BIOGRAPHICAL SKETCH

NAME: Kathryn Paige Harden

eRA COMMONS USER NAME: KPHARDEN

POSITION TITLE: Associate Professor, Department of Psychology

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date MM/YYYY	FIELD OF STUDY
Furman University, Greenville, SC	BS	05/2003	Psychology
University of Virginia, Charlottesville, VA	MA	05/2005	Psychology
University of Virginia, Charlottesville, VA	PhD	05/2009	Clinical Psychology
McLean Hospital / Harvard Medical School, Belmont, MA	Clinical Internship	05/2009	Clinical Psychology

A. Personal Statement

I am a clinical psychologist that specializes in developmental psychopathology in adolescence. My research focuses on understanding the causes and consequences of individual differences in developmental transitions, including puberty and the initiation of sexual and romantic relationships. I examine these developmental transitions in relation to both psychiatric functioning (e.g., substance use disorders) and cognitive development (e.g., executive function, academic achievement). My research has a particular emphasis on using behavioral genetic methods to understand the interplay between biological risk and social and contextual influences. My research intersects with two of the PRC's primary research areas: (1) Education, Work, and Inequality, and (2) Reproductive Health.

In the next 5 years, I expect to make major contributions to research in both of these areas. Regarding "Demography: Educational Inequality and Opportunity," I am currently collaborating with Dr. Tucker-Drob (Psychology and PRC affiliate) and Dr. Church-Lang (Psychology) to understand how socioeconomic disadvantage affects the development of executive functioning and academic achievement (R21 from NIH/NICHD). We are finalizing data collection on an innovative protocol that measures novel biomarkers of biological stress response (including accumulated cortisol in hair) and both resting state and task-based neuroimaging measures related to the development of executive function, all in an ethnically and socieconomically diverse sample of twins that have been comprehensively measured on socioeconomic contexts at the home, school, and neighborhood levels. Our major contributions will be to examine how socioeconomic disadvantage is related to the neurobiological substrates of executive functioning, and how social class – brain relationships are mediated and moderated by biological stress response. Regarding "Reproductive Health," I am pursuing several lines of research regarding (1) how the hormonal changes of puberty shape neural systems and behavioral motivations related to reward and novelty seeking, and (2) how the ontogenetic hormonal and motivational changes of adolescence can be channeled into positive, prosocial, and adaptive behaviors, particularly in the area of sexual relationships. For example, I have just launched a collaboration with Dr. David Yeager (PRC affiliate) exploring how research in developmental neuroscience and endocrinology can be leveraged to create a brief sexual education intervention for adolescence, with the goal of maximizing positive sexual health outcomes. As PI or Co-I, I currently have five grant applications (four at NIH, one at a private foundation) that are under review or that I am revising for resubmission to support these future contributions.

I am actively involved in population science at the national level. Last year, I was a Russell Sage Foundation Visiting Scholar, collaborating with other faculty from across the country to think about the effects of social inequality on educational and economic outcomes. I currently serve as Associate Editor for *Journal of Personality and Social Psychology: Personality Processes and Individual Differences*, where I handle manuscripts related to academic achievement, achievement-relevant personality traits, socioeconomic inequality, and behavioral genetics. I have served as temporary member on two NIH study sections (MESH and BGES). Beginning this year, I will be working with Dr. Rob Crosnoe (PRC affiliate) as co-chair of the Society for Research on Adolescence program committee. Finally, together with Dr. Elliot Tucker-Drob (PRC affiliate), I run an active research lab, with 6 Ph.D. students all receiving training in population science and behavioral genetics.

The PRC infrastructure supports, influences, and promotes my research in multiple ways. First, the Development core provided seed money for the establishment of the Texas Twin Project (Harden, Tucker-Drob, & Tackett, 2013), an on-going study of child and adolescent twins in central Texas. Research using Texas Twin Project samples has formed the basis of four subsequent NIH grants (two R21s to me, one R21 and one R01 to Dr. Tucker-Drob). The Development core has also provided crucial support for applying for NIH grants. The Administrative core has also been essential for managing grant-funded resources, particularly given that my research involves large numbers of participants and expensive assays of biospecimens. Finally, the Science and Technical core has provided critical infrastructure for the collection of survey data and the encrypted storage of complex project data, via its support for REDCap. In sum, without the support of the PRC, I would not have been able to launch an independent, federally-funded research career so quickly after beginning my faculty position.

B. Positions and Honors

Positions and Employment

2007	Distinguished Teaching Fellow, Department of Psychology, University of Virginia, Charlottesville, VA
2008	Visiting Research Fellow, Center for Educational Research, Max Planck Institute for Human Development, Berlin, Germany
2008-2009	Predoctoral Intern and Clinical Fellow in Psychology, Department of Psychiatry, Harvard Medical School / McLean Hospital, Belmont, MA
2009-2015	Assistant Professor, Department of Psychology / Population Research Center, University of Texas at Austin, Austin, TX
2015-Present	Associate Professor with Tenure, Department of Psychology / Population Research Center, University of Texas at Austin, Austin, TX
2015-2016	Visiting Scholar, Russell Sage Foundation, New York City, NY

Other Experience and Professional Memberships

2013-2015	Editorial Board: *Journal of Abnormal Psychology*
2014-2015	Guest Editor: *Behavior Genetics,* Special Issue on Gene-Hormone Interplay
2015-Present	Associate Editor: *Journal of Personality and Social Psychology: Personality Processes and Individual Differences*
2015	Temporary Member: Behavioral Genetics and Epidemiology Study Section (BGES), NIH

Honors

1999	Founders Scholarship (full tuition and fees), Furman University, Greenville, SC
2007	Thompson Award, Behavior Genetics Association
2008	Award for Excellence in Scholarship in Sciences and Engineering, Office for the Vice-President for Research and Graduate Studies, University of Virginia, Charlottesville, VA
2008	Rebecca Boone Memorial Award for Excellence in Teaching, Department of Psychology, University of Virginia, Charlottesville, VA
2008	All-University Graduate Teaching Assistant Award, Office of the Provost and the Teaching Resource Center, University of Virginia, Charlottesville, VA
2014	Outstanding Alumni Award, International Max Planck Research School on the Life Course, Berlin, Germany
2015	Fuller and Scott Award, Behavior Genetics Association

C. Contributions to Science

As of September 2016, I have published I have published 86 peer-reviewed articles since 2007 (h-index = 25). For a complete list of published work in Google Scholar:
https://scholar.google.com/citations?user=az3EwhEAAAAJ&hl=en

1. Personality Change and the Development of Externalizing Psychopathology

Adolescence and emerging adulthood are times of peak vulnerability for the emergence of externalizing psychopathology, including antisocial behavior problems and substance use. For the past four years, I have been pursuing a line of research on how developmental changes in sensation seeking and impulsivity contribute to age-related change in externalizing psychopathology. This line of research is informed by findings from developmental cognitive neuroscience on neurobiological changes in adolescence. Using a longitudinal, nationally-representative sample of U.S. adolescents who were followed from late childhood through early

adulthood, I found that (a) sensation seeking and impulsivity showed distinct patterns of age-related change, with sensation seeking increasing from childhood to adolescence and impulsivity decreasing, (b) individual differences in the rapidity of personality change predicted the escalation of delinquency and substance use, (c) individual differences in change in sensation seeking are strongly heritable, and (d) substantial portions of the genetic influence on delinquent behavior are mediated via sensation seeking change. More recently, using data I have collected as part of the Texas Twin Project, I have examined social contexts (including parental monitoring and peer deviance) that exacerbate or mitigate personality risks for externalizing behavior problems. I am currently pursuing two new lines of research related to sensation seeking: (1) what individual characteristics and social contexts contribute to adaptive and prosocial functioning among highly sensation seeking youth? and (2) how can sensation seeking be measured using behavioral observations rather than self-report?

- Harden, K.P., Kretsch, N., Mann, F.D., Herzhoff, K., Tackett, J.L., Steinberg, L, & Tucker-Drob, E.M. (under review). Beyond dual systems: A genetically-informed, latent factor model of behavioral and self-report measures related to adolescent risk-taking. Invited resubmission to *Developmental Cognitive Neuroscience*.
- Patterson, M.W., Mann, F.D., Grotzinger, A.D., Tackett, J.L., Tucker-Drob, E.M., & Harden, K.P. (March 2017). Sex-specific pathways between sensation seeking, delinquency, and positive risk-taking in adolescence. Paper to be presented at the biennial meeting of the Society for Research in Child Development in a symposium organized by M.W. Patterson (Harden Ph.D. student) on “The Role of Risk in Positive Youth Development.”
- Mann, F.D., Patterson, M.W, Grotzinger, A., Kretsch, N., Tackett, J.L., Tucker-Drob, E.M., & Harden, K.P. (2016). Sensation seeking, peer deviance, and genetic influences on adolescent delinquency: Evidence for person-environment correlation and interaction. *Journal of Abnormal Psychology, 125,* 679-691.
- Harden, K. P., & Tucker-Drob, E. M. (2011). Individual differences in the development of sensation seeking and impulsivity during adolescence: Further evidence for a dual systems model. *Developmental Psychology, 47*, 739-746.

2. Behavioral Correlates of Gonadal and Adrenal Hormones in Adolescence

My work on the behavioral effects of hormonal change in adolescence has largely focused on the gonadal hormones testosterone and estradiol, and their potential interactions with cortisol, an adrenal stress hormone. Using twin data collected as part of the Texas Twin Project, I published one of the largest twin studies of salivary estradiol and testosterone. Additional research found that higher levels of testosterone and estradiol are associated with externalizing psychopathology, but only in persons who are show low levels of cortisol, a sex hormone × stress hormone interaction. I received an R21 grant from NIH/NIAAA to examine hair measures of testosterone as an index of pubertal status and as a predictor of substance use initiation in adolescents. Finally, I wrote a critical review paper for *International Journal of Eating Disorders* that provides methodological recommendations for integrating hormonal measures in studies of puberty, and guest edited a Special Issue of *Behavior Genetics* on Gene-Hormone Interplay. In my future work, I will be examining the utility of measuring adrenal and gonadal hormones in hair vs. in saliva as predictors of behavior, and am applying for funding to collect data on the epigenetic correlates (DNA methylation) of hormonal change during puberty.

- Grotzinger, A., Mann, F.D., Patterson, M.W., Tackett, J.L, Tucker-Drob, & Harden, K.P. (manuscript in preparation). Differential prediction of adolescent aggression by hair and saliva testosterone: evidence for a testosterone-cortisol interaction.
- Tucker-Drob, E.M., Grotzinger, A., Briley, D.A., Engelhardt, L.E.,… Harden, K.P. (2016). Genetic influences on hormonal markers of chronic HPA function in human hair. Preprint available at *bioRxiv*. (Currently under review as invited resubmission to *Psychological Medicine*).
- Harden, K.P., Wrzus, C., Luong, G., Grotzinger, A., Bajbouj, M., Rauers, A., Wagner, G.G., & Riediger, M. (2016). Diurnal coupling between testosterone and cortisol from adolescence to older adulthood. *Psychoneuroendocrinology, 73*, 79-90. PMCID5048541
- Harden, K.P., Kretsch, N., Tackett, J.L, & Tucker-Drob, E.M. (2014). Genetic and environmental influences on testosterone in adolescents: Evidence for sex differences. *Developmental Psychobiology, 56,* 1278-1289. PMCID4445655

3. Pubertal Development and Adolescent Psychopathology

Teenagers who are further along in the process of pubertal development, particularly if they experience those pubertal changes relatively early, are at elevated risk for psychopathology. The mechanisms underlying the effects of puberty are difficult to parse, because puberty involves a coordinated suite of changes in both biology and the social environment. Using twin data from a nationally representative sample of adolescents, as well as twin data I have collected as part of the Texas Twin Project, I found that (a) genetic variants that

predispose girls toward earlier pubertal timing also confer risk for externalizing and internalizing psychopathology (including depression and eating problems), and (b) genetic risk for externalizing behavior problems is amplified by advancing pubertal status (a gene × puberty interaction). That is, pubertal development both mediates and moderates genetic risk for psychopathology. This work is important because it implies that the elevated rates of psychopathology seen in early maturing youth are not solely a function of problems in the social environment, and suggests that genes that regulate the timing of puberty and genes that are expressed differently after puberty are potential candidates for genetic influences on multiple forms of psychopathology.

- Harden, K.P., Patterson, M.W., Briley, D.A., Engelhardt, L.E., Kretsch, N., Mann, F.D., Tackett, J.L., & Tucker- Drob, E.M. (2015). Developmental changes in genetic and environmental influences on rule-breaking and aggression: age and pubertal development. *Journal of Child Psychology and Psychiatry, 56,* 1370-1379. PMCID4618266
- Harden, K.P., & Mann, F.D. (2015). Biological risk for the development of adolescent externalizing: Integrating insights from behavioral genetics and neuroscience. *Child Development Perspectives, 9,* 211-216. PMCID4671633
- Harden, K.P., Mendle, J., & Kretsch, N. (2012). Environmental and genetic pathways between early pubertal timing and dieting in adolescence: Distinguishing between objective and subjective timing. *Psychological Medicine*, *42*, 183-193.
- Harden, K.P. & Mendle, J. (2012). Gene-environment interplay in the association between early pubertal timing and delinquency in adolescent girls. *Journal of Abnormal Psychology*, *121*, 73-87. PMC4079281

4. Adolescent Sexual Health

Most people first experience sexual intercourse and non-coital sex during adolescence. Research on adolescent sexual behavior has typically adopted a risk perspective, in which sex is seen as a socially problematic behavior with negative psychological and health consequences. In a comprehensive review paper published in *Psychological Bulletin*, I showed that there is typically no association between having sex in adolescence and adverse psychological outcomes in studies that rigorously control for potential third-variable confounds (including genetic differences between people). These results have direct implications for federal and state-level sex education policies, which frequently mandate that schools teach that sex in adolescence causes psychological harm. In a companion paper published in *Perspectives on Psychological Science,* I outlined a framework for future research on adolescent sexual development, which considers the importance of relationship context and the potential positive functions of sexual experience in adolescence. In my future work, I hope to partner with collaborators with expertise in intervention and health education to design a sex-positive intervention for high school students. I am also hosting a Ph.D. student from the Netherlands, who will collaborate with me on a project examining cross-cultural differences (U.S., Netherlands, and Brazil) predictors of positive sexual health outcomes.

- Suleiman, A.B., Galvan, A., Harden, K.P., & Dahl, R.E. (*in press*). Becoming a sexual being: The "elephant in the room" of adolescent brain development. *Developmental Cognitive Neuroscience*.
- Suleiman, A.B., & Harden, K.P. (2016). The importance of sexual and romantic development in understanding the developmental neuroscience of adolescence. *Developmental Cognitive Neuroscience, 17,* 145-147.
- Harden, K.P. (2014). A sex-positive framework for research on adolescent sexual development. *Perspectives on Psychological Science*, 9, 455-469.
- Harden, K.P. (2014). Genetic influences on adolescent sexual behavior: Why genes matter for environmentally- oriented researchers. *Psychological Bulletin*, 140, 434-465. PMCID3893311

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/sites/myncbi/kathryn.harden.1/bibliography/43398758/public/?sort=date&direction=descending

D. Research Support

Ongoing Research Support

R01 HD083613 (PI: Tucker-Drob) 1/1/16-12/31/20
Agency: NIH/NICHD
Title: *Cortisol, Socioeconomic Status, and Genetic Influences on Cognitive Development*
This project will collect behavioral genetic, molecular genetic, educational, endocrine, and demographic data from grade-school participants in the Texas Twin project to (1) examine the genetic etiology of hypothalamic–

pituitary–adrenal (HPA) axis function, as indexed by multiple measures of cortisol output in saliva and hair; (2) test the genetic and environmental mechanisms by which cortisol output is associated with child cognitive ability; and (3) test whether cortisol, along with genetic polymorphisms in the glucocorticoid pathway, interact with latent genetic influences on cognition, as estimated in a twin model (gene × hormone and gene × gene interactions).
Role: Co-Investigator
Responsibilities:I co-direct the Texas Twin Project and oversee all aspects of maintaining the registry of potential twin participants and serve as liaison with local school districts. I oversee participant recruitment, help to train research assistants, and also help design and conduct all statistical analyses. I contribute to all manuscripts.

R21 AA023322 (PI: Harden) 9/5/14-6/30/16
Agency: NIH/NIAAA
Title: *Testing Gene-Testosterone Interplay in Adolescent Alcohol Use*
This project is collecting data on salivary and hair testosterone, decision making, personality, alcohol use, illicit drug use, and delinquency from a diverse sample of high school twins from the Texas Twin Project. We will test the extent to which testosterone mediates genetic influences on alcohol use and other risk-taking behaviors that escalate over the course of adolescence.
Role: Principal Investigator
Responsibilities: As PI of this project, I contribute to all aspects of the project, including designing the protocol, getting ethical approvals, participant recruitment, training and overseeing project personnel, designing and conducting statistical analyses, and writing manuscripts.

R21 HD081437 (PIs: Tucker-Drob and Church-Lang) 4/01/15-3/31/17
Agency: NIH/NICHD
Title: *Chronic Stress and Executive Function in Children: A Neuroimaging Study of Twins*
Using a sample of elementary school twins from the Texas Twin Project, this project will examine the relations between multiple markers of chronic stress (including salivary and hair cortisol) and both resting-state and event-related brain activity underlying executive functioning (EF). We will test the extent to which within-twin-pair-differences in stress biomarkers are related to within-twin-pair-differences in EF-related brain activity.
Role: Co-Investigator
Responsibilities: I co-direct the Texas Twin Project and oversee all aspects of maintaining the registry of potential twin participants and serve as liaison with local school districts. I oversee participant recruitment, help to train research assistants, and also help design and conduct all statistical analyses. I contribute to all manuscripts.

R01 AA020637 (PI: Fromme) 9/20/12-6/30/17
Agency: NIH/NIAAA
Title: *Genetic Mechanisms of Change in Trajectories of Drinking and Deviant Behaviors*
This project is genotyping a large cohort of young adults, who have provided 5 years of longitudinal behavioral data on heavy alcohol use and risk-taking behavior, using the genome-wide PsychArray chip. We will test for genetic associations with trajectories of drinking behavior during the transition to young adulthood, and with alcohol response, as assessed in a laboratory-based, placebo-controlled alcohol challenge.
Role: Co-Investigator
Responsibilities: I design and conduct statistical analyses for genetic association, and oversee all aspects of genotyping (e.g., salivary DNA collection, communication with lab personnel). I contribute to all manuscripts using genomic data.

Completed Research Support

R21 AA020588 (PI: Harden) 5/04/12-4/30/15
Agency: NIH/NIAAA
Title: *Genetic Influences on Adolescent Decision-Making and Alcohol Use*
This project has collected data on alcohol use, illicit drug use, and delinquency, as well as performance on a battery of decision-making tasks, from a diverse sample of high school twins from the Texas Twin Project. We are testing the extent to which impulse control and reward sensitivity mediate genetic influence on alcohol use and other risk-taking behaviors.
Role: Principal Investigator
Responsibilities: As PI of this project, I contributed to all aspects of the project, including designing the protocol, getting ethical approvals, participant recruitment, training and overseeing project personnel, designing and conducting statistical analyses, and writing manuscripts.