F31DA043934-01A1; PI: Brinkman, 1F31DA056207-01A1) and have received continuous NIH/NIDA support for my own research activities, including a diversity supplement and F31 and F32 awards. Together, my experience in experimental health psychopathology and working with trainees provides me with the expertise, experience, and resources to support the proposed supplement.

Featured Grants

R21 DA052723-01
NIH/NIDA

Farris/Leyro (PI)

07/1/2021 – 6/30/2023

A Puff Topography Biofeedback Paradigm to Reduce Stress-Precipitated Smoking Reinforcement

This project is examining a novel puff topography biofeedback paradigm informed by autonomic psychophysiology to attenuate stress-precipitated smoking reinforcement in emotionally vulnerable smokers.
Role: MPI

1R01AG070136-01
NIH/NIA

Farris (PI)

07/01/2021 – 06/30/2026

A Tailored Exposure Intervention Targeting Exercise Anxiety and Avoidance in Cardiac Rehabilitation

This study tests the efficacy of a new cognitive-behavioral intervention, called BE-FIT, for patients enrolled in outpatient cardiac rehabilitation that reduces exercise anxiety, a common barrier to physical activity. Mechanisms of change, including cognitive processes (catastrophizing, uncertainty, discomfort intolerance), behavior (avoidance/safety behaviors), and physiological function (cardiac vagal control) will be examined.

Role: Co-Investigator

R34 DA043751-01A1
NIH/NIDA

Leyro (PI)

09/15/2018-7/31/21 (NCE)

Development and Pilot Investigation of Heart Rate Variability Biofeedback for Smoking Cessation

The project seeks to develop and pilot test heart rate variability biofeedback as a treatment adjunct to standard smoking cessation treatment including nicotine replacement therapy patch and individual cognitive-behavioral smoking cessation counseling for smokers high in emotional distress.

Role: Principal Investigator

B. Positions, Scientific Appointments and Honors

Positions and Employment

2020-Current Faculty Fellow to the Area Dean, Division of Life Sciences, School of Arts and Sciences, Rutgers University
2020-Current Associate Professor of Psychology (with tenure), Rutgers University, Piscataway, NJ
2019-Current Full Member, Cancer Prevention and Control Research Program, Rutgers Cancer Institute of New Jersey
2018-Current Rutgers Center of Alcohol and Addiction Studies, Affiliate Member
2017-2020 Chair, American Psychological Association, Division 12, Continuing Education Committee
2016-Current Licensed Clinical Psychologist, New York
2014-Current Clinical Supervisor, Psychological Services Clinic, Graduate School of Applied and Professional Psychology, Rutgers University
2014-Current Licensed Clinical Psychologist, New Jersey
2014-Current Core Faculty, Institute for Health, Health Care Policy, and Aging Research, Rutgers, The State University of New Jersey, New Brunswick, NJ
2014-2020 Assistant Professor of Psychology, Rutgers University, Piscataway, NJ
2012-2013 Statistical Consultant, Palo Alto VA Medical Center (PI: Marcel Bonn-Miller, Ph.D.; VA640-C29324)
2012-2013 Postdoctoral Fellow, Emotion Health and Psychophysiology Lab, University of California, San Francisco, CA
2012-2013 Postdoctoral Fellow, Habit Abatement Clinic, University of California, San Francisco
2011-2012 Psychology Fellow, Department of Psychiatry, University of California, San Francisco, San Francisco, CA
2011 Instructor, Department of Psychology, University of Vermont, Burlington, VT
2006-2011 Graduate Research Assistant, Department of Psychology, University of Vermont, Burlington, VT
2004-2006 Research Technician, Center for Anxiety and Related Disorders, Boston University

Other Experience and Professional Memberships

2014-2017 Member, Society for Psychophysiological Research (SPR)
2014-2017 Member, Society for Affective Sciences (SAS)
2014-2015 Member, International Society for the Advancement of Respiratory Psychophysiology (ISARP)
2008-2011 Member, North American Quitline Consortium
2008- Member, Society for Research on Nicotine and Tobacco (SRNT)
2008-2011 Member, Vermont Tobacco Evaluation and Review Board, Member
2005- Member, Association for Behavioral and Cognitive Therapies (ABCT)
2006- American Psychological Association; Division 12, Society of Clinical Psychology; Division 50,
2006- Member, Anxiety and Depression Association of American (ADAA)

Honors

2020 The Presidential Fellowship for Teaching Excellence, Rutgers, The State University of New
2017 National Institute on Drug Abuse, Diversity Scholars Network Awardee
2013-2015 National Institute on Drug Abuse, Loan Repayment Award
2012 Increasing Diversity in Nicotine and Tobacco Research Travel Scholarship, SRNT
2012 Career Development Travel Award, ADAA
2009 Wheel Award for Excellence in Research Performance, University of Vermont
2008-2011 National Research Service Award, Panic Disorder and Nicotine Withdrawal (NIDA; F31)

- 2008 DA024919) NIDA Travel Award, Young Investigator's Poster Session at American Psychological Association Annual Meeting
- 2006-2008 Predoctoral Fellowship, supported by a Research Supplement to promote Diversity in Health-Related Research awarded to Michael Zvolensky, Ph.D. (NIDA: R01 DA018734)

C. Contribution to Science

*Denotes mentored trainee

1. Examining the role of distress tolerance in emotional disorders and substance use.

Individual differences in the subjective or behavioral capacity to withstand emotional or physiological distress (i.e., distress tolerance [DT]) are empirically linked to various psychopathology.^a Our research has made significant contributions to the role of DT in anxiety and cigarette smoking. We have found that lower DT predicts greater emotional reactivity to a laboratory stressor, which in turn, is associated with greater post-stress nicotine withdrawal and panic symptoms.^b We have also found that during smoking deprivation, smokers higher in DT, as compared to those low in DT, do not habituate to anxiety relevant withdrawal symptoms.^c Following a laboratory stressor, smokers lower in DT evidenced persistent puff volume over the course of a cigarette, as compared to large initial puffs, which decreased over time, following a control condition. Moreover, DT appears to be malleable. Smokers assigned to a smoking cessation program, including anxiety management, evidenced significant increases in behavioral DT during treatment, compared to smokers in the control condition. These improvements mediated the relation between treatment condition and 7-day point prevalence abstinence, 3-months post-cessation.^c These findings add to the perspective that DT may not be a causal risk marker, and instead, context specific.^c Research on the effect of DT on smoking behavior supports this perspective, wherein differences in puffing behavior following stress are observed in smokers high vs. low in DT. Specifically, smokers lower in DT may experience smoking as more reinforcing when experiencing distress.^d

- a. **Leyro**, T.M., Zvolensky, M.J., Bernstein, A. (2010). Distress tolerance and psychopathological symptoms and disorders: a review of the empirical literature among adults. *Psychological Bulletin*, 136(4):576-600. PMID: PMC2891552
- b. Farris, S.G., Zvolensky, M.J., Otto, M.W., **Leyro**, T.M. (2015). The role of distress intolerance for panic and nicotine withdrawal symptoms during a biological challenge. *Journal of Psychopharmacology*, 29(7): 783-91. PMID: PMC6561481
- c. Farris, S.G., **Leyro**, T.M., Allan, N.P., Øverup, C.S., Schmidt, N.B., Zvolensky, M.J. (2016). Distress intolerance during smoking cessation treatment. *Behavior Research and Therapy*, 85(10): 33-42. PMID: PMC5026956
- d. Farris, S.G., Aston, E.R., **Leyro**, T.M., Brown, L.A., Zvolensky, M.J. (2018). Distress intolerance and smoking topography in the context of a biological challenge. *Nicotine & Tobacco Research*, 21(5): 568-575. PMID: PMC6468131

2. Developing integrated biopsychosocial models of anxiety and related disorders and substance use.

Another important arm of my research has focused on the role physiological systems play in emotional disorders, smoking, and other substance use behavior. We have recently completed data collection for a NIDA-funded study (R03 DA041556-01; PI: Leyro) examining cardiovascular reactivity and cognitive appraisal as mediators of stress-precipitated smoking. One notable finding under review is that smoking-related impairments in cardiac vagal control contributes to individual differences in sensitivity to contextual cues during a stressor. To examine how distinct regulatory systems communicate during stress, we have examined whether subjective and physiological stress reactivity affect recovery in the other domain. Here, we found that less distress reactivity results in slower heart rate recovery and that less heart rate reactivity results in slower subjective distress recovery. This suggests that in smokers a decreased ability to mount a stress response in either domain, may result in slowed recovery in the other. Extending this work, we found that individual differences in emotion regulatory processes amongst daily cigarette smokers affect relations across subjective and physiological domains, but not within. Other work in this domain seeks to better characterize how parasympathetic and sympathetic processes provide unique information central to emotional processing. For example, we have found that sympathetic predominance at rest significantly predicts current major depression in college students. Alternatively, a measure of *total activation* of

parasympathetic and sympathetic branches was not predictive of depression status. This suggests that autonomic dysregulation in emotional disorders may be mediated by decreased parasympathetic influence and increased sympathetic influence, at rest. Finally, we have examined how autonomic parameters provide distinct information regarding positive and negative affect *to others*. For example, greater decreases in respiratory sinus arrhythmia and increases in cardiac output, perhaps reflecting effort and challenge, respectively, were associated with greater ratings of others' positive affect.^d

- a. Borges, A.M., Selby, E., Bates, M., Zvolensky, M., **Leyro**, T.M. (2019). Examining the relation between physiological and psychological components of stress reactivity and recovery in cigarette smokers. *Applied Psychophysiology and Biofeedback*, 44(2): 131-141. PMID: PMC6506376
- b. Brush, C.J., Olson, R.L., Ehmann, P.J., Bocchine, A.J., Bates, M.E., Buckman, J.F., **Leyro**, T.M., Alderman, B.L. (2019). Lower resting cardiac autonomic balance in young adults with current major depression. *Psychophysiology*. PMID: PMC6650364
- c. Borges, A. M., Yang, M-J., Farris, S. G., Zvolensky, M. J., & **Leyro**, T. M. (2020). Examining the role of emotion regulation in the bidirectional relation between physiological and subjective stress response among daily cigarette smokers. *Personality and Individual Differences*, 155, 109740. doi.org/10.1016/j.paid.2019.109740 PMID: PMC7450890
- d. Eckland, N.S., **Leyro**, T.M., Mendes, W.B., & Thompson, R.J. (2019). The role of physiology and voice in emotion perception during social stress. *Journal of Nonverbal Behavior*, 43(4), 493–511. https://doi.org/10.1007/s10919-019-00311-4

3. Translation of findings to novel intervention that address barriers to tobacco treatment.

The scope of my work has direct implications for novel treatment targets, particularly for smokers high in emotional distress. As detailed in our recent review, reduced heart rate variability is associated with a decreased ability to adaptively respond to both internal and external demands and is markedly reduced in smokers, an effect that appears largely driven by nicotine, but does not necessarily fully recover upon cessation. In addition, a recently completed meta-analytic review and regression demonstrated large effects of respiratory interventions on anxiety symptoms.^d This work has largely served as the basis for an ongoing randomized clinical trial (NIH R34 DA043751) investigating heart rate variability biofeedback as a smoking cessation adjunct for smokers high in emotional distress. In addition, my colleagues and I are committed to identifying novel avenues to promote cessation in disparate populations. We recently completed a randomized clinical trial focused on promoting cessation in socioeconomically disadvantaged smokers. Our findings^b revealed 39.6% reported making a serious quit attempt between their intervention date and one-month follow-up. No differences in cessation, use of counseling services, or post-intervention ratings of importance of and confidence in quitting were observed between groups. However, participants randomized to nicotine replacement sampling were significantly more likely to use nicotine replacement therapy.^b This finding parallels my research indicating that directly offering of nicotine replacement to psychiatric inpatients is associated with greater use and motivation to quit. Given the high rates of smoking in low-income individuals, refining and disseminating brief evidence-based interventions, such as these, is crucial. We have also investigated individual characteristics that promote resumption of a quit attempt, following initial failure, among those enrolled in a long-term, abstinence maintenance, intervention program.^d

- a. **Leyro**, T.M., Buckman, J.F., Bates, M.E. (2019). Theoretical implications and clinical support for heart rate variability biofeedback for substance use disorders. *Current Opinion in Psychology*, 30: 92-97. PMID: PMC6774915
- b. Steinberg, M., Rosen, R.L., Versella, M.V., Borges, A., **Leyro**, T.M. (2020). A pilot randomized clinical trial of motivational interventions in smokers from socioeconomic disadvantage. *Nicotine and Tobacco Research*, 22(9):1500-1508. PMID: PMC7899481.
- c. **Leyro**, T. M., Hendricks, P. S., Hall, S. M. (2015). If at first you don't succeed: Characterization of Smokers with Late Smoking Abstinence Onset. *Addictive Behaviors*, 45, 34-38. PMID: PMC4454339
- d. **Leyro**, T.M., Versella, M., Yang, M., Brinkman, H.R., Hoyt, D.L., & Lehrer, P. (in press). Respiratory therapy for the treatment of anxiety: Meta-analytic review and regression. *Clinical Psychology Review*. doi.org/10.1016/j.cpr.2021.101980. PMID: PMC8302658

Complete list of Published Work in MyBibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/1zGukkZqE8y5j/bibliography/public/>