BIOGRAPHICAL SKETCH

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NAME: Evans, Suzette M

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

POSITION TITLE: Professor of Neurobiology (in Psychiatry); Professor of Clinical Neuroscience & Research Scientist VI

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
Onondaga Community College, Syracuse, NY	A.A.S.	05/1979	Humanities
Syracuse University, Syracuse, NY	B.S.	05/1981	Psychology
The University of Chicago, Chicago, IL	Ph.D.	06/1987	Biopsychology
Johns Hopkins University, Baltimore, MD	Postdoc	06/1990	Beh Pharmacology

A. Personal Statement

I will serve as the PI on application. I have been overseeing and publishing studies conducted at the Substance Use Research Center that investigate the effects of alcohol, cocaine and other stimulants, sedatives, and more recently cannabinoids in humans and non-human primates for almost 30 years. I have over 100 publications and a total of 47 publications involved the administration of alcohol or other drugs of abuse, either alone or in combination with other drugs or medications. In terms of my experience with cannabis, Dr. Reed and I completed an investigator-initiated R01 NIDA grant (DA035850) that examined sex differences in the effects of intranasal oxytocin (IN OXT) on stress reactivity and cannabis self-administration in recreational cannabis users and the results from this study have been published. I am currently a Multi-PI with Dr. Richard Foltin on an RO1 examining the effects of oxytocin on cocaine self-administration and hippocampal volume in male and female non-human primates. I recently completed a study (subcontract with SUNY) where we had participants smoke two 5.6% Δ9-THC cannabis cigarettes over 10 minutes, similar to what we propose in this project. Lastly, I am multiple PI of another grant (R01 DA044339) with Dr. Bedi to examine the neurobehavioral mechanism of choices to smoke cannabis in individuals with and without cannabis use disorder.

We recently (Reed et al., 2019) examined sex differences and the effects of IN OXT (40 IU) in response to a standard laboratory stressor (the Trier Social Stress Test; TSST) and cannabis self-administration in recreational cannabis users. IN OXT administration produced an unexpected <u>increase</u> in TSST-induced subjective stress in women compared to placebo (PBO) and compared to men. However, there is currently insufficient information on whether: 1) the effects of IN OXT on stress reactivity differ between men and women, 2) the effects are dose-dependent and 3) the effects are specific to cannabis users. In this application we will rigorously assess sex differences in the effects of a range of IN OXT doses on stress reactivity in cannabis users compared to healthy controls and the subjective and cardiovascular effects of smoked cannabis in cannabis users.

<u>Most relevant to the current application</u>

Evans, SM and Foltin, RW: Exogenous progesterone attenuates the subjective effects of smoked cocaine in women, but not in men. Neuropsychopharmacology 2006; 31: 659-674.

Comer, S.D., Cooper, Z.D., Kowalczyk, W.J., Sullivan, M.A., **Evans, S.M**., Bisaga, A.M. and Vosburg, SK. Evaluation of potential sex differences in the subjective and analgesic effects of morphine in normal, healthy volunteers. Psychopharmacology. 2010; 208: 45-55. PMCID: PMC332072.

Reed, S.C., Levin, F.R., **Evans, S.M.** The effects of progesterone pretreatment on the response to oral d-amphetamine in women. Hormones & Behavior 2010; 58: 533-543. PMCID: PMC2916024.

Reed, S.C., Haney, M., Manubay, J., Campagna, B.R., Reed, B., Foltin, R.W., **Evans, S.M.** Sex differences in stress reactivity after intranasal oxytocin in recreational cannabis users. Pharmacology, Biochemistry and Behavior, 2019; 176:72-82. PMCID: PMC6383670.

B. Positions and Honors

Positions and Employment

1990-1992	Addiction Research Center, National Institute on Drug Abuse, Baltimore, MD, Clinical Pharmacology Branch, Staff Fellow.
1992-1998	Research Scientist III, Division on Substance Abuse, The New York State Psychiatric Institute (NYSPI), New York, NY
1992-2000	Assistant Professor of Behavioral Biology, Department of Psychiatry, College of Physicians and Surgeons at Columbia University, New York, NY
1998-1999	Research Scientist IV, Division on Substance Abuse, NYSPI, New York, NY
1999-2004	Research Scientist V, Department of Psychiatry, NYSPI, New York, NY
1999-2006	Associate Professor of Clinical Neuroscience Department of Psychiatry, College of Physicians and Surgeons of Columbia University, New York, NY
2004-present	Research Scientist VI, Department of Psychiatry, NYSPI, New York, NY
2006-present	Professor of Clinical Neuroscience, Department of Psychiatry, Columbia University Medical Center, New York, NY

Honors and Awards:

1988	CPDD Travel Award
1990	NIDA-sponsored CPDD Travel Award
1991	ACNP Travel Award
1992	APA Young Psychopharmacologist Award

C. Contribution to Science Directly Related to this Application

1. Vulnerability to Drug Abuse: The Role of the Menstrual Cycle and Gonadal Hormones

For the past 20 years, my research focus has been examining vulnerability to drug abuse in various subgroups of women at increased risk for drug abuse. Further, rather than ignoring the menstrual cycle, I embraced the opportunity to examine the role of the menstrual cycle on the response to drugs. Our study in 2002 was one of the first to demonstrate that the positive subjective effects of smoked cocaine were attenuated during the luteal phase of the menstrual cycle when progesterone levels are elevated. This has become a seminal paper and has been one of my most cited publications. Since then, I have gone on to examine the role of progesterone on the response to cocaine and amphetamine. I have over 20 publications that have focused exclusively on females (both human and non-human) and/or the role of the menstrual cycle.

a. **Evans, S.M.**, Haney, M. and Foltin, R.W.: The effects of smoked cocaine during the follicular and luteal phases of the menstrual cycle in women. Psychopharmacology 2002; 159: 397-406.

b. Reed, S.C., Levin, F.R., and **Evans, S.M.** The effects of progesterone pretreatment on the response to oral d-amphetamine in women. Hormones & Behavior. 2010; 58: 533-543. NIHMSID: 197786; PMCID: PMC2916024.

c. Reed, S.C., **Evans, S.M.**, Bedi, G., Rubin, E. and Foltin, R.W.: The effects of oral micronized progesterone on smoked cocaine self-administration in women. Hormones & Behavior 59: 227-235, 2011. PMCID: PMC3040275.

d. **Evans, S.M.** and Levin, F.R. Response to alcohol in women: Role of the menstrual cycle and a family history of alcoholism. Drug Alcohol Depend. 2011; 114: 18-30. NIHMSID: 235550; PMCID: PMC3017640.

2. Sex Differences in Response to Drugs of Abuse

While I have been recognized as an expert in the area of drug abuse in women and the role of the menstrual cycle, it just as important to directly examine males and females under the same experimental conditions. To this end, Drs. Comer, Bisaga and I had a grant that examined potential sex differences and hormonal

influences on the response to laboratory-induced pain. I had another grant with Dr. Reed that examined sex differences on impulsivity and stress in cocaine abusers. Further, in collaboration with Dr. Reed, I was PI on a grant to elucidate sex differences in the role of stress and intranasal oxytocin on marijuana self-administration in marijuana users. To date, I have 8 publications that have directly compared males and females. My goal as a scientist is explore the role of *sex as a biological variable*, an important area that is largely ignored, but can have important implications with respect to treatment outcomes.

a. **Evans, SM**, Haney, M, Fischman, MW and Foltin, RW: Limited sex differences in response to binge smoked cocaine use in humans. Neuropsychopharamcology 1999; 21: 445-454.
b. **Evans, SM** and Foltin, RW: Exogenous progesterone attenuates the subjective effects of smoked cocaine in women, but not in men. Neuropsychopharmacology 20006; 31: 659-674.
c. Collins S.L., **Evans S.M**., Foltin R.W. and Haney M. Intranasal cocaine in humans: Effects of sex and menstrual cycle. Pharmacol. Biochem. Behav. 2007; 86: 117-124. PMCID: PMC1852487.
d. Comer, S.D., Cooper, Z.D., Kowalczyk, W.J., Sullivan, M.A., **Evans, S.M**., Bisaga, A.M. and Vosburg, SK. Evaluation of potential sex differences in the subjective and analgesic effects of morphine in normal, healthy volunteers. Psychopharmacology. 2010; 208: 45-55. PMCID: PMC332072.

3. Behavioral Pharmacology of Cocaine in Humans

I have published other studies examining the effects of cocaine in humans, including the effects of medications in the laboratory and the clinic. Currently, I am involved in a large project with Dr. Foltin examining multiple components of impulsivity in cocaine users. Again, my research with cocaine is translational from non-human primates, to the laboratory and to the clinic. I have over 20 publications that involve human cocaine users.

a. **Evans, S.M.**, Levin, F.R., Fischman, M.W. and Foltin, R.W.: Smoked cocaine self-administration in females and voucher incentives for abstinence. J. Substance Abuse 1998; 10: 143-162.
b. Collins, S.L., Levin, F.R., Foltin, R.W., Kleber, H.D. and **Evans, S.M.**: Response to cocaine, alone and in combination with methylphenidate, in cocaine abusers with ADHD. Drug Alcohol Depend. 2006; 82: 158-167. PMID: 16213109.
c. Foltin RW, Haney M, Rubin E, Reed SC, Vadhan N, Balter R, **Evans SM**. Development of translational preclinical models in substance abuse: effects of cocaine administration on cocaine choice in humans and non-human primates. Pharmacol Biochem Behav. 2015; 134:12-21. PMCID: PMC5846106.
d. Reed, S.C. and **Evans, S.M.** The effects of oral d-amphetamine on impulsivity in smoked and intranasal cocaine users. Drug Alcohol Depend. 2016; 163:141-152. PMCID: PMC4880502.

4. Behavioral Pharmacology of Alcohol in Vulnerable Subgroups and Potential Medications

I have had an interest in alcohol research, primarily related to vulnerability to alcohol abuse among subgroups of individuals at increased risk, including women, individuals with a family history of alcoholism and individuals who are moderate/heavy drinkers and women with a family history of alcoholism. Although women generally drink less than men, this gap is decreasing, and women progress to problematic alcohol use more rapidly than men. I have conducted several other studies that involved alcohol drinkers, from light drinkers to those who met criteria for an Alcohol Use Disorder. To date, I have 8 publications that examined the effects of alcohol alone, and in combination with other medications. I have also conducted several other studies that involved alcohol drinkers, from light drinkers to those who met criteria for an Alcohol Use Disorder. In total, I have published 46 papers that directly involved the administration of alcohol or other drugs of abuse, either alone or in combination with other drugs or medications, to humans.

a. **Evans, SM** and Levin, FR: Response to alcohol in females with a paternal history of alcoholism. Psychopharmacology 2003; 169: 10-20.
b. **Evans, SM** and Levin, FR: Differential response to alcohol in light and moderate female social drinkers. Behavioural Pharmacology 2004; 15: 167-181.
c. **Evans, SM**, Levin, FR, Brooks, DJ, Garawi, F: A pilot double-blind treatment trial of memantine for alcohol dependence. Alc. Clin. Exp. Res. 2007; 31: 775-782.
d. **Evans, S.M.** and Bisaga, A.: Acute interaction of baclofen in combination with alcohol in heavy social drinkers. Alc. Clin. Exp. Res. 2009; 33: 19-30. PMCID: PMC2626149.

5. Impulsivity

Over the last 10 years, I incorporated impulsivity into my research since that is a core feature of alcohol and drug use. Since impulsivity is a multidimensional construct, I include both self-report and a range of behavioral tasks. A strength of my research is that I measure impulsivity while participants are under the influence of drugs. I have 4 papers measuring impulsivity.

a. Reed, S.C., Levin, F.R., **Evans, S.M.** The effects of progesterone pretreatment on the response to oral d-amphetamine in women. Hormones & Behavior 2010; 58: 533-543. PMCID: PMC2916024.
b. Reed, S.C., Levin, F.R., **Evans, S.M.** Alcohol increases impulsivity and abuse liability in heavy drinking women. Exp. Clin. Psychopharmacol. 2012; 20, 454-465. PMCID: PMC3598581.
c. Reed, S.C. and **Evans, S.M.** The effects of oral d-amphetamine on impulsivity in smoked and intranasal cocaine users. Drug Alcohol Depend. 163:141-152, 2016. doi: 10.1016/j.drugalcdep.2016.04.013. PMCID: PMC4880502.
d. Sysko, R, Ojserkis, R, Schebendach J, **Evans, SM**, Hildebrandt, T, Walsh, BT. Impulsivity and test meal intake among women with bulimia nervosa. Appetite 2017; 112: 1-8. PMCID: PMC5344707.

For my bibliography (over 100 peer-reviewed publications) see:
http://www.ncbi.nlm.nih.gov/pubmed/?term=Evans+Suzette+M

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support:

R21AA027392 (Clelland) 07/01/17 thru 06/30/22
NIAAA
A Novel Personalized Approach towards Treating Negative Symptoms and Reducing Alcohol Abuse in patients with Comorbid AUD and Schizophrenia
The goals of this study are to explore whether COMT enzyme activity is associated with alcohol-use disorder in patients with schizophrenia. In a naturalistic study, we will then test whether some medication can alleviate negative schizophrenia symptoms in patients self-medicating with alcohol due to their COMT enzyme activity.
Role: Co-investigator

R01 DA044339 (Bedi/Evans) 07/01/17 thru 06/30/22
NIDA
Neurobehavioral Mechanism of Choices to Smoke Cannabis in Cannabis Use Disorder
This project, focusing on cannabis smokers, will investigate the brain and behavioral mechanisms of choices for cannabis and an alternative reward in cannabis smokers with and without Cannabis Use Disorder.
Role: Multi-PI (with Gillinder Bedi Psy.D.)

R01 DA041543-01A1 (Evans/Foltin) 09/01/17 thru 05/31/23
NIDA
Antecedents and Consequences of Cocaine Taking: Impact of Oxytocin
Oxytocin (OXT), a peptide hormone associated with social attachment, has recently been shown to modulate drug self-administration. We propose a prospective study on the effects of social status and cocaine self-administration on OXT levels and HC volume in baboons and, reciprocally, the effects of manipulating OXT on cocaine self-administration. This proposal will contribute critical information about the neurobiological determinants and consequences of cocaine abuse and will provide an empirical basis for the development of biologically informed treatments based on the oxytocin system.
Role: Multi PI (with Richard Foltin, Ph.D.)

U54 DA037842-02 (Levin) 09/01/14 thru 06/30/20 (NCE)
Shared Pharmacotherapeutic Strategies for Cannabinoid & Opioid Use Disorders
The Pilot Project Core provides support for pilot projects in order to promote innovative and exploratory research in a rapid manner to move the field forward. The Administrative Core provides centralized coordination of all Center resources and support services, including the structured meetings.
Role: Director of Pilot Project Core & Co-Director of Administrative Core

R01 DA035846-01A1 (Foltin/Wang) 04/01/14 thru 03/31/20 (NCE)
NIDA
Impulsivity in Cocaine Abusers: Relationship to Drug Taking and Treatment Outcome
The purpose of this study is to propose a model that will identify four latent factors related to 'Impulsive Choice' derived from neurobehavioral domains that are commonly used to assess impulsive choice. We will compare

cocaine abusers to healthy controls on our measures of impulsive choice and then determine the validity of our model in predicting actual cocaine use and success of cocaine treatment.
Role: Co-Investigator

R01 DA039169-01A1 (Comer) 06/15/2017 thru 05/31/2020 (NCE)
NIDA
Medication Development for Opioid and Alcohol Abuse: Laboratory Studies in Humans
This research will provide a great deal of information about the safety and clinical utility of buprenorphine/naloxone in combination with gabapentin for treating co-abuse of opioids and alcohol.
Role: Co-Investigator; PD/PI on consortium to Columbia

Completed Research Support (within last 3 years):

R01 DA039123-01 (Evans/Foltin) 05/01/15 thru 04/30/19
NIDA
Preclinical Synthetic Cannabinoid Vapor Inhalation: Acute and Chronic Effects
This grant will focus on developing vapor self-administration of THC and one synthetic cannabinoid in non-human primates. It will also evaluate the effects of an orexin antagonist, an oxytocin releaser, and a CB1 antagonist on THC and synthetic cannabinoid vapor self-administration.
Role: Multi-PI (with Richard Foltin, Ph.D.)

Zxerex Corporation (Macknik - PI) 05/15/17 thru 12/31/17
Calibration of Eye Tracking Technology with Marijuana Impairment Algorithm
This six-month project will measure oculomotor behavior during marijuana-induced intoxication, to determine specific constellation of oculomotor dynamics that indicates current impairment
Role: PI of subcontract to SUNY – Research Foundation

R01 DA035850-03 (Evans) 09/15/13 thru 12/31/17
NIDA
Stress-Induced Marijuana Self-Administration: Role of Sex and Oxytocin
This project will elucidate sex differences in the role of stress and the oxytocin system in marijuana users to better inform future sex specific intervention strategies.
Role: PI

R01 DA029618-03 (Foltin) 04/01/11 thru 03/31/17
NIDA
Hypocretin Antagonists as a Novel Approach to Mediation Development
Data suggest that hypocretin-mediated arousal has motivating effects and increases the salience of cues associated with reinforcement. This research will assess of the influence of hypocretin agonists and antagonists on cocaine- and food-seeking and self-administration in non-human primates.
Role: Co-Investigator & PI on consortium to Columbia University