UCLA
Undergraduate Research Journal of Psychology at UCLA

Title
Volume 3

Permalink
https://escholarship.org/uc/item/2hd0m1q2

Journal
Undergraduate Research Journal of Psychology at UCLA, 3(1)

Author
Undergraduate Research Journal of Psychology at UCLA

Publication Date
2016-06-01

DOI
10.5070/JP2.39978

Copyright Information
This work is made available under the terms of a Creative Commons Attribution-NonCommercial License, available at https://creativecommons.org/licenses/by-nc/4.0/

eScholarship.org Powered by the California Digital Library
University of California

The Undergraduate Research Journal of Psychology at UCLA

Volume 3 | Spring 2016

Table of Contents

2 Journal Staff

3 Acknowledgments

4 Note from the Editors-In-Chief

5 Preface :: Margaret Shih

6 Faculty Endorsements

8 Advice from a Grad :: What to Consider When Choosing a Program
Carolyn A. Bufford

11 Advice from a Grad :: What to Expect in the First Year of Graduate School
Sarah White

13 Advice from a Grad :: Gap to the Max: Maximizing Your Gap Year
Anthony Osuna

16 *Can Parental Preparation for Bias Help? Intergroup relations of African American Adolescents*
Whitney Akabike :: University of California, Los Angeles

23 *What Social Media Use Can Tell Us About Self-Identity, Self-Esteem, and Relationships*
Lucy Cui :: University of California, Los Angeles

30 *An Introduction to Clinical Research on Non-Suicidal Self-Injury*
Daley DiCorcia :: University of Michigan

36 *Dialectical Behavioral Therapy in Forensic Settings*
Laurie Edmunson :: Simon Fraser University

44 *An Analysis of the Two-Hit Model of Schizophrenia*
Rivka Fleischman :: University of Maryland, Baltimore County

51 *Stressed is Just Desserts Spelled Backwards: The Mediation Effects of a Healthy Diet on the Relationship Between Perceived Stress and Self-Rated Health*
Arianna Ulloa :: University of Pennsylvania

Journal Staff

Role	Names
Senior Editors-in-Chief	Alisa R. Muñoz Vincent Nguyen
Associate Editor-in-Chief	Jake Gavenas
Chief of Marketing and Finance	Sophie Mako Tanaka
Editors	Carter Bedford Christopher Bondoc Lucy Cui Cheryl Li Melissa Maccarini Hannah Neiderman Jasmine Sidhu Sabrin Sidhu Melissa Walman Cindy Xiong Julia Yi
Submissions	Qinglin Bian Shannon Roux Melanie Tran
Marketing and Finance	Simran Brar Cynthia Garcia
Webmasters	Christopher Garduno Luna Haesoo Kim
Graphics and Layout	Ingrid Channa Naomi Kline

Acknowledgments

Graduate Student Mentors	Natsuki Atagi Elizabeth Dalton Melissa DeWolf Chardee Galan Brianna Goodale Zachary Pennington

Special thanks to Chardee Galan, Anthony Osuna, Dr. Margaret Shih, Christina Schonberg, The University Credit Union, Dave Margolis, Krisztina Kecskei, and all of the faculty and staff at UCLA that have supported us.

Note from the Editors-In-Chief

A big thank you is in order for everyone involved in the execution of this publication. Thank you to our authors – the breadth and depth of your work challenges the stereotype that involvement in research as an undergrad is 'just for practice'. It is our hope that showcasing the stellar contributions of these undergraduate researchers will inspire other students to do the same.

To our graduate student mentors who provided guidance throughout the editing process, thank you – your time and expertise helps us delve deeper and hold this publication to a high standard. Thank you to the faculty and staff at UCLA who have helped and supported us by offering words of encouragement and wisdom, and sharing URJP with your networks and students. To our own staff members: We appreciate your year-round effort and commitment – without you all this wouldn't be possible.

We are very proud of the third edition of the Undergraduate Research Journal of Psychology at UCLA. We think undergraduate research is quite often overlooked, leaving students to defer many of their research aspirations to graduate school. We want to change this misconception, and we hope this and future editions will encourage students to start now. We look forward to seeing what undergraduate researchers will do in the years to come!

Sincerely,

Alisa R. Muñoz, Vincent Nguyen, and Jake Gavenas

Preface

Margaret Shih, Ph.D.

Board of Visitors Term Chair Professor of Management and Professor of Psychology
Senior Associate Dean, Full Time and Fully Employed MBA program

I am honored to write the preface for the third volume of The Undergraduate Research Journal of Psychology at UCLA. Undergraduate students have long been an integral part of the psychological research community. This journal presents a collection of just some of the incredible contributions that undergraduates have made to the advancement of psychological science at UCLA and beyond.

Participating in research projects during one's undergraduate years is the first step for many students to embark on productive and successful research careers. Joining a lab gives students an opportunity to become involved in the research enterprise. They can gain experience in all aspects of conducting research such as designing studies, reviewing literature, collecting data, building surveys, and interpreting results. Students hone their analytical and critical thinking skills. Working with undergraduates is also a rewarding experience for the faculty, post- doctoral scholars and graduate students who serve as mentors and instructors to these undergraduate students. Teaching undergraduates the methods used to generate new knowledge and watching these students acquire these skills as they develop into research scientists is gratifying. This partnership has resulted in many of major scientific advances in our field.

Uncovering new knowledge in a field is just one aspect of the research process. The second aspect is disseminating and communicating the newly acquired knowledge. Publishing one's research findings is one channel through which scholars can share their newly discovered knowledge. Writing research papers requires that one be able to report clearly and accurately the research questions asked, the methods used and analyses run to investigate the questions. Soliciting feedback and responding to critiques are also critical aspects to this practice. The creation of this journal provides a terrific venue for undergraduate students to gain exposure to this second aspect of the scientific process.

I congratulate everybody who has been involved with this journal. One can clearly see the tremendous work and dedication that went into creating this journal—from the students and scholars who conducted the research to the individuals who evaluated, selected and edited the papers that would be included in this volume. This journal is a product that clearly illustrates the excellence, initiative and collaboration that characterizes the scientific community of undergraduate researchers worldwide

Faculty Endorsements

Craig R. Fox, Ph.D. | As an experimental psychologist and journal editor I strongly support the mission of the Undergraduate Research Journal of Psychology at UCLA. The best way to gain admission to top academic programs is by demonstrating a capacity to produce high quality research. And the best way to learn how to produce high quality research is by doing it. URJP provides a valuable vehicle for undergraduates to gain this experience, and acceptance by the journal provides a signal of their promise as future researchers as well as exposure for their work. I applaud the URJP staff for their quick success and I urge undergraduate researchers to take advantage of the unique opportunities this journal provides.

William (Bill) Grisham, Ph.D. | The Undergraduate Research Journal of Psychology plays a pivotal role in the educational landscape by providing a genuine means of communicating and disseminating undergraduate research results. The Undergraduate Research Journal of Psychology provides the perfect opportunity and outlet for students to practice and utilize their communication skills, both via the written word and graphical representation. Notably, the Undergraduate Research Journal of Psychology has expanded its reach beyond the walls of UCLA and publishes articles from students from other institutions. This latter fact not only ensures a greater readership but also guarantees future viability of this journal. Thus, the Undergraduate Research Journal of Psychology is not only offering a valuable service to the undergraduate community at UCLA and other institutions, but also provides the world with a window to explore and utilize the research efforts of undergraduates.

Constance Hammen, Ph.D. | So many valuable skills come into play in research on human behavior: forming an interesting idea or a useful question, building on the available conceptualization and theory, translating the question into a puzzle to be pursued systematically, collecting data over and over again, performing statistical analysis, and making sense of the results. And then comes the reward: crafting a document about your research that precisely describes and informs others of what you found and which has the potential to stimulate someone else to build on your thoughts and conclusions. Congratulations to the Undergraduate Research Journal of Psychology at UCLA for providing the opportunity for psychology students to exercise the skills—and the pleasure—of sharing your scientific accomplishment with others.

Jaana Juvonen, Ph.D. | Congratulation to all of the authors for getting your first research publication! I hope that this will be one of many. As you may be applying to or starting in a graduate program, this first piece will always have a special place. I also hope this issue will motivate many more new scholars to write up their research for publication. The process takes time and hard work, but “there is not gain if there is no pain.” Take pride in your labor and achievement.

Uri Maoz, Ph.D. | Research is sometime arduous, often challenging and complex, and at times frustrating. But it is always exciting, frequently exhilarating, rarely repetitive, and never boring. It therefore requires a combination of passion, creativity, diligence, perseverance, and an unquenchable thirst for knowledge and discovery. Undergraduate research is the meeting point between young researchers

Faculty Endorsements

possessing these traits and the guidance and experience of more seasoned research mentors. In my experience, the results are instructive and frequently fascinating. Research takes a long time to master, and requires first-hand hands-on experience. So it makes sense that it is increasingly part of undergraduate education. This makes initiatives such as the Undergraduate Research Journal of Psychology at UCLA ever more important. It grants undergraduate students invaluable experience at the process leading from an idea to a paper. In that it certainly answers a need in the field, and I commend the editors and authors for making it an ongoing reality.

Gregory A. Miller, Ph.D. | The Undergraduate Research Journal of Psychology at UCLA is an impressive product showcasing the diverse research that undergraduates at UCLA and other universities are pursuing. Research is central to modern psychology – a contribution to the world and to the student's education. The URJP shows what a committed group of students can accomplish to disseminate scientific discoveries.

Daniel Oppenheimer, Ph.D. | I'll never ceased to be amazed at students who attend a research university, but then don't get involved in research. Research opportunities are fantastic educational experiences, and the fundamental advantage of a research university over other institutions of higher learning. And yet, many (perhaps most?) students don't take advantage of having access to top scholars and labs. What a wonderful thing that URJP is encouraging undergraduates to become active in research and providing an outlet for the fruits of their scholarship. By promoting a culture of undergraduate involvement in research, URJP will hopefully inspire many more students to become active scholars and get the most out of their university education.

Gerardo Ramirez, Ph.D. | In my time at UCLA I have had the privilege of working with a couple of students who are involved in UCLA's undergrad Research Journal of Psychology (URJP). I have noticed that students who are involved in the URJP have received one of a kind insights into the scientific writing and publication process which is a terrific opportunity to improve overall interest getting involved in independent research. I have also noticed that participation in the URJP has helped to build an undergrad led research community that helps students to get a taste of what it means to work in academia and has generally increased students interest in attending doctoral programs. The URJP is a unique resource which our research oriented university is fortunate to have. I fully encourage UCLA and the Department of Psychology to continue to support the URJP.

Jennifer Silvers, Ph.D. | Conducting research as an undergraduate was one of the most empowering, challenging, and ultimately, formative experiences I had as a college student. While time in the laboratory is a critical element of this experience, so too is sharing your findings with a broader audience. The Undergraduate Research Journal of Psychology at UCLA is an invaluable resource for connecting undergraduate researchers from around the world and for disseminating cutting-edge research to a broader audience. I commend the work that the Journal is doing and encourage even more undergraduates to submit and contribute to this fantastic publication.

Advice From A Grad

Carolyn A. Bufford

M.A. Psychology, 2014; B.S. Cognitive Science, 2012

What to Consider When Choosing a Program

The first consideration for choosing a graduate program in psychology or a related field is whether graduate school is the right path for you. As a current fourth-year PhD student, I find it very rewarding. But it is also demanding work for low pay when pay is available, so do not consider it a "default" or "fall back" option. Know your goals, and how graduate education will fit into achieving them. Know yourself and in what kinds of relationships and environments you thrive. As with choosing an undergraduate institution, an internship or job, carefully consider your options before and after submitting applications.

There are a variety of aspects to consider when choosing a graduate program. In reflecting on my own decision process and experiences as a PhD student, I have grouped these aspects into six major themes: type of program, advisor(s), program features, funding, campus features, and location. I will discuss the themes in this order, which reflects decreasing specificity but not necessarily importance or order in which to consider them.

Type of program. First, identify whether you are interested in a clinical/counseling program or a research program. There are some clinical research programs (such as in the Clinical Area of the Psychology PhD program here at UCLA), but most programs fall into one category or the other. Identify what kind of degree will suit you and your goals: a graduate certificate, a master's, PhD, PsyD, MD/PhD. Part of this is knowing the application requirements and expectations. Particularly for PhD programs, the requirements and expectations can be quite different. For example, a degree in psychology or a related field and two years of research experience may not be required, but they are often expected for your application to be competitive. Also investigate programs that are not in psychology departments. Psychologists and psychology-related research can be found in a variety of other departments, such as schools of business, education, or medicine; neuroscience, computer science, and communication studies departments; even schools of music and schools of law.

Advisor. If your program requires research and/or fieldwork, you will most likely have one or more advisors. This person or people are important, even critical for PhD programs, because you may work very closely with them on their research or related research. You will need their recommendation for fellowships, grants, and positions during and after graduate school. If you enter a PhD program, you will be essentially apprenticed to your advisor.

Advice From A Grad

Consider at each institution who potential advisors might be, their advising style, their age and tenure status, and the number of potential advisors.

Advisors can have a variety of different approaches or styles in their interactions with their students. Some are more hands-off, checking in or meeting with you only when you ask. Some want to meet weekly for updates, questions, problem-solving, etc. Some keep a professional distance, while others have more parenting styles. Some have productivity philosophies; others, deep thinking philosophies. Ideally, there is a match between your advisor's style and the style of working relationship you prefer. For some of you, you will decide that the relationship is more important than the specific research, and others will choose the research over the kind of working relationship.

A potential advisor's age and tenure status may influence the relationship as well. Younger, untenured professors tend to be publishing more but may or may not stay for the duration of your study. Mid-career professors may publish the same or less but might be more respected in the field and less available to you, traveling to conferences and speaking engagements or taking sabbatical. Late-career professors tend to be well-known and respected, but may retire and occasionally pass away during their students' graduate careers. Choosing an institution with more potential advisors means you will more likely avoid some of these possible problems, and may have more opportunity for collaboration among the other graduate students

Program features. The structure and features of graduate programs impact your experience of them. Overall quality and reputation is one consideration. The balance of coursework and research or fieldwork or clinic hours is another. Program size is also important. Smaller programs with smaller cohorts tend to offer fewer courses and fewer students in a specialty, so you are exposed to more of the breadth of the field and collaborate more across areas. Larger programs with larger cohorts tend to offer more specialized coursework and more students in specific areas, e.g. cognitive psychology, so you gain more depth and more collaborations within an area.

There are also more practical considerations. What access do you have to participants or fieldwork sites? Time to degree and attrition rate are notable considerations: how long does it typically take students to finish the program, and how many of those who start actually stay in and finish? What interest and support is there for academic and non-academic career choices? What is the track record of graduates – what kinds of work do they do, and where do they do it?

Funding. Funding is always a consideration. PhD programs tend to offer funding, but other kinds of programs will typically cost you. Funding can come from a variety of sources, with benefits and drawbacks to each. Working as a teaching assistant can be good experience, but takes time away from degree-related activities. Working as a paid researcher on your advisor's or someone else's grant pays you for doing research, but specifies what research to do. External and internal fellowships and grants give you money towards research costs and/

or towards living expenses, but the applications take time and are competitive. Also consider the quality and cost of health insurance, if it is offered or available to you.

Campus features. The campus on which a graduate program exists makes a difference in your graduate career and quality of life. Some campuses have career centers with support and programming particularly for graduate students. Your advisor may or may not be able to help you much with developing professional skills and applying to jobs, but a good career center can help. A writing center, which may or may not be connected to the career center, is another potential benefit to you. It can help you hone your skills and help form writing groups, the saving grace of procrastinators and others who struggle with writing.

Other campus features are more relevant to quality of life. For example, the availability of health centers, mental health services, and gyms on some campuses give their students easy access to physical and mental health care and maintenance. Parking, accessibility by public transit, and proximity to housing can vary drastically from campus to campus and impact your daily life. Some campuses offer graduate housing, which can make finding housing and getting to know other graduate students easier.

Location. Graduate programs are located all over the country and the world. Where you live and where you prefer to live will make a difference in your quality of life while in graduate school. For shorter programs, it may make less difference, unless you get connected to local job networks through your program. Local culture varies across states and regions, as does weather. Size of city or town as well as region will impact your cost of living. City size will also influence the distractions and activities available for time set aside from working (there isn't really "free" time). You might even make location your top priority in choosing a program if you want to stay near friends and family, a significant other, or a church or other religious or social community.

My list of considerations for choosing a graduate program is not exhaustive, but it is intended to give broad coverage to life as a graduate student. You will not just be a student, you will also continue to be yourself. Here is my main point: choose what is best for you as a complete person with goals and preferences; do not just default to what is academically most impressive or advantageous.

Carolyn A. Bufford *is a PhD student in Cognitive Psychology at UCLA in the laboratory of Dr. Philip J. Kellman. She studies the intersection of perception, cognition, and expertise through psychophysics and learning technology - measuring how we learn to see the important patterns and structure in domains such as mathematics and medicine and learn to hear them in domains such as music, and how learning technology can accelerate the development of visual and auditory expert perception. Carolyn shares her love of psychological science through mentoring undergraduate research assistants, teaching, and participating in Psychology in Action (psychologyinaction.org). She enjoys spending time with friends and family and helping out at her church.*

Advice From A Grad

Anthony Osuna

B.A. Psychology, UCLA 2015

Staff Research Associate, Kasari Lab, UCLA

Gap to the Max: Maximizing Your Gap Year

Congratulations, you're graduating! While you're busy cherishing your last days as an undergraduate (as you should), you can no longer ignore the single question that you're definitely tired of hearing: "so what are you doing next?" You continue to throw around the phrase "gap year" because you know that you're not going to graduate school *yet*, but what does that actually mean? What is a "gap year" and what does it mean in the grand scheme of your plan to attend graduate school?

First thing's first, you need to be prepared to have your "gap year" last more than one year. While I'm sure that you're eager to zoom into graduate school as soon as possible, you have to remember that your gap year(s) need to be productive. You need to be able to show graduate admission committees that you're a much better applicant because of your gap year(s) than you were coming out of undergrad. If you're looking to take only one gap year before a research-based doctoral program, it means that you'll likely be submitting graduate applications within seven months of graduating. While much can be learned in seven months, it may not be long enough to convince faculty members that you have become proficient in whatever research or clinical skills you are being trained in. I'm not implying that you cannot get into graduate school with a one-year gap year plan—many have been successful in this route—I'm saying be prepared to take more than one gap year.

When it comes to taking time between your undergraduate experience and attending graduate school, it's important to have a gap year plan. You should go into your gap years with an understanding of which areas of your graduate application you need to improve. While it's extremely difficult to find a psychology-related job fresh out of undergrad, knowing what you're hoping to get out of your gap years will help steer you in a direction that will be beneficial to your long-term goals. There are plenty of productive gap year options including: teaching (Teach for America, etc.), volunteering, clinical training/practice (ABA therapist, etc.), and becoming a staff researcher (lab coordinator, Staff Research Associate, etc.) to name a few. If your research interests include education, it may benefit you to become a teacher or work in the school system. If you think you need clinical experience, you might look into becoming a therapist. While every experience may be a valuable one, I will offer most of my advice from the perspective of someone who aims to go into a clinical PhD program, and who is currently spending their gap years as a staff researcher.

Advice From A Grad

When I was thinking about how I could maximize my gap years, I knew that I needed to refine my research skills and obtain clinical experience. I wanted a position that would involve me in all aspects of the research process and allow me to work directly with a clinical population. I was fortunate to secure a job as a Staff Research Associate at UCLA in a research lab that both fits my research interests and caters to my needs as an aspiring graduate student. Upon accepting a staff research position, it's important to be forward and transparent with your principal investigator about your research interests, long-term goals, and what you hope to get out of your experience in his or her lab. This conversation will remind both your PI and yourself that your gap years should be a productive time to develop your skills for graduate study. You want your gap years to be more than a job but a critical stage in your development as a researcher.

Regardless of which direction you take your gap years, always remember that gap years are anything but a gap—they're more like development years. During these years, continue to think about ways that you can better yourself and your graduate application. If you were involved in independent undergraduate research, try to publish your work or present it at professional conferences in your field. Continue to stay in touch with the faculty that you've worked with as an undergrad, since they may be writing you letters of recommendation in the near future. Consider volunteering and/or getting involved with things that will develop you in ways in which your job may not be able to offer. Overall, no matter how you decide to spend your gap years, if you keep your goals in mind, work hard toward them, and enjoy yourself, you'll find yourself in a good position to get accepted into a graduate program.

Anthony graduated from UCLA in 2015 with a major in Psychology and minor in Applied Developmental Psychology. In 2013, Anthony helped found the URJP and served as the Editor-in-Chief for the organization's first two publications. As an undergraduate, he was a McNair Research Scholar and received the URFP and URSP research grants from UCLA. He currently is a Staff Research Associate at UCLA in Dr. Connie Kasari's autism research lab. He will be applying to graduate programs in the near future and aspires to research the intersection of treatment interventions in under-resourced communities using a Community-Partnered Participatory Research (CPPR) approach.

Advice From A Grad

Sarah White
B.S. Cognitive Science, UCLA 2015

What to Expect in the First Year of Graduate School

When entering or deciding whether to pursue graduate school, it is hard to know what to expect, even if you have discussed what graduate school life is like with numerous professors or other graduate students or have read the entire series of PhD Comics. Hopefully the ensuing reflection on my first few months in a PhD program can provide a slightly less nostalgic and moderately helpful perspective on the transition from completing an undergraduate degree to embarking on the path to becoming an independent researcher.

Academically, I would describe the first two quarters of graduate school as enjoyable. Classes are much smaller (six to eighteen students) than in most undergraduate programs, which has allowed for much deeper discussions of journal articles than is possible in a 30 or 200-person class with a textbook. Despite having so few classmates, the breadth of opinions and background knowledge has been extremely enriching; this is probably the case not only in my Learning Sciences program but also in more typical psychology programs.

One of the most eye-opening things I have learned is that there are both pros and cons of the Holy Grail that is a canonical psychology experiment; it all depends on what question you are asking. In addition to classes and spontaneous chats with fellow graduate students, there are several talks and workshops to attend to learn something new. The best ones are those with free food (graduate students have an *abnormally* keen knack for finding free food) and those that seem only tangentially related to your research on the surface because you never know what will spark a new project idea. Professors are also very open and available to discuss your wildest research proposals; just remember that they are people too, no matter how intimidating they may seem. Take every opportunity you can to learn from the best minds in your field and you'll be one of them eventually.

Both success and personal satisfaction in graduate school require a high degree of self-motivation. However, several things can undermine that motivation. Two challenges I have faced in my first few months of graduate school are 1) managing time productively and 2) the impostor syndrome.

Advice From A Grad

With fewer hours dedicated specifically to classes each week, there is more time available to do the work you really SHOULD be doing, i.e., pursuing personal research interests and doing the work that your advisor wants you to do that is not specifically for a class. In those hours, my level of productivity usually cycles through watching Netflix, actually having a strong desire to do work, being stressed about not having done work earlier, and (very rarely) striking a good balance. And I have been told that this is somewhat normal. One of the best pieces of advice I have received is to find the schedule that works for you, whether that means working 9- to-5 Monday through Friday or a different range of hours or "working" on weekends but with several minutes spent taking BuzzFeed quizzes. Managing my time to maintain self-motivation, more than any other skill or tidbit of knowledge, has been the most valuable and most difficult aspect of life as a graduate student to master.

This aspect of time management is very inter-related with the second challenge: the graduate school stereotype of impostor syndrome. Yup, it's real. The self-doubt about whether I am qualified to be in graduate school because I am not devoting enough hours to research or should instead be working outside of the academy because industry has strict, highly-motivating deadlines plagues me at least once a week. Remembering why earning a PhD is the best method for me to accomplish my goals while using my talents usually helps. Other times I read blog posts on the topic to remind myself that I am not alone. Every so often there will be a little victory – like reading an intriguing paper, receiving positive feedback, or making it through the day without needing a piece of chocolate – that makes the moments of uncertainty worthwhile.

Lastly, I want to mention what to expect in graduate school when you aren't sitting in solitude at a computer reading, writing papers and e-mails (probably more of the latter), or procrastinating. In contrast to having all of your friends live in a mile (or closer) radius from you, like in undergrad, having a social life as a graduate student requires a bit more effort but comes with way more freedom. Maybe it is because I moved to a different state where I only knew two other people or because I am slightly introverted or because I am at a smaller school, but it can be difficult to meet a broad range of people in the transition to life after college.

Meeting people in other departments can be difficult because they are also often sitting at their computers doing the same thing as you but with different content. Meeting people outside of the university can be even harder because you are often sitting at your computer during atypical work hours.

Luckily, the eight other students in my cohort are wonderful to spend time with both in and out of the office and the older students in my department have also been very welcoming. So start making friends in your field – they will be integral to your professional and non-professional success – and apply the same drive for joining extra-curricular activities that qualified you for graduate school to expanding beyond your academic interests. Trying out

new hobbies and talking to strangers isn't as terrifying as I thought it was and definitely is not as terrifying as passing my qualifying exams sounds right about now.

You can only be a graduate student for so long; make the most of all of the opportunities. Hopefully the five, six, seven, nine, or maybe only four (if you somehow master Challenges #1 and #2) years of graduate school will be even more fulfilling than you expected.

After graduating from UCLA in 2015 with a B.S. in Cognitive Science and minors in Neuroscience and Education Studies, Sarah White is now a Ph.D. Student in Learning Sciences at Northwestern University researching how teacher training and classroom instruction can be designed to better align with cognitive science principles related to categorization and adaptive learning. While at UCLA, Sarah was also an editor for URJP.

Whitney Akabike
University of California, Los Angeles

Whitney Akabike is a recent graduate from the University of California, Los Angeles. In June 2015, she graduated with her Bachelors of Arts degree in Psychology. Upon graduation, she was nominated to conduct a paper talk about this research project at various institutions across the country, such as the University of California, Los Angeles, Stanford University and at the University of Hawaii at Manoa. Whitney is currently working on pursuing an advanced degree in a field related to psychology. Outside of academia, she enjoys, listening to her favorite artist Beyoncé, hiking outdoors and spending time with friends and family.

Was there a particular experience that sparked your research interests?

I had a difficult time deciding on a research topic. However, my weekly meetings with my advisor, Dr. Juvonen, helped me through this challenging process. Her best advice to me was to relate the topic to my own experiences and to ask myself, "How has this affected me?" and "Why is this important?" From there, I began to think about my upbringing and figured it would be interesting to see if this type of racial socialization has affected other African Americans.

Who has been an influential person in your life?

My dearest sister, Andrea Akabike. She constantly pushes me to raise the bar in all things I pursue. In my last quarter at UCLA, I was not sure how I would be able to balance my schoolwork, extracurricular activities, going to work, preparing for graduation, presenting my project at conferences. But, with her advice and encouragement, I was able to successfully do it all and more—hence, the publishing of my paper.

When and where are you the most productive?

I am most productive early in the morning after working out around 5 a.m. Then, I like to get my work done in any quiet & spacious location, preferably the desk in my room.

Where do you see yourself in 10 years?

Within the next 10 years, I hope to have obtained my PhD degree in either clinical psychology or industrial organizational psychology. If I go into clinical psychology, I would like to work as a clinician at juvenile detention centers. If I go into industrial organizational psychology, I would like to work as a traveling business consultant, preferably internationally.

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Can Parental Preparation for Bias Help? Intergroup relations of African American Adolescents

Whitney Akabike B.A. and Hannah Schacter M.A.
University of California, Los Angeles

Studies have shown that compared to other ethnic groups, African American parents talk more with their children about discrimination and racial bias. These parental messages have been shown to help children cope with experiences of discrimination. Less is known about whether parental preparation for bias may influence adolescents to develop same-ethnic friendships which may in turn relate to their feelings of ethnic pride. We tested this proposed model in a sample of 718 African American 6 th graders. We found that more parental preparation for bias at the beginning of middle school was associated with more same-ethnic friendships among adolescents, which in turn related to more ethnic pride at the end of the 6 th grade year. These results suggest that together with increased racial awareness from parents, forming same-ethnic friendships may serve as a protective factor against racially dissonant experiences, but also have an indirect positive effect on the development of adolescent's ethnic identity.

In 2014, the U.S. Department of Education and the U.S. Department of Justice released a statement declaring that racial discrimination is a prominent issue within public elementary and secondary schools that needs to be addressed. They reported that students of color, in particular African-American students, were three times more likely to be harshly disciplined than their peers. Even with misbehavior taken into consideration, the statistical evidence showed that students of color were more likely than not to be subjected to "differential treatment or a school policy or practice that may have an adverse discriminatory impact (U.S. Department of Education (DOE) & U.S. Department of Justice (DOJ), 2014)." Furthermore, in comparison to their peers, black adolescents are more likely to report experiencing peer and teacher discrimination (Greene, Way & Pahl, 2006; Rosenbloom & Way, 2004). Being exposed to continuous acts of discrimination has been found to cause adverse effects, such as decreased school engagement, diminished academic achievement and increased behavioral issues (Wong, Eccles, & Sameroff, 2003; Brody et al., 2006). However, according to Wong et al., (2003), such issues may be alleviated if one develops a positive connection to their own ethnic identity and ethnic group.

One way that positive ethnic identity may be fostered is through the process of a parent communicating with one's child about racial issues and biases. This parenting practice is known as preparation for bias. The term preparation for bias is defined as parents' efforts to promote their child's understanding of and skills for coping with ethnic-racial prejudice and discrimination (Hughes, Witherspoon, Rivas-Drake & West-Bey, 2009). These messages can come in different forms, such as verbal and nonverbal messages, messages that parents intend and deliberately communicate, and unintended messages that parents transmit inadvertently (Hughes, Bachman, Ruble & Fuligni, 2006a). Preparation for bias occurs primarily in minority families, in particular in African American families; this could be primarily due to African Americans' long history of marginalization and oppression (Ward, 1991). With increased racial awareness taught by parents, children may be better equipped to effectively handle experiences of racial discrimination in various settings, such as school.

Some studies have suggested that preparation for bias messages may foster higher levels of competence, self-worth, and resilience amongst youth. In a study by Harris-Britt, Valerie, Kurtz-Costes and Rowley (2007), it was found that African American youth who received more messages about preparation for bias from their parents reported higher levels of self-esteem. Another study found that 8th grade African American adolescents who received fewer parental supports for negotiating and coping with discrimination were more likely to disconnect from their racial group and develop

© 2016 URJP at UCLA / urjp.psych.ucla.edu

negative affective views towards their group (Richardson et al., 2014). Murry, Berkel, Brody, Miller and Chen (2009) found that children who were warned about racial discrimination by their parents were less likely to conceal their academic strengths and also rejected stereotypes that included attitudes incorporating school failure and academic underachievement as a part of their African American identity. Furthermore, Tang and Hallman (2015), found that the more parents communicated to their child about racial barriers, the more it mitigated their child's negative feelings towards academics and perceptions about themselves.

In regards to friendships, studies have found that parental preparation for bias was associated with behavioral engagement (e.g. "I have preference to play/hang with friends of the same race as me") (Hughes et al., 2009) and feelings of affirmation (e.g. "I am happy that I am the race that I am") (O'Connor, Brooks-Gunn & Graber, 2000), such that these students wanted to associate with others of their ethnicity. They also expressed pride for belonging to their ethnic group. African American children who strongly identify with their ethnic group have been shown to select more same-ethnic than cross-ethnic friends (Hamm, Bradford-Brown & Heck, 2005). By building same-ethnic friendships, it may help youth develop increased feelings of support and group connectedness, which has also been associated with higher levels of ethnic pride (Chavous et al., 2003). A reason for this could be that having same-ethnic friends may provide a safe and secure environment in which youth will less likely be judged or challenged because of their race/ethnicity. Likewise, compared to other ethnic groups, African Americans tend to share similar experiences when it comes to experiencing discrimination, which may also have a driving influence on their choice of friendships (Ogbu, 2003).

The present study examines the effects of parental preparation for bias on 6th grade African American youth's friendships and ethnic pride. We hypothesized that parents who prepare African American children for bias in the beginning of 6th grade may influence youth to select more same-ethnic friendships, which in turn may relate to these youth reporting higher levels of ethnic pride at the end of 6th grade. It is presumed that having same-ethnic friendships will account for the relationship between preparation for bias and ethnic pride. Thus, by parents making their child aware of what may happen to them because they are African American, it may encourage youth to become connected to those of the same ethnicity. Furthermore, these same-ethnic friendships may provide children with a supportive environment, especially if they experience racial discrimination in school, which may in turn help them develop higher levels of ethnic pride.

Method

Data for this study was collected as part of a larger, longitudinal study of middle schools located in California. The purpose of the study was to examine the psychosocial benefits of racial/ethnic diversity in urban middle schools. The sample (N = 5,991) was recruited from 26 ethnically diverse urban middle schools. All school districts provided permission to conduct the study, and during recruitment, all students and families received informed consent and informational letters. Students who returned signed parent consents and written assent participated in the study.

Sample and Procedure

The current study sample consisted of 718 African American 6th grade students (50% female). Students completed a written questionnaire in the fall and spring of their 6th grade year within a classroom setting. Prior to completing the questionnaires, students were informed about confidentiality and were reminded that participation was voluntary. Researchers read all instructions and questionnaires aloud as students followed along and provided written responses within a protected space. After completing each survey, students either received $5 in cash or a $5 gift certificate.

Parents were also asked to complete a questionnaire, which was sent home along with the informational letters and parent assent forms. The multiple choice questionnaire asked about the ways in which parents talked to their children about gender and race/ethnicity.

Measures

Preparation for bias. Parental preparation for bias was measured in the fall of 6th grade using two items from the questionnaire designed to determine whether parents spoke with their children about gender and race/ethnicity. Parents rated their racial socialization practices at the time when they gave permission for their child to take part in the larger, longitudinal study. This measure was adapted from two subscales ("preparation for bias" and "cultural socialization") from the 16-item measure developed by Hughes and Chen (1997). It is used to assess the transmission of information about race and ethnicity from parents to their children. It includes statements such as: "Talked with your child about how people can be discriminated against because of their race or ethnicity" and "Told your child that people might treat him/her unfairly because of their race or ethnicity." Parents rated each item on a 5-point scale from 1 ("Never") to 5 ("Very Often"). The two items were averaged to create

© 2016 URJP at UCLA / urjp.psych.ucla.edu

a composite score of parental preparation for bias (α = .82).

Ethnic pride. Ethnic pride was measured in the spring of 6th grade using three items from the questionnaire designed to understand students' perceptions about their own ethnic group. The decision to measure ethnic pride in the spring was based on the anticipation that there might be a change in ethnic pride as youth enter middle school—middle school typically has a larger population size than elementary school. Therefore, in expectation that students would be adjusted to the new environment by the spring, ethnic pride was only measured towards the end of their first year.

This measure was adapted from the Multigroup Ethnic Identity Measure (MEIM) which is used to assess ethnic identity development in adolescents (Phinney, 1992). At the beginning of the survey, students were asked about their own ethnic group and received instructions about what it meant to be a part of an ethnic group as well as examples of various ethnic groups (e.g. Black/other country of origin—e.g. Belize, Guyana, Caribbean). The measure asked questions such as: "I feel like I really belong to my ethnic group" and "I am a proud member of my ethnic group." Students rated each item on a 5-point scale from 1 ("Definitely Yes!") to 5 ("Definitely No!"). Items were reverse coded and averaged to create a composite measure of ethnic pride, with higher values indicating more ethnic pride (α = .69).

Same-ethnic friends. The proportion of same-ethnic friendships was measured in the spring of 6th grade using an instrument in which students listed the names of their "good friends" who were in the 6th grade and attended the same school as them. We decided to use friendships nominations from the spring rather than the fall because it was presumed that friendships would be more stable at the end of the year rather than at the beginning of the year; when transitioning from elementary to middle school, children tend to enroll at new schools and sometimes their elementary school friends may not attend the same school. Thus, at the beginning of the school year, this may require students to build new friendships. For each friend listed, participants responded to one item asking whether the friend belongs to the same or a different ethnic group. A proportion score was then calculated by dividing the number of same-ethnic friends by the total number of friends nominated.

Results

Descriptive Findings.

Means, standard deviations and correlations for all main variables are presented in Table 1. Fall preparation for bias (*M* = 3.60, *SD* = 1.08) was positively correlated with spring proportion of same-ethnic friendships (*M* = 4.26, *SD* = .660), *r* = .118**, *p* = .003. Spring ethnic pride (*M* = .506, *SD* = .354) was also positively correlated with spring same-ethnic friendships, *r* = .107, *p* = .006. Lastly, there was no significant correlation between fall preparation for bias and spring ethnic pride, *r* = .015, *p* = .710.

Table 1

Correlations between Preparation for Bias, Ethnic Pride and Proportion of Same-Ethnic Friendships

Variables	1	2	3
1. Fall – Preparation for Bias			
2. Spring – Same-ethnic Friendships	.118**		
3. Spring – Ethnic Pride	.015	.107**	
M =	3.60	.506	4.26
SD =	1.08	.354	.660

Note: * p< .05 **, ** p<.01

Table 2 presents the correlations separated by gender; the slashes indicate which gender, for example boy/girl. These findings were stronger for girls such that, fall preparation for bias (*M* = 3.62/3.56, *SD* = .060/.059) was positively correlated with spring proportion of same-ethnic friendships for girls (*M* = .519/.500, *SD* = .364/.345), *r* = .094/.139*, *p* = .003. Spring ethnic pride (*M* = 4.25/4.27, *SD* = .675/.643) was also positively correlated with spring same-ethnic friendships for girls, *r* = .016/.210**, *p* = .006. Lastly, there was no significant correlation between fall preparation for bias and spring ethnic pride, *r* = .023/.006, *p* = .710 for either gender.

Table 2

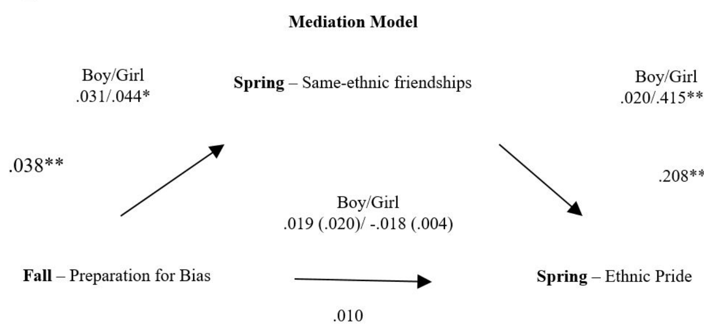
Correlations between Preparation for Bias, Ethnic Pride and Proportion of Same-Ethnic Friendships by Gender

Variables	1	2	3
	Boy/Girl	**Boy/Girl**	**Boy/Girl**
1. Fall – Preparation for Bias			
2. Spring – Same ethnic Friendships	.094/.139*		
3. Spring – Ethnic Pride	.023/.006	.016/.210**	
M =	3.62/3.56	.519/.500	4.25/4.27
SD =	.060/.059	.364/.345	.675/.643

Note: * p<. 05 **, p < .01

We tested a mediation model to determine whether students' proportion of same-ethnic friends could account for a relationship between parental preparation for bias and subsequent ethnic pride (see Figure 1). Bootstrapping analyses were conducted using the PROCESS macro (Hayes, 2013). Although the total effect of fall preparation

for bias on spring ethnic pride was not significant, $b = .010$, $p = .674$, there was a significant indirect effect of preparation for bias on ethnic pride, $b = .008$, bootstrap confidence interval: .002-.017. That is, fall preparation for bias predicted a higher proportion of spring same-ethnic friends (b = .038, $p = .004$), which in turn predicted greater spring ethnic pride (b = .208, $p = .006$). It is important to note that the findings from this model were stronger for girls than boys; the slashes indicate which gender, for example boy/girl. That is, fall preparation for bias predicted a higher proportion of spring same-ethnic friends (b = .031/0.44*, $p = .010/.014$), which in turn predicted greater spring ethnic pride (b = .020/.415***, $p = .851/.001$) for girls. But again, there was no significant effect between preparation for bias and ethnic pride for boys or girls (b = .019/-.018***), $p = .580/.990$).



In summary, although we did not find evidence of mediation, the significant indirect effect may suggest a process by which more parental preparation for bias may indirectly predict greater ethnic pride by promoting a greater proportion of same-ethnic friendships.

Discussion

Based on the findings, there was a positive correlation between preparation for bias by parents at the beginning of 6th grade and same-ethnic friendships reports by students at the end of 6th grade. We expected this result based on past studies that have found connections between these two variables (Hughes et al., 2009; O'Connor et al., 2000). Therefore, to such a degree, parents who prepare their children for bias may also have an influence on their child's decision about who they will become friends with. We speculate that having same-ethnic friendships may be beneficial when youth are confronted with acts of discrimination. When such instances occur, these youth may find more comfort by confiding in those who are similar to themselves rather than those who are of a different racial group. These negative experiences are more likely than not to be experienced amongst other African Americans, which may make it easier for youth to discuss these situations with their friends (Ogbu, 2003).

Furthermore, we also found that same-ethnic friendships was positively correlated with higher levels of ethnic pride at the end of 6th grade. Again, we predicted this finding being that African American children who positively identified with their ethnic group have been shown to select more same-ethnic than cross-ethnic friends (Hamm et al., 2005; Chavous et al., 2003). Thus, youth who surround themselves around their own racial group may serve as both a promotive and a protective factor to buffer against racially oppressive circumstances. Lastly, the findings suggest that there is no direct association between parental preparation for bias and ethnic pride. A reason for this could be due to the fact that when parents prepare their children for bias they are essentially informing them about the possible negative encounters they may experience because of their race. Inadvertently, parents are then placing less emphasis on developing their child's ethnic pride, which is typically associated with other types of socializations, such as cultural socialization (Hughes et al., 2006a).

This study extends from other studies because it uses a mediation model. Although we did not find evidence of mediation, we found a significant indirect effect such that, the more parents prepared their children for bias in the fall, it related to youth selecting more same-ethnic friends which in turn also related to youth reporting higher levels of ethnic pride in the spring. Thus, our results suggest that same-ethnic friendships may serve as an intervening variable that may provide information about a meaningful process by which preparation for bias indirectly influences ethnic pride. It is important to note that the overall findings were stronger for girls than boys, especially when it came to having same-ethnic friendships. We speculate that this may be due to girls' tendency of placing high value on close relationships and group connectedness (Collins & Repinski, 1994). This reasoning appears to be valid when those friends are a part of their own ethnic group than of another ethnic group (Levin, Van Laar & Sidanius, 2003). In contrast, when selecting peers, boys may place more value on shared activities (e.g., sports) and less value on other factors of similarity such as race/ethnicity (McNelles & Conolly, 1999).

Conclusions and Future Study

The purpose of this study was to investigate the effects of parental preparation for bias on African American youths' friendships and ethnic pride. We found that the more parents

© 2016 URJP at UCLA / urjp.psych.ucla.edu

prepared their child for bias, the more their child selected same-ethnic peers, which then indirectly resulted in these youth reporting higher levels of ethnic pride. In order to gain a better understanding of the effects of preparation for bias on friendships and ethnic pride, it is necessary to conduct a future follow up study that examines these effects with other ethnicities. Although African American children tend to be prepared the most for bias by parents, future studies should look to see if the effects are different for other ethnicities, such as Hispanics, Latinos, White/Europeans, and Asians. Although having same-ethnic friends has been shown to have advantages, there is limited research that examines other possible benefits of having same-ethnic friendships. In particular, it would be interesting to investigate whether same-ethnic friendships may increase youths' feelings of social and emotional safety. This may then give reason as to why African American children may feel more inclined to connect with other African Americans.

Additionally, with schools becoming more diverse, it becomes more important to understand the dynamic of same-ethnic and cross-ethnic interactions, with the success or failure of these interactions possibly depending on the way in which these students are socialized. Thus, it is important to determine whether preparation for bias is beneficial for youths' social and emotional development. Furthermore, the current study only used two to three questions from each questionnaire to measure the variables of interest. Future studies should use questionnaires that have more items and are tested for better reliability and validity. Nevertheless, this study contributes to our understanding of the effects of parental preparation for bias on African American children.

References

Brody, G. H., Chen, Y.-F., Murry, V. M., Ge, X., Simons, R. L., Gibbons, F. X., Gerrard, M., & Cutrona, C. E. (2006). Perceived Discrimination and the Adjustment of African American Youths: A Five-Year Longitudinal Analysis With Contextual Moderation Effects. *Child Development*, 77(5), 1170–1189. doi: http://dx.doi.org/10.1111/j.1467-8624.2006.00927.x

Chavous, T. M., Bernat, D. H., Schmeelk-Cone, K., Caldwell, C. H., Kohn-Wood, L., & Zimmerman, M. A. (2003). Racial identity and academic attainment among African American adolescents. *Child Development*, 74(4), 1076-1090. doi: http://dx.doi.org/10.1111/1467-8624.00593

Collins, W. A., & Repinski, D. J. (1994). Relationships during adolescence: Continuity and change in interpersonal perspective. In R. Montemayor, G. Adams, & T. Gullotta (Eds.), Advances in adolescent development: Vol. 5. Personal relationships during adolescence (pp. 7-36). Thousand Oaks, CA: Sage.

Hamm, J. V., Bradford Brown, B., & Heck, D. J. (2005). Bridging the Ethnic Divide: Student and School Characteristics in African American, Asian-Descent, Latino, and White Adolescents' Cross-Ethnic Friend Nominations. *Journal of Research on Adolescence, 15*, 21–46. doi: http://dx.doi.org/10.1111/j.1532-7795.2005.00085.x

Harris-Britt, A., Valerie, C. R., Kurtz-Costes, B., & Rowley, S. J. (2007). Perceived racial discrimination and self-esteem in African American youth: Racial socialization as a protective factor. *Journal of Research on Adolescence, 17*(4), 669-682. doi: http://dx.doi.org/10.1111/j.1532-7795.2007.00540.x

Hayes, A. F. (2013). An introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York, NY: Guilford Press

Hughes, D., & Chen, L. (1997). When and what parents tell children about race: An examination of race-related socialization among African American families. *Applied Developmental Science, 1*, 200-214.

Hughes, D., Bachman, M., Ruble, D., & Fuligni, A. (2006A). Tuned in or tuned out: Children's interpretations of parents' racial socialization messages. In L. Balter & C. Tamis Lemonda (Eds.), Child psychology: A handbook of contemporary issues (2nd ed., pp. 591– 610). Philadelphia: Psychology Press.

Hughes, D., Witherspoon, D., Rivas-Drake, D., & West-Bey, N. (2009). Received ethnic–racial socialization messages and youths' academic and behavioral outcomes: Examining the mediating role of ethnic identity and self-esteem. *Cultural Diversity and Ethnic Minority Psychology, 15*(2), 112-124. doi: http://dx.doi.org/10.1037/a0015509

Greene, L. M., Way, N., & Pahl, K. (2006). Trajectories of Perceived Adult and Peer Discrimination Among Black, Latino, and Asian American Adolescents: Patterns and Psychological Correlates. *Developmental Psychology, 42*(2), 218-238.

Levin, S., Van Laar, C., & Sidanius, J. (2003). The effects of ingroup and outgroup friendships on ethnic attitudes in college: A longitudinal study. *Group Processes & Intergroup Relations, 6*(1), 76-92. http://dx.doi.org/10.1177/1368430203006001013

McNelles, L. R., & Connolly, J. A. (1999). Intimacy between adolescent friends: Age and gender differences in intimate affect and intimate behaviors. *Journal of Research on Adolescence, 9*(2), 143-159. http://dx.doi.org/10.1207/s15327795jra0902_2

Murry, V. M., Berkel, C., Brody, G. H., Miller, S. J., & Chen, Y. (2009). Linking parental socialization to interpersonal protective processes, academic self-presentation, and expectations among rural African American youth. *Cultural Diversity and Ethnic Minority Psychology, 15*(1), 1-10. doi: http://dx.doi.org/10.1037/a0013180

O'Connor, L. A., Brooks-Gunn, J., & Graber, J. (2000). Black and white girls' racial preferences in media and peer choices and the role of socialization for black girls. *Journal of Family Psychology, 14*(3), 510-521. doi: http://dx.doi.org/10.1037/0893-3200.14.3.510

Ogbu, J. U. (2003). *Black american students in an affluent suburb: A study of academic disengagement.* Lawrence Erlbaum Associates Publishers, Mahwah, NJ. Retrieved from http://search.proquest.com/docview/620092328?accountid=14512

Phinney, J. (1992). The Multigroup Ethnic Identity Measure: A new scale for use with adolescents and young adults from diverse groups. *Journal of Adolescent Research, 7*, 156-176.

Richardson, B. L., Macon, T. A., Mustafaa, F. N., Bogan, E. D., Cole-Lewis, Y., & Chavous, T. M. (2014). Associations of racial discrimination and parental discrimination coping messages with African American adolescent racial identity. *Journal of Youth and Adolescence*, doi: http://dx.doi.org/10.1007/

s10964-014-0196-6

Rosenbloom, R. S., & Way, N. (2004). Experiences of Discrimination among African American, Asian American, and Latino Adolescents in an Urban High School. *Youth & Society, 35*(4), 420-451. doi: http://dx.doi.org/10.1177/0044118X03261479

Tang, S., McLoyd, V. C., & Hallman, S. K. (2015). Racial Socialization, Racial Identity, and Academic Attitudes Among African American Adolescents: Examining the Moderating Influence of Parent–Adolescent Communication. *Journal of Youth and Adolescence,* 1-15.

U.S. Department of Education & U.S. Department of Justice. (2014). *Overview of Racial Disparities in the Administration of School Discipline.* Retrieved from http://www2.ed.gov/about/offices/list/ocr/letters/colleague-201401-title-vi.pdf

Ward, J. (1991). Eyes in the back of your head: Moral themes in African American narratives of racial conflict. *Journal of Moral Education, 20,* 267–281.

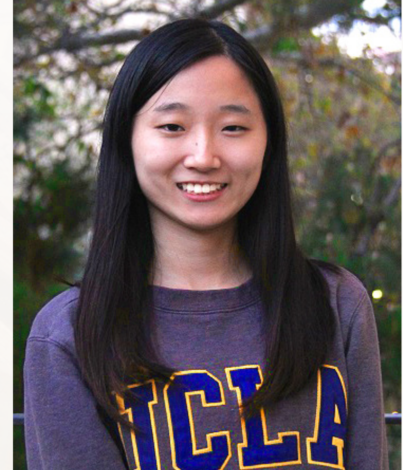
Wong, C. A., Eccles, J. S. and Sameroff, A. (2003). The Influence of Ethnic Discrimination and Ethnic Identification on African American adolescents' School and Socioemotional Adjustment. *Journal of Personality,* 71: 1197–1232. doi: http://dx.doi.org/10.1111/1467-6494.7106012

Editors: Alisa Muñoz, Lucy Cui & Sabrin Sidhu
Graduate Student Mentor: Brianna Goodale

Author Note: This research was supported in part by grants from the National Science Foundation, the National Institute of Health and Spencer Foundation
Correspondence concerning this article should be addressed to Whitney Akabike, Department of Psychology, University of California, Los Angeles, 90095
Contact: wakabike@ucla.edu

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Lucy Cui
University of California, Los Angeles



Lucy Cui is a third-year Psychology major, minoring in Statistics. She has broad experience in research: having worked at a national lab for three summers, a neuroscience lab, and two psychology labs during her undergraduate career thus far. This summer, she will be going to the University of Wisconsin-Madison for a summer research program. She is interested in studying statistics learning as a research topic for the rest of her undergraduate career as well as during graduate school. More specifically, she is interested in concept learning and conceptual understanding, problem-type categorization, data visualization and interpretation, and perceptual learning and building statistical intuition. This academic year, she worked on an independent research project on statistics learning with James W. Stigler, PhD and Emma H. Geller, a graduate student. The goal of the experiment was to investigate and discover strategies to help students distinguish between when to use different hypothesis tests. After undergraduate, Lucy plans on getting her PhD in cognitive psychology and aspires to become a professor and researcher. Outside of academics, Lucy enjoys reading nonfiction, watching crime dramas, and going on morning walks.

Was there a particular experience that sparked your research interests?

It was a pattern of experiences rather than any one particular experience that sparked my research interests. Through taking introductory statistics classes (Statistics 10 and Psychology 100A) and taking upper division statistics courses for my statistics minor, I have noticed how much statistics instruction is lacking and how common it is for students to go through a course clueless or having acquired little insight on how to apply these statistical concepts in the real-world. This problem worried me, for in the Big Data and technologically advancing world, statistics is becoming more important for jobs and itself a bigger job market.

Who has been an influential person in your life?

It is hard to pick just one influential person and much easier to pick a group of people who have been both influential and inspiring to me. The professors I've had the privilege of taking a class with, going to office hours, and/or conducting research with (in no particular order): Jim Stigler, Phil Kellman, Martin Monti, Keith Holyoak, and Jaana Juvonen have all contributed greatly to my research interests, passion for research, and/or my confidence in my research abilities. They have been supportive in my undergraduate journey and endeavors and I am very grateful for the lovely people in the Psychology Department, not just of them. They will forever be my role models and I have learned much about the journey to professorship through them.

When and where are you the most productive?

I am most productive in the early morning (6am - 10am) and late evenings (10pm - 12pm). I like to finish my coursework in the morning before class -- that way when I come home I can relax and wind down to a good book or a good show. On busy days when this doesn't work, I like to come home and take a nap (~1.5 hr) to recharge before doing more work. At home, I work best at my desk or on the dining table. At school, I work best in a cubby desk in Powell Library.

Where do you see yourself in 10 years?

In 10 years, I hope to have obtained my PhD in cognitive psychology and completed a postdoctoral fellowship. I would like to have done some teaching in a state/public university or liberal arts college before looking for a tenure-track position at a research university.

© 2016 URJP at UCLA / urjp.psych.ucla.edu

What Social Media Use Can Tell Us About Self-Identity, Self-Esteem, and Relationships

Lucy Cui
University of California, Los Angeles

Within the last decade, social media use has been growing in popularity. Many young adults now use social media platforms on a daily basis. It is not uncommon to have disproportionately more Facebook friends than real-life friends. With a majority of Facebook friends being strangers or acquaintances, what problems may this pose to our friendships, self-esteem and well-being? This literature review will examine studies on Facebook use and discuss: (1) the types of Facebook users and their associated affect and behaviors, (2) the relationship between Facebook use, self-identity, and self-esteem, and (3) the relationship between Facebook use and friendships and intimate relationships. Most of the studies reviewed in this article are correlational studies, cross-sectional studies, or experimental studies with self-report measures. Future directions in the research of social media use should incorporate more direct and objective measures of social interactions, even if this means getting information from users' peers and family. Studying social media use has allowed researchers to understand how individuals develop their identities and maintain their friendships in the modern age.

Within the last decade, social media use has been growing in popularity, up to the point that many young adults immerse themselves in social media platforms on a daily basis. Facebook is the most prevalent social media account in the United States population: at 62% compared to 26% Pinterest, 24% Instagram, 22% LinkedIn, and 20% Twitter (Duggan, 2015). Facebook users make up 72% of adult internet users and 62% of the entire adult population in the United States (Duggan, 2015). Facebook is most popular amongst the young adult population at 82% of internet users between the ages of 18 and 29 owning a Facebook account (Duggan, 2015). Facebook is still a popular social media platform for other age groups: 79% of internet users ages 30-49, 64% of internet users ages 50-64, and 48% of internet users ages 65+ (Duggan, 2015).

Facebook usage is also integrated into our daily activities. Logging onto social media has become a part of many individuals' daily routine. Over 50% of teens log onto social media at least once per day and 22% of teens more than ten times a day (Lenhart, 2015). Out of the entire adult population, 70% log on daily, including 43% who log on several times a day (Duggan, 2015).

With the rise in popularity of social media platforms also came concerns about their influences. Initially, researchers and parents were concerned that online communication would replace face-to-face communication (i.e., displacement hypothesis; Valkenburg & Peter, 2007a). This seemed like a reasonable concern due to the discrepancy between number of Facebook friends and real-life friends reported. The general Facebook user has an average of 229 friends (Hampton, Goulet, Rainie, & Purcell, 2011) while college students have an average of 300-400 Facebook friends (Reich, Subrahmanyam, & Espinoza, 2012). That is far more people than one actually interacts with on a daily basis. In fact, college students report that only about 21% of their social media networks consist of close friends and family (Manago, Taylor, & Greenfield, 2012).

The studies reviewed here focus on the social media platform Facebook as it is the most prevalent and one of the oldest successful social media platforms. Consequently, Facebook has been the most studied social media platform to date compared to its younger counterparts. Research on Facebook usage can provide groundwork for studying other social media platforms due to their similar goals, appeals, and

© 2016 URJP at UCLA / urjp.psych.ucla.edu

features. The strength and value of researching Facebook use can be attributed to its potential for generalizability: its prevalence, the diverse demographic on the platform (i.e., broad range of ages), and its place in our daily routine and habits. Studying the usage of Facebook may also give us insight into factors that contribute to individuals' well-being.

While the terms "Facebook", and "social media" or "social networking site" will be used interchangeably throughout this literature review, statements about "social media" are derivative of studies on Facebook use only. It is also important to note that because many of the studies are correlational, directionality cannot be determined. Results should be interpreted as perhaps a reflection of or amplification of pre-existing well-being rather than a negative effect of social media usage; there are many ways well-being and types of social media usage and behavior may influence each other. This literature review will examine the relationship between the user and the platform, the user and his/her concept of self, and the user and his/her network.

Types of Users

Researchers have classified Facebook use into three categories: active (i.e., post own content), passive (i.e., view other's content), and intense use (i.e., frequent and prolonged sessions of use). These three categories reflect an individual's inclinations for certain behaviors on social media sites. For example, active users may already engage in other forms of self-expression and self-promotion offline, while passive users may already engage in (negative) social comparisons offline, and there may be factors offline that predispose intense users to spending a lot of time on social media platforms (e.g., social isolation, compensating for few face-to-face interactions, liking online interactions more than offline ones). Facebook provides an outlet for these individuals' inclinations and could intensify pre-existing affect (i.e., positive or negative emotions, feelings, desires) users already experienced from their behaviors (e.g., self-expression, social comparison).

Active User. Active users are those who post content and interact with other members of their social media network. Active users experience greater perception of social bonding and closeness (Ellison, Steinfield, & Lampe, 2007). Deters and Mehl (2012) found that participants who were randomly assigned to post more status updates reported reduced loneliness compared to those in the control group. When used to express emotional needs, social networking sites can rally social support and decrease loneliness (Bessiere, Kiesler, Kraut, & Boneva, 2008; Blais, Craig, Pepler, & Connolly, 2008; Burke, Marlow, & Lento, 2010; Desjarlais & Willoughby, 2010; Kim, LaRose, & Peng, 2009; Valkenburg & Peter, 2011). Those who are more active on Facebook also report being able to depend on their network for emotional support when needed (Ellison et al., 2007).

Passive User. While active use has been linked to decreased loneliness and increased social support, passive use has been linked to self-esteem issues, life dissatisfaction (Ellison et al., 2007), and even body image problems (Haferkamp & Kramer, 2011). Passive users are those who strictly browse other people's profiles without posting their own material. Studies on passive use of social networking sites show that passive users are more likely to make negative social comparisons (Krasnova, Wenninger, Widjaja, & Buxmann, 2013, Haferkamp & Kramer, 2011). Krasnova et al. (2013) found that passively looking at photos of others on vacations or at social events often triggers resentment of not being invited, envy of others' happiness, and loneliness. Haferkamp and Kramer (2011) found that those who passively view attractive strangers' and celebrities' profiles are more likely to have poorer body image and lower self-esteem.

Intense User. Intense use is often defined by researchers by the frequency and duration of social media use (e.g., daily use for several hours). Researchers may also use a subjective measure for social media use intensity. For example, Lee (2014) used a 5-point Likert Scale for items like "Facebook has become part of my daily routine" and "I feel out of touch when I haven't logged onto Facebook for a while." Intense use is associated with more frequent social comparisons (Lee, 2014) and negative affect (e.g., Valkenburg, Peter, & Schouten, 2006). Those who have a high inclination to make social comparisons may find themselves spending more time on social media platforms and becoming an intense user.

As it turns out, intense Facebook use has been linked to comparing oneself negatively to others on Facebook (Lee, 2014). Chou and Edge (2012) found that the extent of negative social comparisons made by users (i.e., "others are better or happier than me") is associated with the amount of time spent on Facebook. Intense Facebook use may also take time away from face-to-face interactions and increase chances of social isolation. Valkenburg et al. (2006) found that longer use of Facebook is associated with increased risk for depression, loneliness, and smaller social circles.

This maladaptive use of social media can pose problems to self-esteem, affect, and even relationships with others. Selectively viewing profiles of strangers has

© 2016 URJP at UCLA / urjp.psych.ucla.edu

been linked to lower life satisfaction and more depressive symptoms (Lup, Trub, & Rosenthal, 2015), and selectively viewing profiles of attractive people has been linked to poorer body image and lower self-esteem (Haferkamp & Kramer, 2011). These studies have shown that those who view more profiles of friends and fewer attractive people are less likely to make negative social comparisons.

Self-Identity

Self-identity refers to how we define ourselves (i.e., who am I? what makes me, me?) and the associated potential, qualities, goals, values, and beliefs. Self-identity influences self-concept (i.e., what am I like?) and self-esteem (i.e., how do I feel about myself?) and vice versa. Research on Facebook use is important for learning about how individuals create, maintain, and modify their self-identities. Numerous studies (Buckingham, 2008; Calvert, Jordan, & Cocking, 2002; Davis & James, 2013; H. Gardner & Davis, 2013) show that adolescents use the creation of social media profiles, posts, and videos for self-expression and experimentation. In fact, social media usage is normative for adolescents and contributes to a developmentally important stage of self-exploration. However, social media use could be beneficial (i.e., providing an outlet for adaptive behaviors and encouraging positive self-concepts and high self-esteem) or harmful (i.e., facilitating maladaptive behaviors, like rumination and unhealthy social comparisons, and amplifying negative affect). Below is a discussion of studies that associated social media usage with positive and negative outcomes.

Social Media Use and Positive Psychological Associations. Social networking sites allow for selective self-presentation and full control of identity formation. Users are able to choose what aspects of themselves they want to share with their network. Control over one's image also encourages self-disclosure (i.e., sharing information about oneself), and in many studies, higher self-esteem. Many studies have shown that positive self-presentation has a positive effect on self-esteem. For example, Kim and Lee (2011) found that college students who post positive status updates of themselves also report feeling good about themselves and their lives. Gonzales and Hancock (2011) found that when participants were asked to complete a questionnaire about others' opinions of themselves, those who were in the presence of their own Facebook profile scored higher in self-esteem than those who were in the presence of a mirror. This suggests that being able to selectively self-present one's positive features may enhance one's perception of oneself. Even though users can choose what kind of information to disclose, users still tend to portray relatively accurate representations of themselves on Facebook (Back et al., 2010). The information users decide to disclose is usually strategically chosen to give a positive impression of themselves (i.e., by omitting 'negative' information; Manago, Graham, Greenfield, & Salimkhan, 2008; Zhao, Grasmuck, & Martin, 2008; Walther, 2007). While the content users disclose is important for a positive view of self, the type of feedback they receive may also play a role. Valkenburg et al. (2006) found that getting positive feedback on social media is associated with higher self-esteem and well-being. Though those who post positive content may already have high self-esteem, positive feedback may reinforce or even enhance this positive view of self.

Surprisingly, posting negative content can have positive results too. Kim and Lee (2011) found that college students who disclosed more about their emotional needs on Facebook and received social support via comments reported higher subjective well-being. Therefore, posting negative content may have a positive impact on one's well-being under the condition that they feel related to and sympathized with.

Social Media Use and Negative Psychological Associations. There are certain online situations that are associated with negative affect. When negative feedback is paired with negative content, we observe a different association than with positive feedback. Valkenburg et al. (2006) found that—as one might expect—receiving negative feedback on social media is associated with lower self-esteem and well-being. Thus, one may be potentially risking feeling worse by posting negative content. Some studies have suggested that posting about one's negative emotional state may prolong negative feelings because the act is similar to rumination, which itself fosters lower subjective well-being (Locatelli, Kluwe & Bryant, 2012).

People who have more strangers as Facebook "friends" are more likely to believe that other people's lives are better than theirs (Chou & Edge, 2012). The fact that one tends to know more about an actual friend's life may reduce attribution error (i.e., attributing a person's behavior, like smiling in a photo, to internal characteristics, like being happy, rather than external characteristics, like the social situation) and negative social comparison (Lup et al., 2015). These studies suggest that the number of strangers one follows may mediate the association between social media use and well-being.

Social Media Use, Friendships & Intimate Relationships

Communication, in general, helps facilitate and maintain friendships. Adolescents who report more frequent online communication among their friends report higher quality friendships (Valkenburg & Peter, 2007a). Thus, using social media platforms, such as Facebook, can be one of the many ways people facilitate communication within their relationships.

Positive Psychological and Social Associations. Numerous studies have shown that online peer communication encourages both self-disclosure and intimacy (Walther, 1996; Bonetti, Campbell, & Gilmore, 2010; Davis, 2012; Schouten, Valkenburg, & Peter, 2007, 2011), and this association extends to social networking sites. Many cross-sectional studies show that the frequency of social media use is associated with enhanced friendship quality and intimacy (Ellison et al., 2007; McMillan & Morrison, 2006; Reich et al., 2012). Beyond the friendship level, Ellison et al. (2007) found that actively using Facebook relates to greater perceptions of social bonding, social ties, and closeness to others. The most common use of social networking sites is, indeed, to maintain pre-existing offline friendships (McMillan & Morrison, 2006).

Negative Psychological and Social Associations. Generally, social networking sites are not conducive to forming new friendships because online-only social interactions tend to not be as deep, authentic and genuine as those that derive from face-to-face interactions (Froding & Peterson, 2012; Soraker, 2012). Yang and Brown (2012) found that college students who use Facebook to meet new people rather than to maintain pre-existing face-to-face relationships show less adjustment to college (i.e., ability to adapt to changing environments and balance conflicting needs) and greater loneliness.

Easy access to others' profiles and a quick means of communication may also fuel maladaptive thinking and behaviors. Though social media makes communicating with friends more convenient, it also makes viewing much of the communication between friends readily accessible to others. With wall posts and comments made public, one may become distracted by information about others. For example, spending too much time on the profiles of romantic partners may pose problems of jealousy, trust, and other relationships issues (Muise, Christofides, & Desmarais, 2009). Though using social media excessively during a relationship may be unhealthy, not controlling usage after a relationship may be unhealthy too. People who continue contact with ex-partners and/or check ex-partners' profiles find it harder to heal after a breakup (Marshall, 2012).

Future Directions

Most of the studies reviewed here were correlational studies, cross-sectional studies, or experimental studies that used purely self-report measures. It is not a surprise that a majority of social media studies are correlational or cross-sectional because social media platforms are relatively young. Whereas longitudinal studies have been lacking on this topic, Wilson, Gosling, and Graham (2012) pointed out that longitudinal studies may be impractical given that social media regulations and policies are always changing and their features constantly being updated. In this case, cross-sectional studies may be just as good at gauging the ways people connect and communicate via social media as these platforms continue to develop.

Most of the studies reviewed used self-report measures, which have their own limitations. Though there have been objective assessments of social media use—one study used participant's ten most recent Facebook posts coded for positivity, negativity, and the amount of "likes" the posts received (Forest & Wood, 2012), it is unclear how accurate these measures would be for assessing quality of friendship, life, and well-being due to selective self-presentation on social media. Since passive users do not post content, such 'objective' measures may give us a biased view of social media use—only the active users' perspective. A possible solution is to collect other measures to control for individual differences in social media usage (e.g., number of real friends followed, number of strangers followed, number of people interacted with online), face-to-face interactions (e.g., quality of real-life friendships and communications), and other measures of quality of life (e.g., social belonging, financial stability, family life). These measures are likely to have less selection bias compared to Facebook posts (i.e., active versus passive users) and better capture all types of users.

Exploring different ways of coding social media use and developing reliable objective measures is an important direction for social media research. However, for the time being, an easier solution to self-report bias may be to collect information about users' well-being from peers and family members. Even direct observations of users in their natural environment may be helpful. Some studies, still in their early phases, use Facebook applications to allow researchers to analyze teens' online social interactions (e.g., Mikami, Szwedo, Allen, Evans, & Hare, 2010). Another method

that has been used is requesting participants to "friend" the account made especially for the study (Moore & McElroy, 2012).

Conducting experimental studies on the associations found in the existing literature is an important next step. Though manipulations for such research are non-invasive—posting more status updates (Deters & Mehl, 2012) and viewing one's profile during a survey (Gonzales & Hancock, 2011)—it is important to note that asking participants to change their natural usage may be met with reluctance or resistance. For example, users may not like being asked to unfollow strangers or follow fewer strangers, and even if they follow the instructions of researchers, that does not guarantee they will not view certain profiles. Likewise, asking users to change their usage from passive to active may be met with reluctance and/or take time for users to adapt to.

Conclusion

Technology is an increasing part of people's daily lives and this social media era has provided researchers with a new valuable resource for understanding people's behaviors and well-being. One's social media profile and posts can be likened to a record of identity development, self-perception, quality of friendships and intimate relationships, communication, network interaction, activity/ event involvement, and life milestones. Thus far, researchers have learned that individuals most frequently use social media as an outlet for positive self-presentation, which is both beneficial to our self-identity and our self-esteem. Furthermore, it seems that active use is associated with many positive outcomes: less loneliness, greater perceived social bonding, and greater ability to depend on one's network for social support. With social media use still on the rise and with social media platforms continuing to emerge and evolve, researchers will need to continue to adapt their methodologies in order to examine how social media use affects our lives.

References

Back, M.D., Stopfer, J. M., Vazire, S., Gaddis, S., Schmukle, S. C., Egloff, B., & Gosling, S.D. (2010). Facebook profiles reflect actual personality, not self-idealization. *Psychological Science, 21*(3), 372-374.

Bessiere, K., Kiesler, S., Kraut, R., & Boneva, B. (2008). Effects of Internet use and social resources on changes in depression. *Information, Communication & Society, 11*, 47-70.

Blais, J., Craig, W., Pepler, D., & Connolly, J. (2008). Adolescents online: The importance of Internet activity choices to salient relationships. *Journal of Youth & Adolescence, 37*, 522-536.

Bonetti, L., Campbell, M.A., & Gilmore, L. (2010). The relationship of loneliness and social anxiety within children's and adolescents' online communication. *Cyberpsychology, behavior, and social networking, 13*, 279-285.

Buckingham, D. (20 08). Youth, identity, and digital media. Cambridge, MA: MIT Press.

Burke, M., Marlow, C., & Lento, T. (2010). Social network activity and social well-being. *Proceedings of the 2010 ACM Conference on Human Factors in Computing Systems,* 1909-1912.

Calvert, S. L., Jordan, A. B., & Cocking, R. R. (2002). Children in the digital age: Influences of electronic media on development. Westport, CT: Praeger.

Chou, H., & Edge, N. (2012). "They are happier and having better lives than I am": the impact of using Facebook on perceptions of others' lives. *Cyberpsychology, Behavior, & Social Networking; 15:* 117-120.

Davis, K. (2012). Friendship 2.0: Adolescents' experiences of belonging and self-disclosure online. *Journal of Adolescence, 35,* 1527-1536.

Davis, K., & James, C. (2013). Tweens' conceptions of privacy online: Implications for educators. *Learning Media and Technology, 38,* 4-25.

Desjarlais, M., & Willoughby, T. (2010). A longitudinal study of the relation between adolescent boys and girls' computer use with friends and friendship quality: Support for the social compensation or the rich-get-richer hypothesis? *Computers in Human Behavior, 26*, 896-905.

Duggan, M. (2015). Mobile Messaging and Social Media 2015. Pew Research Center, August 2015. http://www.pewinternet.org/files/2015/08/Social-Media-Update-2015-FINAL2.pdf Accessed 30 March 2015.

Ellison, N., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook 'friends': Exploring the relationship between college students' use of online social networks and social capital. *Journal of Computer-Mediated Communication, 12*(4): 1143-1168.

Froding, B., & Peterson, M. (2012). Why virtual friendship is no genuine friendship. *Ethics and Information Technology, 14*(3), 201-207.

Gardner, H., & Davis, K. (2013). The App Generation: How today's youth navigate identity, intimacy, and imagination in a digital world. New Haven, CT: Yale University Press.

Hampton, K., Goulet, L.S., Rainie, L., & Purcell, K. (2011). Social networking sites and our Lives. http:/www.pewinternet.org/Reports/2011/Technology-and-social-networks/Summary.aspx. Accessed 1 Feb 2013.

Kim, J., LaRose, R., & Peng, W. (2009). Loneliness as the cause and the effect of problematic Internet use: The relationships between Internet use and psychological well-being. *Cyberpsychology & Behavior, 12*(4), 451-455.

Kim, J. & Lee, J. (2011). The Facebook paths to happiness: Effects of the number of Facebook friends and self-presentation on subjective well-being. *Cyberpsychology, Behavior and Social Networking, 6*, 359-364.

Krasnova, H., Wenninger, H., Widjaja, T., & Buxmann, P. (2013). Envoy on Facebook: a hidden threat to users' life satisfaction? *Wirtschaftsinformatik* Proceedings; 92.

Lenhart, A. (2015). *Teen, Social Media, and Technology Overview 2015. Pew Research Center, April 2015.* http://www.pewinternet.org/files/2015/04/PI_TeensandTech_Update2015_0409151.pdf Accessed 28 March 2015

Lee, S. (2014). How do people compare themselves with others on social network sites?: The case of Facebook. *Computers in Human*

Behavior; 32: 253-260.

Locatelli, S.M., Kluwe, K., & Bryant, F. B. (2012). Facebook use and the tendency to ruminate among college students: Testing mediational hypotheses. *Journal of Educational Computing Research, 46*(4), 377-394.

Lup, K., Trub, L., & Rosenthal, L. (2012).“Instagram #Instasad?: Exploring Associations Among Instagram Use, Depressive Symptoms, Negative Social Comparison, and Strangers Followed.” *Cyberpsychology, Behavior, and Social Networking; 18*(5): 247-252.

Manago, A.M., Taylor, T., & Greenfield, P.M. (2012). Me and my 400 friends: the anatomy of college students’ Facebook networks, their communication patterns, and well-being. *Developmental Psychology. 48*(2): 369-380.

Manago, A.M., Graham, M., Greenfield, P., & Salimkhan, G. (2008). Self-Presentation and gender on MySpace., *Journal of Applied Developmental Psychology, 29*, 446-458.

Marshall, T. (2012). Facebook surveillance of former romantic partners: associations with post breakup recovery and personal growth. *Cyberpsychology, Behavior, & Social Networking; 15*:521-526.

McMillan S. J., & Morrison M. M. (2006). Coming of age with the Internet: A qualitative exploration of how Internet has become an integral part of young people’s lives. *New Media & Society; 8*(1): 73-95.

Mikami, A. Y., Szwedo, D. E., Allen, J.P., Evans, M.A., & Hare, A. L. (2010). Adolescent peer relationships and behavior problems predict young adults’ communication on social networking websites. *Developmental Psychology; 46*(1): 46-56.

Moore, K., & McElroy, J. C. (2012). The influence of personality on Facebook usage, wall postings, and regret. *Computers in Human Behavior; 28*: 267-274.

Muise A., Christofides E., & Desmarais S. (2009). More information than you ever wanted: does Facebook bring out the green-eyed monster of jealousy? *CyberPsychology & Behavior; 12*:441-444.

Reich, S. M., Subrahmanyam, K., & Espinoza, G. (2012). Friending, iming, and hanging out face-to-face: Overlap in adolescents’ online and offline social networks. *Developmental Psychology, 48*, 356-368.

Schouten, A. P., Valkenburg, P. M, & Peter, J. (2007). Precursors and underlying processes of adolescents’ online self-disclosure: Developing and testing an “Internet-attribute-perception” model. *Media Psychology, 10*(2), 292-315.

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*, 3-43.

Walther, J. B. (2007). Selective self-presentation in computer mediated communication: Hyperpersonal dimensions of technology, language, and cognition. *Computers in Human Behavior, 23*, 2538-2557.

Wilson, R. E., Gosling, S.D., & Graham, L. T. (2012). A review of Facebook research in the social sciences. *Perspectives on Psychological Science, 7*(3), 203-220.

Yang, C., & Brown, B. (2012). Motives for using Facebook, patterns of Facebook activities and late adolescents’ social adjustment to college. *Journal of Youth and Adolescence, 42*(3), 403-416.

Valkenburg, P., & Peter, J. (2011). Online communication among adolescents: An integrated model of its attraction, opportunities, and risks. *Journal of Adolescent Health, 48,* 121-127.

Valkenburg, P., & Peter, J. (2007a). Online communication and adolescent well-being: Testing the stimulation versus displacement hypothesis. *Journal of Computer-Mediated Communication, 12,* 1169-1182.

Valkenburg P., Peter J., & Schouten A. (2006). Friend networking sites and their relationship to adolescents’ well-being and social self-esteem. *CyberPsychology & Behavior; 9*: 584-590.

Zhao, S., Grasmuck, S., & Martin, J. (2008). Identity construction on Facebook: *Digital empowerment in anchored relationships. Computers in Human Behavior, 24,* 1816-1836.

Editors: Alisa Muñoz, Christopher Bondoc, and Sabrin Sidhu
Graduate Student Mentor: Melissa DeWolf

Author Note: Correspondence concerning this article should be addressed to Lucy Cui, Department of Psychology, University of California, Los Angeles
Contact: itslucysway@ucla.edu

Daley DiCorcia
University of Michigan

Daley DiCorcia graduated with honors from the University of Michigan in 2016 with a Bachelor of Arts in Psychology and completed minor in LGBTQ & Sexuality Studies. She has presented research on depression in women exposed to intimate partner violence as well as nonsuicidal self-injury and its relation to suicide. Daley was a research assistant for 3 research labs within the University of Michigan departments of Psychiatry and Psychology, and would like to one day conduct her own research on preventative interventions of suicide in youth and young adults.

Was there a particular experience that sparked your research interests?

A particular life experience that led me to pursue research in clinical psychology and psychiatry was attending my younger sister's child psychiatry appointments at Stony Brook University. My sister has been diagnosed with Autism, and from an early age I was exposed to clinical practice and research through her treatment. I am very thankful to have had this unique although at times challenging opportunity.

Who has been an influential person in your life?

Three women who have influenced me greatly throughout my college education, specifically are Alejandra Arango, Dr. Cheryl A. King, and Dr. Sandra Graham-Bermann. These women are accomplished researchers in the field of clinical psychology and value community involvement in research and intervention, bringing theory into practice in underserved communities. I find their commitment to both academia and public service, so to speak, especially inspiring and commendable.

When and where are you the most productive?

I am most productive in front of a huge monitor (which can be found in an undergraduate computing site called the "Fishbowl" at the University of Michigan) and in the evening!

Where do you see yourself in 10 years?

In 10 years, I will be 31 years of age and have hopefully completed a doctoral program in Clinical Psychology as well Postdoctoral research. I hope that at 31 years of age, I will be conducting original research, teaching undergraduates as a professor of psychology, and practicing as a clinician—or any combination of these!

© 2016 URJP at UCLA / urjp.psych.ucla.edu

An Introduction to Clinical Research on Non-Suicidal Self-Injury

Daley DiCorcia
University of Michigan

Non-suicidal self-injury (NSSI) is defined in the DSM-5 (*Diagnostic and Statistical Manual of Mental Disorders, 5th edition*), as intentional self-inflicted damage to the surface of… [the] body of a sort likely to induce bleeding, bruising, or pain… [with] no suicidal intent (American Psychiatric Association, 2013). In other words, NSSI refers to intentional, physical injury to one's body *without* the expectation to die as a result of said injury. According to Klonsky and Muehlenkamp (2007), the most common forms of NSSI include skin cutting, followed by skin burning. Other methods include, but are not limited to, piercing the skin with needles or other objects, scratching the skin, rubbing the skin against abrasive surfaces, hitting/punching oneself, and picking at wounds (Klonsky & Olino, 2008; Klonksy, 2011; Nock et al., 2006; Whitlock, Eckenrode, & Silverman, 2006). Researchers suggest that mid-adolescence is the typical point of first engagement, with 16 years being the average age of onset (e.g. Whitlock et al., 2006; Klonsky, 2011). This paper examines the risk factors, theoretical explanations, and treatments for NSSI. This paper will also cover the specific link between NSSI and suicide and suggest future directions for work in this area.

In the previous manual, DSM-IV-TR (2000), NSSI was referred to as "self-mutilation" and featured solely as a symptom of Borderline Personality Disorder (BPD; American Psychiatric Association, 2000). The frequent occurrence of this behavior supports the idea that NSSI occurs in individuals without BPD; approximately 1-4% of adults and 13-23% of adolescents report engaging in self-harm at some point in their lives (Auerbach et al., 2014; Jacobson & Gould, 2007). These rates exceed those of BPD, which affects an estimated 1.4% of adults in the United States (Lenzenweger, Lane, Loranger, & Kessler, 2007). Further, Chapman, Specht, & Cellucci (2005) found that prisoners with BPD reported a significantly higher prevalence of self-harm when compared with that rate among prisoners without BPD (73% versus 34%). It is worth noting that fully one-third of the non-BPD sample nevertheless engaged in NSSI in their lifetime.

Engagement in NSSI has been linked to suicidal ideation and suicide attempts. In a review of 31 studies examining the relationship between NSSI and suicidal thoughts and behaviors, Hamza, Stewart, and Willoughby (2012) offer that NSSI is more strongly associated with suicide than other known predictors. Notably, Andover and Gibb (2010) found that the frequency of NSSI was more strongly associated with past suicide attempts than depressive symptoms, hopelessness, BPD, and current suicidal ideation in psychiatric inpatients (ages 17-73). Authors also found that the strength of the relationship between frequency of NSSI and past suicide attempts was comparable to that of the relationship between past suicide attempts and current suicidal ideation.

Risk Factors for NSSI Engagement

The factors associated with engagement in NSSI can be broken down into social (e.g. perceived support from family and peers), biological (e.g. neurobiological and emotional responses to abuse in childhood), and psychological (e.g. anxiety, depression, BPD) factors and conditions. Nock (2009) notes that many published studies on NSSI point to childhood abuse and psychiatric diagnosis as the two leading comorbid factors associated with engagement in this behavior. Much research has been conducted on the cognitive difficulties that are commonly linked, but not limited to, childhood abuse and psychiatric diagnoses in relation to NSSI. Such cognitive difficulties include emotion regulation (regulating one's own emotions) and rumination (thinking about something "over and over" again).

With a neurobiological approach to the effects of trauma on individuals, a study by De Bellis (2002) posits that childhood maltreatment can have lasting dysregulatory effects on major biological stress response systems, such as the HPA-axis, which regulates cortisol levels. HPA-axis dysregulation and increased cortisol levels have been linked to pediatric depression (Lopez-Duran, Kovacs, & George, 2009) and other emotional issues. Research has found that cortisol levels in children may also be affected by experiences

of different forms of physical and emotional maltreatment (Bruce, Fisher, Pears, & Levine, 2009).

As discussed by MacMillan et al. (2009), children exposed to maltreatment appear to have a blunted cortisol response to psychological stressors. A risk factor such as childhood abuse can have a strong impact on the mental health of individuals not only because it leads to problems in emotion regulation, cortisol levels, and communication with others, but also because it is a 'nonmodifiable' risk factor, or something that cannot be "undone" (King, Foster, & Rogalski, 2013). Auerbach and colleagues (2014) examined a sample of 194 13-18 year-olds and found that prior childhood [physical, sexual, and emotional] abuse is associated with the frequency (occurrence) of NSSI in the past month as well as the individual's number of mental health diagnoses.

Although the specific pathways from childhood abuse to NSSI are unclear (Auerbach et al., 2014; Nock, 2009), some research offers repeated or prolonged exposure to maltreatment as cause for anxiety, aggression, and avoidant behaviors, as well as impulsiveness (Auerbach et al., 2014; Braquehais et al., 2010; Cloitre et al., 2009), which may be due in part by the neurobiological effects of trauma on the brain as discussed above.

Theoretical Explanations of NSSI Engagement

The Emotional Cascade Model (ECM), proposed by Selby (2013), offers that NSSI functions as a distraction from "cascades" of negative feelings and rumination. It was found that, aligning with the ECM, self-reported feelings of sadness and rumination about the past most strongly predicted an episode of NSSI (Selby, 2013). An emotional cascade is conceptualized as a sharp increase in negative emotion; a volatile "flood" of unpleasant emotions that can be thought of as fast and intense rumination. An emotional cascade is characterized as a positive feedback loop in which ruminating on negative emotional thoughts increases levels of negative emotion and in turn spurs an increased awareness of emotional stimuli, which then results in more rumination. In other words, an increase in rumination on negative thoughts and feelings garners more attention to negative emotional stimuli, which results in further rumination. Eventually, this feedback loop may intensify and create an unbearable emotional state, which is then "short-circuited" by an act of NSSI. In this model, the physical sensation of NSSI is believed to immediately distract the individual experiencing an emotional cascade from the negative thoughts and feelings brought on by the cascade process. For example, the pain and/or sight of blood that results from cutting one's own skin may serve as an adequate distraction from cyclical, unrelenting thoughts of something emotionally painful (Selby, Anestis, Bender, & Joiner, 2009) like a recent breakup or failing exam grade.

Nock and Prinstein's four-function model of NSSI (2004) offers other theoretical explanations for engagement in this maladaptive behavior, and proposes four types of reinforcement that drive individuals to self-injure: 1) intrapersonal negative reinforcement, 2) intrapersonal positive reinforcement, 3) interpersonal negative reinforcement, and 4) interpersonal positive reinforcement. Distraction from negative thoughts or feelings (e.g. stopping bad feelings and relieving feelings of numbness/emptiness) characterizes intrapersonal negative reinforcement. Desired feelings of stimulation (e.g. to feel relaxed, to feel "something" even if it is pain) make up intrapersonal positive reinforcement. Interpersonal negative reinforcement refers to escape from displeasing social situations (e.g. to avoid school or work, to avoid being with people). Finally, obtaining attention and help from others (e.g. to make others angry, to receive more attention from family and friends) defines interpersonal positive reinforcement. Intrapersonal negative reinforcement (distraction from negative thoughts or feelings) is the function of NSSI explored in Selby and colleagues' aforementioned Emotional Cascade Model.

Significance of NSSI to Risk of Suicide

The link between NSSI engagement and suicide has been addressed via two important theories: the anti-suicide model (Klonsky, 2007) and the idea of acquired capability for suicide via habituation (the interpersonal-psychological theory of suicide; Joiner, 2005). The anti-suicide model purports self-injurious behavior as a function of resisting urges to make a suicide attempt; NSSI may serve as a way to express suicidal thoughts, and a compromise to making a suicide attempt (Klonsky, 2007; Suyemoto, 1998). Further, Paul, Tsypes, Eidlitz, Ernhout, and Whitlock (2014) found that in a sample of 18-29 year olds, those who endorsed suicidal thoughts and behaviors endorsed functions of NSSI that were specifically related to suicide attempt only (e.g. avoiding suicide attempt, coping with self-hatred). Yet, among those who endorsed suicidal thoughts and behaviors, a history of bipolar disorder or problematic substance use were the only two factors significantly associated with actual risk of suicide attempt. NSSI engagement was not found to be associated with suicide risk in this study, which frames NSSI as a strategy to quell suicidal thoughts and urges that may be superseded by psychopathology in regard to risk of

© 2016 URJP at UCLA / urjp.psych.ucla.edu

actual attempt.

According to Joiner's (2005) interpersonal-psychological theory of suicidal behavior, engagement in life-threatening suicidal behavior requires both suicidal desire and the "acquired capability for suicide", which involves habituation to physical pain, the fear of death, and the fear of bodily harm. In this context, habituation can be understood as the physiological naturalization to the fear of imminent pain and physical sensations of pain through repeated exposure to pain-inducing stimuli (Van Orden et al., 2010), such as methods of NSSI like cutting the skin with razor blades and burning the skin with household chemicals. It is offered that repeated engagement in NSSI may normalize the idea of inflicting pain and damage on one's own body, which can ultimately lead to decreased fear of attempting suicide via lethal injury in those experiencing active suicidal thoughts and desires (Joiner, 2005). Ultimately, the relationship of NSSI engagement and suicide risk should be further explored as suicide is the second-leading cause of death among adolescents (Center for Disease Control, 2011), and about 19% of adolescents report engagement in NSSI.

NSSI Interventions

Because NSSI has been conceptualized as a coping mechanism for negative emotional states, as well as a communicative tool for expressing one's own distress to others, interventions designed to teach effective, non-harmful ways of managing and expressing negative emotions can lessen engagement in NSSI. Approaches to aiding persons who engage in NSSI include evidence-based interventions, although the development of interventions specific to NSSI engagement only began within the last ten years (Gonzales & Bergstrom, 2013). In their review of all published research on NSSI interventions, Gonzales and Bergstrom (2013) discovered that only psychosocial intervention in an emergency department significantly reduced the incidence of future NSSI (Bergen, Hawton, Waters, Cooper, & Kapur, 2010). Group and multiple-session therapies such as developmental group therapy for adolescents who self-harm (Green et al., 2011), dialectical behavior therapy (DBT) for inpatient and community adolescents (Katz, Cox, Gunasekara, & Miller, 2004; Fleischhaker et al., 2011), and cognitive-behavioral therapy (CBT; Taylor, Oldershaw, Richards, & Davidson, 2011) have not been found to significantly reduce NSSI in study participants to date. Clearly, the development of NSSI treatments available to community members requires significant progress as only hospital-based interventions (e.g., that developed by Bergen and colleagues) have successfully reduced future episodes of NSSI.

Future Directions in NSSI Research

In order to develop effective treatments for reducing NSSI engagement, more research should also be conducted to clarify NSSI as an individual disorder in future versions of the DSM. As previously stated, NSSI is classified as requiring further study in the current DSM-5 (and therefore cannot be used as a formal diagnosis by practitioners), which is in part due to distinct differences in constructs related to NSSI engagement among persons of different genders and ages (Zetterqvist, 2015). Further research of the demographic characteristics associated with NSSI engagement is therefore needed, given specific differences across demographic characteristics have not yet been clarified. Which methods (e.g., cutting) of NSSI truly count as self-harm has been debated among researchers, as well as the number of times this behavior must be completed in order to qualify as a disorder (Zetterqvist, 2015). Gaining a more specific understanding of who engages in NSSI and how they are doing so may further the development of NSSI as a disorder, and the classification of NSSI as a diagnosable condition would likely spur research of more NSSI-specific treatment options.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Andover, M. S., & Gibb, B. E. (2010). Non-suicidal self-injury, attempted suicide, and suicidal intent among psychiatric inpatients. *Psychiatry research, 178*(1), 101-105.

Auerbach, R. P., Kim, J. C., Chango, J. M., Spiro, W. J., Cha, C., Gold, J., & ... Nock, M. K. (2014). Adolescent nonsuicidal self-injury: Examining the role of child abuse, comorbidity, and disinhibition. *Psychiatry Research, 220*(1-2), 579-584.

Bergen, H., Hawton, K., Waters, K., Cooper, J., & Kapur, N. (2010). Epidemiology and trends in non-fatal self-harm in three centres in England: 2000–2007. *The British Journal of Psychiatry, 197*(6), 493-498.

Braquehais, M. D., Oquendo, M. A., Baca-García, E., & Sher, L. (2010). Is impulsivity a link between childhood abuse and suicide?. *Comprehensive Psychiatry, 51*(2), 121-129.

Bruce, J., Fisher, P.A., Pears, K.C., & Levine, S. (2009). Morning cortisol levels in preschool-aged foster children: Differential effects of maltreatment type. *Developmental Psychobiology, 51*, 14-23.

Centers for Disease Control and Prevention. (2011). Web-based Injury Statistics Query and Reporting System (WISQARS). Retrieved 12 November 2015 from http://www.cdc.gov/injury/wisqars/index.html.

Chapman, A. L., Specht, M. W., & Cellucci, T. (2005). Borderline Personality Disorder and Deliberate Self-Harm: Does Experiential Avoidance Play a Role?. *Suicide and Life-Threatening Behavior, 35*(4), 388-399.

Cloitre, M., Stolbach, B. C., Herman, J. L., Kolk, B. v. d., Pynoos, R., Wang, J. and Petkova, E. (2009). A developmental approach to complex PTSD: Childhood and adult cumulative trauma as predictors of symptom complexity. *J. Traum. Stress, 22*: 399–408.

De Bellis, M.D. (2002). Developmental traumatology: a contributory mechanism for alcohol and substance use disorders. *Psychoneuroendocrinology, 27*(1), 155-70.

Fleischhaker, C., Böhme, R., Sixt, B., Brück, C., Schneider, C., & Schulz, E. (2011). Dialectical behavioral therapy for adolescents (DBT-A): a clinical trial for patients with suicidal and self-injurious behavior and borderline symptoms with a one-year follow-up. *Child Adolesc Psychiatry Ment Health, 5*(1), 3.

Gonzales, A. H., & Bergstrom, L. (2013). Adolescent Non-Suicidal Self-Injury (NSSI) Interventions. *Journal of child and adolescent psychiatric nursing, 26*(2), 124-130.

Green, J. M., Wood, A. J., Kerfoot, M. J., Trainor, G., Roberts, C., Rothwell, J., & Harrington, R. (2011). Group therapy for adolescents with repeated self harm: randomised controlled trial with economic evaluation. *BMJ, 342,* d682.

Hamza, C. A., Stewart, S. L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review, 32*(6), 482-495.

Jacobson, C. M., & Gould, M. (2007). The epidemiology and phenomenology of non-suicidal self-injurious behavior among adolescents: A critical review of the literature. *Archives of Suicide Research, 11*(2), 129-147.

Joiner, T. (2007). *Why people die by suicide.* Cambridge, Mass.: Harvard University Press.

Katz, L. Y., Cox, B. J., Gunasekara, S., & Miller, A. L. (2004). Feasibility of dialectical behavior therapy for suicidal adolescent inpatients. *Journal of the American Academy of Child & Adolescent Psychiatry, 43*(3), 276-282.

King, C. A., Foster, C. E., & Rogalski, K. M. (2013). *Teen suicide risk: A practitioner guide to screening, assessment, and management.* New York, NY, US: Guilford Press.

Klonsky, E. D., Muehlenkamp, J., Lewis, S. P., & Walsh, B. (2011). *Nonsuicidal self-injury* (Vol. 22). Hogrefe Publishing.

Klonsky, E. D., & Olino, T. M. (2008). Identifying clinically distinct subgroups of self-injurers among young adults: a latent class analysis. *Journal of Consulting and Clinical Psychology, 76*(1), 22.

Klonsky, E. D., & Muehlenkamp, J. (2007). Self-injury: A Research Review For The Practitioner. *Journal of Clinical Psychology, 63*(11), 1045-1056.

Klonsky, E. D. (2009). The functions of self-injury in young adults who cut themselves: Clarifying the evidence for affect-regulation. *Psychiatry Research, 166*, 260–268.

Lenzenweger, M. F., Lane, M.C., Loranger, A.W., Kessler, R.C. (2007). DSM-IV personality disorders in the National Comorbidity Survey Replication. *Biol Psychiatry.* 64.

Lopez-Duran, N. L., Kovacs, M., & George, C. J. (2009). Hypothalamic–pituitary–adrenal axis dysregulation in depressed children and adolescents: A meta-analysis. *Psychoneuroendocrinology, 34*(9), 1272-1283.

MacMillan, H. L., et al. (2009). Cortisol response to stress in female youths exposed to childhood maltreatment: Results of the youth mood project. *Biological Psychiatry, 66*, 62-68.

Nock, M. K., & Prinstein, M. J. (2004). A functional approach to the assessment of self-mutilative behavior. *Journal of consulting and clinical psychology, 72*(5), 885.

Nock, M. K., Joiner, T. E., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry research, 144*(1), 65-72.

Nock, M. K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. Current Directions in *Psychological Science 18*(2), 78-83.

Paul, E., Tsypes, A., Eidlitz, L., Ernhout, C., & Whitlock, J. (2015). Frequency and functions of non-suicidal self-injury: associations with suicidal thoughts and behaviors. *Psychiatry research, 225*(3), 276-282.

Selby, E. A., Anestis, M. D., Bender, T. W., & Joiner Jr, T. E. (2009). An exploration of the emotional cascade model in borderline personality disorder. *Journal of abnormal psychology, 118*(2), 375.

Selby, E. A., Franklin, J., Carson-Wong, A., & Rizvi, S. L. (2013). Emotional cascades and self-injury: Investigating instability of rumination and negative emotion. *Journal Of Clinical Psychology, 69*(12), 1213-1227.

Taylor, L. M., Oldershaw, A., Richards, C., Davidson, K., Schmidt, U., & Simic, M. (2011). Development and pilot evaluation of a manualized cognitive-behavioural treatment package for adolescent self-harm. *Behavioural and cognitive psychotherapy, 39*(05), 619-625.

Suyemoto, K. L. (1998). The functions of self-mutilation. *Clinical psychology review, 18*(5), 531-554.

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner Jr, T. E. (2010). The interpersonal theory of suicide. *Psychological review, 117*(2), 575.

Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics, 117*(6), 1939-1948.

Zetterqvist, M. (2015). The DSM-5 diagnosis of nonsuicidal self-injury disorder: a review of the empirical literature. *Child and adolescent psychiatry and mental health, 9*(1), 1-13.

Editors: Alisa Muñoz, Christopher Bondoc, and Melissa Walman
Graduate Student Mentor: Chardee Galan

Author Note: Special thanks to Alejandra Arango and Cheryl A. King for their guidance and advice in regard to the creation of this work and beyond.

Laurie Edmundson
Simon Fraser University

Laurie Edmundson is studying psychology and criminology at Simon Fraser University in British Columbia, Canada, where she also works as a research assistant. She intends to continue her education in a graduate program, focusing on borderline personality disorder and Dialectical Behavior Therapy. She has been sitting as co-chair of a Child and Youth Mental Health and Substance Use Local Action Team where she works in collaboration with others in the field to create positive change in the mental health system by increasing timely access to integrated services for those struggling with mental health and substance use issues. She is also a mental health advocate, consultant and sought-after public speaker throughout British Columbia on issues related to anxiety, borderline personality disorder, early intervention and mental wellness.

Was there a particular experience that sparked your research interests?

Through my mental health advocacy work I have met many people with borderline personality disorder (BPD) and families who have been affected by it. About half of them have had the opportunity to go through aspects of Dialectical Behavior Therapy (DBT). I have seen their lives change in so many positive ways and was inspired to study BPD and DBT. Forensic settings interested me specifically due to the high instances of personality disorders in these settings, where treatment options are often challenging but where treatment is especially important for the vulnerable population.

Who has been an influential person in your life?

The most influential people in my life have been those who bravely share their stories of mental illness and recovery to the public. These individuals change the conversation around mental illness while providing hope and inspiration for those struggling. I have had the privilege to work alongside some amazingly inspiring people in this work. Particularly inspiring to me have been: Corey Reid, who has overcome serious drug addiction issues; Ashleigh Singleton who has overcome debilitating obsessive compulsive disorder while living with schizophrenia; Brent Seal who first shared his battle with schizophrenia on a public stage years ago and now serves as a mentor and inspiration to those of us who share our stories.

When and where are you the most productive?

I am by far the most productive at school or in a library. I find there are far too many distractions at home so I often get out of the house, even if just to a coffee shop, to do work. Time of day rarely matters. I prefer to wake up early so I can go to bed early to give myself consistency, but all students know that is not always possible.

Where do you see yourself in 10 years?

In 10 years I hope to be a practicing DBT clinician while continuing to advocate for change in the mental health system and being an inspiration for those who have mental health challenges. I hope that I can continue to share my lived experiences, as well as present new research, so that those who have disorders like BPD and anxiety who may feel they have no other role model can feel less helpless and alone.

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Dialectical Behavioral Therapy in Forensic Settings

Laurie Edmundson
Simon Fraser University

Dialectical Behavioral Therapy (DBT) was originally created for parasuicidal women and is used for the treatment of borderline personality disorder (BPD) (Linehan et al., 1991; Neacsiu & Linehan, 2014). DBT is currently being revised for use in forensic settings but research on its use in these settings is in the early stages (McCann & Ball, 2000). Due to the high prevalence of personality disorders in forensic settings, implementation of DBT could be beneficial for members of this population. A literature review of the current uses of DBT in forensic settings, as well as an overview of the DBT program and BPD in general, allow for an understanding of the efficacy of this program when used on forensic populations. Goals of DBT in forensic settings include reducing recidivism, decreasing staff burnout and causing a positive shift in the lives of inmates, especially those who present with personality disorders such as BPD and antisocial personality disorder (ASPD). Further research is needed to address the lack of research on women in prison, and on using DBT to treat men with BPD. This future research could inform practice and aid in creating a more uniform approach for the use of DBT in forensic settings.

Due to the extremely high incidences of personality disorders in prison a successful treatment program for this group is essential for the health of the inmates, the job satisfaction of prison staff and the social and economic well-being of the general public. Treatment is especially important in considering that the deinstitutionalization of psychiatric hospitals in the 1960's-90's and the lack of sufficient community mental health services may lead to more mentally ill individuals ending up in the criminal justice system (Markowitz, 2006). Many of these individuals experience borderline personality disorder (BPD), which is a particularly difficult disorder to live with for both the individual experiencing it as well as those around them (Black et al., 2007). While it was once considered "untreatable", hope for treatment was restored with the introduction of Dialectical Behavioral Therapy (DBT) by Marsha Linehan in 1993. This intervention has shown great success treating those with BPD in the community and its implementation deserves consideration for forensic settings. A summary of BPD, an overview of the original DBT program that is used in the community and an examination of its application in forensic settings will show that this is a treatment program that can improve the quality of life of inmates, decrease staff burnout and decrease recidivism, the chances of relapsing into criminal behavior, and therefore should be implemented in more forensic institutions.

Borderline Personality Disorder

BPD is a relatively common disorder in the general population. Between 1-6% of the general population meet the diagnostic criteria for the disorder (American Psychiatric Association, 2013; Nicol, Sprenglmeyer, Young & Hall, 2013). Of those in inpatient services, 8-11% of patients meet the diagnostic criteria. In prisons, 65% of inmates present with personality disorders and between 30-60% have BPD specifically (Fazel & Danesh, 2002; Vittacco, 2006; Black et al., 2007; Nicol et al., 2013). BPD often exhibits high rates of comorbidity with other disorders such as depression, anxiety, post-traumatic stress disorder (PTSD) and other personality disorders such as anti-social personality disorder (ASPD) (American Psychiatric Association, 2013). Due to the characteristics of BPD, psychologists and psychiatrists often find those with the disorder hard to work with (Neacsiu & Linehan, 2014). Paranoia, manipulation and shifts between idolization and devaluation can make for a difficult and stressful therapeutic relationship (Black et al., 2007; American Psychiatric Association, 2013). Until recently, it was a common belief that those with personality disorders

© 2016 URJP at UCLA / urjp.psych.ucla.edu

will never experience a full improvement in symptomology. BPD is a cluster B personality disorder and is often co-morbid with other disorders of this type (American Psychiatric Association, 2013). Like other cluster B personality disorders, BPD is characterized by emotional, erratic and dramatic symptoms, which are also found in histrionic personality disorder and narcissistic personality disorder (American Psychiatric Association, 2013). Anti-social personality disorder (ASPD) is also often co-morbid with BPD and is particularly relevant to forensic settings because it is characterized by a "pattern of disregard for, and violation of, the rights of others" which often leads to law breaking (American Psychiatric Association, 2013, p. 645; Krabbendam et al., 2015). Individuals with BPD have shown patterns of interpersonal problems, instability of self-image and affects and impulsivity. There are nine diagnostic criteria for BPD, and an individual must exhibit five of these behaviors to be formally diagnosed. The nine diagnostic criteria include: a fear of abandonment, patterns of intense and unstable relationships, problems with self-image, impulsivity, suicidal behavior and/or self-harm, instability in mood, feelings of emptiness, anger management problems and paranoia and/or dissociation (American Psychiatric Association, 2013). The suicide rates in those with BPD range between 8-10% which is much higher than the average population (Gunderson, 2011). In 2011, there were 3728 suicides out of a population of 33.5 million Canadians which is 0.01% of the average population (Statistics Canada, 2014).

For those experiencing BPD, impulsivity and intense uncontrollable anger resulting from emotional dysregulation may lead to criminal activity (Howard, Huband, Duggan & Monnion, 2008). Due to the hyper sensitivity to interpersonal stressors that those with BPD experience, their reactions to stressors can be extreme and can cause conflict (American Psychiatric Association, 2013). Even though some individuals with BPD may experience psychotic-like features, the disorder is generally not considered for Not Criminally Responsible on Account of Mental Disorder (NCRMD) legal defenses. Due to its high co-morbidity with ASPD, recidivism in these patients is a large concern and successful treatment is essential (Krabbendam et al., 2015).

Traditional Dialectical Behavioral Therapy

Dialectical behavioral therapy (DBT) was created by Marsha Linehan in 1993 to treat individuals with BPD (Rizvi, Steffel & Carson-Wong, 2012). DBT is most often used to treat individuals with BPD and has been shown to reduce suicide risk, hospitalization and anger in as little as one year of treatment (Neacsiu & Linehan, 2014). Due to the treatment's focus on emotional dysregulation it may be used for related problems in individuals who do not necessarily have a BPD diagnosis. DBT is a form of cognitive behavioral therapy that focuses treatment on four domains: biological, spiritual, socio-environmental, and behavioral (Rizvi et al., 2012). Because of the heterogeneity of its domains, the treatment appeals to patients of different backgrounds (Rizvi et al., 2012). The program is also based on a combination of three theories: biosocial, behavioral theory, and dialectical philosophy. To begin treatment, patients must be of average intelligence and have their psychotic symptoms, if any, under control (Vittacco, 2006). This is important because the program is comprehensive and requires the patients to complete weekly homework assignments and understand the skills being taught (Vittacco, 2006).

There are five main functions of DBT that serve as goals of treatment. They include increasing the motivation to change, enhancing the client's capabilities, generalizing the client's gains to their primary environments, reinforcing those gains and increasing therapists' motivations and competence. The main overarching goal of DBT, however, is for the client to build a life worth living (Rizvi et al., 2012).

There are four modes of treatment in the traditional DBT model: individual therapy, skills training (usually in a group setting), as needed consultations for crises and therapists meetings (Rizvi et al., 2012). In the first mode of DBT treatment, individual therapy, treatment is organized into a pre-treatment phase and four stages. Pre-treatment is done before stage one. At this stage, the treatment goals are set and the patient gives a commitment of treatment to the therapist. Next, a hierarchical list is made of problem behaviors. Of these behaviors, the biggest problems that affect the overall quality of life of the patient are to be treated first. Reducing behavioral dyscontrol is the main goal of stage one and targets the most serious and potentially life threatening behaviors that the patient presents. For people with BPD, self-harm and suicidality are very common. Deliberate self-harm in those with BPD is seen in between 63-80% of cases and about 10% will complete suicide, which adds to the importance of this stage (Chapman, Specht & Cellucci, 2005; Black et al., 2007; Gunderson, 2011). The treatment targets behaviors in this order: reduce life threatening behaviors, reduce therapy interfering behaviors, decrease quality of life interfering behaviors, increase behavioral skills (which is dealt with during skills training). Stage two focuses on treating axis I disorders that are often comorbid with BPD. These Axis I clinical disorders

© 2016 URJP at UCLA / urjp.psych.ucla.edu

include depression, anxiety, attention deficit hyperactivity disorder (ADHD) and post-traumatic stress disorder (PTSD) (Zimmerman & Mattia, 1999; American Psychiatric Association, 2000; American Psychiatric Association, 2013). Some of these conditions are the result of a patient's history of an invalidating environment, usually during childhood, where their reactions are punished, told are wrong or told they do not matter (Linehan Armstrong, Suarez, Allmon, & Heard, 1991). Linehan (1991) believes this invalidating environment, often fraught with sexual abuse, and biological dysfunction of the emotional regulation system are causes of BPD. Problems with boredom and emptiness are also addressed in stage two. Increasing self-respect and improving the overall quality of one's life is the goal of stage three and by stage four the focus is on awareness of self, feelings of incompleteness and spiritual fulfillment (Rizvi et al., 2012).

The patient's progress is tracked through diary cards that are to be filled out daily. These cards record the day's emotions, behaviors and skill use. The recorded thoughts and behaviors are those associated with self-harm, suicidal thoughts and drug use. If suicidal or self-harm thoughts or behaviors are recorded during the week they become the primary focus of the therapy session. If they have not occurred in the past week, other concerns that could interfere with therapy, such as not completing homework, are addressed. Life interfering behaviors such as substance use and depression are used to analyze and discuss what skills could have been used in the past week's situations (Rizvi et al., 2012).

The second mode of DBT, skills training, monitors and encourages the use and strengthening of behavioral skills in a group environment. Group skills training is 2-2.5 hours per week and is usually maintained for a minimum of 6 months (Neacsiu & Linehan, 2014). There are four skills modules: Mindfulness, emotion regulation, interpersonal effectiveness and distress tolerance. These modules are taught in groups in which homework is assigned and reviewed weekly (Neacsiu & Linehan, 2014).

The third mode of treatment in DBT, telephone consultations, are for emergency crises in which skills coaching is provided. It is important for therapists to not reinforce suicidal or crisis behaviors and the patient is therefore expected to attempt to use their skills prior to using the telephone consultation option (Neacsiu & Linehan, 2014).

The consultation team is an important aspect of DBT treatment due to the treatment's complicated features as well as the possibility of difficulties arising during treatment. Teams meet in order to provide support for therapists, gives therapists opportunities to practice skills and promote treatment adherence (Neacsiu & Linehan, 2014).

Due to the success of DBT with patients with BPD, DBT has begun to be used in other populations and has been modified for use with those who present with eating disorders, substance use and for use in forensic settings (Linehan et al., 1999; Rizvi et al., 2012).

Dialectical Behavioral Therapy in Forensic Settings

There are many benefits of DBT in general as well as benefits specific to the forensic population. DBT as it was first intended has shown to significantly reduce parasuicidal/suicidal behaviors, decrease inpatient days, improve social adjustment, and reduce the amount of days a patient will spend hospitalized (Linehan et al., 1991). When applied forensically, there are additional benefits specific to this setting. Decreased anger as a result of emotion regulation and greater interpersonal effectiveness skills can decrease both patients' problems within prison and upon release (McCann & Ball, 2000). While reducing staff burnout is not usually a specific goal of most therapy programs it is a big problem in forensic settings because of the constant contact with inmates with behavioral dyscontrol, which can be emotionally exhausting and harmful to staff (McCann & Ball, 2000). Adaptations for these populations include increased focus on substance abuse and scenario planning for past and future criminality (Vittacco, 2006). Scenario planning helps the patient analyze what skills they could have used to cope with the factors leading to their past crimes and learn what skills to use in the future to prevent possible future criminality. Due to the DBT adaptions that target future criminality, ASPD's co-morbidity with BPD is discussed in terms of the specific symptom reduction of criminality that is especially important for those with co-morbid BPD and ASPD diagnoses.

Issues specific to forensic populations, such as violence and manipulation, highlight the importance of the effects of DBT treatment on guards and other prison staff. Reducing staff burnout is a significant by-product of DBT therapy and works by making forensic staff feel safer and has been shown to improve hopelessness and anger from staff (McCann & Ball, 2000). BPD and ASPD can occur both separately and co-morbidly (McCann & Ball, 2000). Due to high rates of ASPD and BPD in forensic settings, DBT is extremely relevant to these settings in order to address issues with recidivism that may be associated with ASPD and to treat the symptoms of BPD. The high rate of personality disorders in forensic institutions has led to the adaptation of DBT for forensic patients where some programs include

adaptions to treat co-morbid ASPD symptoms; however, there are very few DBT programs currently offered at correctional facilities. As of 2000, there have only been 12 programs in forensic institutions and 8 directly related to the criminal justice system in North America, the United Kingdom, and Australia (McCann & Ball, 2000).

In a forensic setting the behaviors that are monitored differ slightly from those used in the traditional DBT model that was discussed previously. The scope of life-threatening behaviors is widened in forensic settings to include killing, assaulting and making weapons as opposed to a specific focus on self-harm and suicidal behaviors as seen in the traditional DBT model. Similarly, unit destructive behaviors are unique to forensic settings, and include breaking the rules, lying or conning, substance use and violation of others rights (McCann & Ball, 2000). Therapy interfering behaviors look at behaviors that increase staff burnout as well as bring a rude and disruptive atmosphere to group therapy sessions. While staff burnout is a possible issue to consider in all therapeutic settings, it of extra importance in forensic settings due to specific issues that arise such as the constant contact with inmates (McCann & Ball, 2000).

There are four main institutions of note that have effectively modified DBT programs available for inmates: The Colorado Mental Health Institute, The Montford Psychiatric Unit, the US Medical Centre for Federal Prisons and the Correctional Services of Canada (Berzins & Trestman, 2004). At the Colorado Mental Health Unit, DBT runs as usual for the first four modules (mindfulness, emotion regulation, distress tolerance and interpersonal effectiveness) and is completed twice. It is then followed by a comprehensive skills exam, after which, if successful, the graduate moves onto a group specific to criminality in a crime review section. The Colorado Mental Health Unit DBT treatment program targets males with ASPD features, rather than parasuicidal women, for whom DBT was originally intended. There is an added focus on invalidation and staff burnout that is not seen in a community setting (McCann & Ball, 2000). This program has also modified DBT by adding a crime review section. The goal of this added module is to increase empathy for victims by encouraging the inmates to imagine themselves in their victim's shoes (McCann & Ball, 2000). This empathy component is especially important due to the high rate of ASPD in these institutions, where the prevalence of the disorder is as high as 65% in male offenders and 42% in female offenders (Adler, Mueller, Laufer & Greklul, 2012; Serin, Forth, Brown, Nunes, Bennell & Pozzulo, 2011). ASPD is considered in the treatment of BPD in forensic settings due to the high co-morbidity between disorders and the ability of DBT to target some of the symptoms associated with both disorders (Krabbendam et al., 2015; Newhill, Eack, & Mulvey, 2009). The goal of this increase in empathy is to decrease violent recidivism post-release. To do this, the patients must analyze their past crimes by examining police records and creating a chain analysis. Once they have completed the chain analysis they must present it to their group. The presentation is done in five sections. Section one is a non-judgmental explanation of what events led up to the crime, including vulnerability factors. Being non-judgmental is one of the skills learned in the mindfulness module in the early stages of treatment. Section two is the first step directly designed to increase empathy. During this section the patient outlines the consequences of their crimes (McCann & Ball, 2000). This leads to section three where they must explain the crime yet again, but this time from the point of view of the victim (McCann & Ball, 2000). Next, in section four, the patient produces, based on what they discovered in their chain analysis, a relapse plan using the causes of their previous crimes. They use what reinforced their criminal behaviors and emotions they were feeling at the time of the crime to come up with multiple different scenarios in which they could use their skills next time (McCann & Ball, 2000). These skills act as tools for scenario planning in the hopes of reducing recidivism by substituting their old criminogenic behaviors with pro-social, healthy coping mechanisms.

Another successful forensic DBT program has been conducted at the Montford Psychiatric Unit in Texas, USA, where DBT was used for a high-risk group of suicidal patients. The Montford Psychiatric Unit modified the DBT program by adding criminal thinking errors to each module as well as a fifth module about anger management. The wording of the program was also changed to be more inmate friendly and easier to understand (Berzins & Trestman, 2004). The group met twice a week for 2 hours and the results indicated that self-harm decreased and self-management abilities increased in patients.

The DBT program at the US Medical Centre for Federal Prisons has many strict rules. Firstly, to be admitted into the program one must have at least 18 months left to their sentence, have no psychotic disorder, no intellectual disability, and no predatory acts of violence within the last 6 months. The inmates were required to have "sufficient self-control" which has not been specified in other DBT admission requirements as self-control is often a significant problem for those with BPD and is usually a focus of treatment. Patients were also to be removed from the group if

a major violent incident occurred during treatment (Berzins & Trestman, 2004). It is possible that these strict rules may impede the progress of those going through the program as episodes of anger are common in many people with BPD and occasional losses of control are a good way to discuss the use of skills and focus on areas of improvement (American Psychiatric Association 2013; Newhill et al., 2009). Another possible problem with the treatment at this centre is that they only meet for 1 hour, twice a week. This is likely not enough to learn the many complicated skills and practice them effectively.

The Correctional Services of Canada (CSC) use DBT in three institutions for female offenders. The offenders do not need to have an actual diagnosis of BPD to receive treatment but do need to show BPD consistent behaviors. Lacking a diagnosis requirement can be helpful for several reasons. Primarily, it can take a long time to receive an official diagnosis which often delays treatment. Needing to receive a diagnosis to receive treatment is a bigger obstacle for those in the community where psychiatrists are often hard to find. The lack of required diagnosis also prevents the harm associated with labeling and hostile feelings against receiving a diagnosis of a personality disorder, which hold a great deal of stigma, primarily due to the view that they were considered untreatable in the recent past (Black & Thornicroft, 2013). Mason, Hall, Caulfied, & Melling (2010) conducted a study comparing the perceptions of forensic nurses on diagnoses of mental illness and personality disorders. Their results showed that forensic nurses saw those with personality disorders as cases to "manage" rather than individuals that could be treated (Mason et al., 2010). In the CSC DBT programs, patients receive 1 hour of individual counselling, 2 hours of skills training and 2 hours of skills practice time per week. Patients are not allowed to graduate the program until behaviors have been shown to actually change. Because of this, treatment usually takes between 50-60 sessions (Berzins & Trestman, 2004). While this is a long time, ensuring the results are effective makes it worth the lengthy treatment process and ensures the participants do not fall through the cracks. Once graduated from the four original DBT modules, the patient moves onto the crime cycle session where they use behavioral chain analyses to help them identify what led up to their previous criminal behaviors (Berzins & Trestman, 2004). The CSC has also pilot tested a Bridging Module where the main attempt is to break the crime cycle that led the patient into the forensic institution. Having a DBT program for female inmates may be more useful for staff burnout than for men as staff burnout in those working in women's prisons is much higher than those working with male inmates (Nathan, Brown, Redhead, Hold & Hill, 2007). This could be because of the higher incidences of BPD in females compared to higher rates of ASPD in males. Because of their perceived attention seeking and manipulative behavior, working with those with BPD can be difficult (Caruso, Biancosino, Borghi, Marmai, Kerr & Grassi, 2013). A decrease in violent emotional outbursts from female prisoners can make these interpersonally demanding individuals easier to work with, thus decreasing staff burnout (Nathan et al., 2007).

There is no straightforward adaptation of DBT that is seen across all forensic settings. All four examples of the adapted programs have large differences in the population they target, the goals of their treatments, and the ways in which the program has been modified to forensic settings. Population differences in modified DBT programs range from males with ASPD in the Colorado Mental Health Unit, to suicidal high risk patients in the Montford Psychiatric Unit, to lower risk offenders who already show sufficient self-control and lack of recent violence at the US Medical Centre for Federal Prisons, and the CSC programs where female offenders present with BPD consistent behaviors (Berzins & Trestman, 2004; McCann & Ball, 2000). The Colorado Mental Health Unit focuses on an increase in empathy in offenders in an attempt to lower violent recidivism and reduce staff burnout (McCann & Ball, 2000), while the Montford Psychiatric Unit and the CSC aim to decrease self-harm (Berzins & Trestman, 2004). Seeing actual behavioral change in those presenting with BPD symptoms in a forensic setting can be beneficial for staff wellness as well as the success of the inmates after their release.

Conclusion

DBT is a relatively new treatment option and one of the few treatments that have been shown to be effective for those with personality disorders. Research on DBT is ongoing and its use in non-community or inpatient hospital settings and with disorders other than BPD is in the preliminary stages but appears to be positive. Because the disorder itself is much more frequently diagnosed in women and the treatment was originally designed for women, its application in forensic settings is hindered due to the lack of research done on males with BPD and males receiving DBT treatment (McCann & Ball, 2000). Since a great majority of the prison population is male, it is difficult to generalize the scarce research that there is on males with BPD and males going through DBT to the majority of those

© 2016 URJP at UCLA / urjp.psych.ucla.edu

incarcerated. That being said, it is vital that more research be done on the effectiveness of DBT in forensic settings so as to improve the modifications of the program in these settings as well as evaluate its effectiveness on this population. The cost of untreated BPD is high for the community. Even after remission, which is defined as showing no more than two symptoms of BPD for 12 months, the unemployment rate is substantial for those with BPD. Only 25% of those with BPD hold full-time jobs and as many as 40% receive disability payments (Gunderson, 2011). The possibilities of lowered recidivism rates and greater empathy in those who present with co-morbid ASPD could have significant implications for the amount of crime in general as well as the amount of time people spend in jail. The current forensic adaptions of DBT have additional components that address the issues that individuals with disorders that are often co-morbid with BPD face. Successful implementation of these programs may slow the "revolving-doors" that plague our current criminal justice system.

References

Adler, F., Mueller, G. O. W., Laufer, W. S., & Greklul, J. (2012). *Criminology*. United States of America: McGraw-Hill Ryerson Limited.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington VA: American Psychiatric Publishing.

Berzins, L. G. & Trestman, R. L. (2004). The development and implementation of dialectical behavior therapy in forensic settings. International Journal of Forensic Mental Health, 3(1), 93-103. doi: 10.1080/14999013.2004.10471199

Black, D. W., Gunter, T., Allen, J., Blum N., Arndt, S., & Sieleni, B. (2007). Borderline personality disorder in male and female offenders committed to prison. *Comprehensive Psychiatry, 48*(5), 400-405. doi: 10.1016/j.comppsych.2007.04.006

Black, G., & Thornicroft, G. (2013). What do people in forensic secure and community settings think of their personality disorder diagnosis? A qualitative study. *Social Psychiatry and Psychiatric Epidemiology, 48*, 1161-1168. doi 10.1007/s00127-012-0616-4

Caruso, R., Biancosino, B., Borghi, C. Marmai, L., Kerr, I. B., & Grassi, L. (2013). Working with the 'difficult' patient. The use of a contextual cognitive-analytic therapy based training in improving team function in a routine psychiatry service setting. *Community Mental Health Journal, 49*, 722-727. doi: 10.1007/s10597-012-9579-x

Chapman, A. L., Specht, M. W., & Cellucci, T. (2005). Borderline personality disorder and deliberate self-harm: Does experimental avoidance play a role? *Suicide and Life- Threatening Behavior, 35*(4). doi: http://dx.doi.org/10.1521/suli.2005.35.4.388

Fazel, S. & Danesh, J. (2002). Serious mental disorder in 23 000 prisoners: a systematic review of 62 surveys. *The Lancet*, 359(9306), 545-550. doi: 10.1016/S0140-6736(02)07740-1

Gunderson. J. G. (2011). Borderline personality disorder. *The New England Journal of Medicine*. 364. 2037-2042. doi: 10.1056/NEJMcp1007358.

Howard, R. C., Huband, N., Duggan, C., & Mannion, A. (2008). Exploring the link between personality disorders and criminality in a community sample. *Journal of Personality Disorders, 22*(6), 589-603. doi: 10.1521/pedi.2008.22.6.589

Krabbendam, A. A., Colins, O. F., Doreleijers, T. T., van der Molen, E., Beekman, A. F., & Vermeiren, R. M. (2015). Personality disorders in previously detained adolescent females: A prospective study. *American Journal of Orthopsychiatry, 85*(1), 63-71. doi: 10.1037/ort0000032

Linehan, M. M., Armstrong, H. E., Suarez, A., Allmon, D., & Heard, D. (1991). Cognitive- Behavioral Treatment of chronically parasuicidal borderline patients. *Archives of General Psychiatry, 48*, 1060-1064.

Linehan, M. M., Schmidt, H. I., Dimeff, L. A., Craft, J. C., Kanter, J., & Comtois, K. A. (1999). Dialectical behavior therapy for patients with borderline personality disorder and drug- dependence. *The American Journal on Addictions, 8*(4), 279-292. doi: 10.1080/105504999305686

Markowitz, F. (2006). Psychiatric hospital capacity, homelessness and crime arrest rates. *Criminology, 44* (1), 45-63. doi: 10.1111/j.1745-9125.2006.00042.x

Mason, T., Hall, R., Caulfied, M, & Melling, K. (2010). Forensic nurses' perceptions of labels of mental illness and personality disorder: clinical versus management issues. *Journal of Psychiatric and Mental Health Nursing, 17*, 131-140. doi: 10.1111/j.1365- 2850.2009.01483.x

McCann, R. A., & Ball, E. M. (2000). DBT with an inpatient forensic population: The CMHIP forensic model. *Cognitive and Behavioral Practice, 7*, 447-456. doi: 10.1016/S1077-7229(00)80056-5

Nathan, R., Brown, A., Redhead, K. Hold, G., & Hill, J. (2007). Staff responses to the therapeutic environment: A prospective study comparing burnout among nurses working on male and female wards in a medium secure unit. *The Journal of Forensic Psychiatry & Psychology, 18*(3), 342-352. doi: http://dx.doi.org/10.1080/14789940701441136

Neacsiu, A. D., & Linehan, M. M. (2014). Borderline personality disorder. In D. H. Barlow (Ed.), *Clinical Handbook of Psychological Disorders* (pp. 394-461). New York, NY: The Guildford Press.

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Newhill. C. E. Eack. S. M., & Mulvey, E. p. (2009). Violent behavior in borderline personality. *Journal of Personality Disorders, 23*(6), 541-554. doi: 10.1521/pedi.2009.23.6.541

Nicol, K., Pope, M., Sprengelmeyer, R., Young, A. W., & Hall, J. (2013). Social Judgement in Borderline Personality Disorder. *Plos ONE, 8*(11). doi: 10.1371/journal.pone.0073440

Rizvi, S. L., Steffel, M., L., & Carson-Wong, A. (2012). An overview of dialectical behavioral therapy for professional psychologists. *Professional Psychology: Research and Practice 44*(2), 73-80. doi: 10.1037/a0029808

Serin, R., Forth, A., Brown, S., Nunes, K., Bennell, C., Pozzulo, J. (2011). Psychology of criminal behaviour. Toronto, Ontario; Pearson Canada. Statistics Canada. (2014). *Suicides and suicide rate, by sex and by age group.* Retrieved November 27th 2014 from http://www.statcan.gc.ca/tables-tableaux/sum- som/l01/cst01/hlth66a-eng.htm. (Statistics Canada, 2014)

Vittacco, M. J. & Van Rybroek, G., J. (2006). Treating insanity acquittees with personality disorders: Implementing dialectical behavioral therapy in a forensic hospital. *Journal of Forensic Psychology Practice.* 6(2). 1-6 doi: http://dx.doi.org/10.1300/J158v06n02_01

Zimmerman, M., & Mattia, J. I. (1999). Axis I comorbidity and borderline personality disorder. *Comprehensive Psychiatry, 40*(4), 245-252. doi: 10.1016/S0010-440X(99)90123-2

Editors: Jake Gavenas, Carter Bedford, and Hannah Neiderman
Graduate Student Mentor: Elizabeth Dalton

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Rivka Fleischman
University of Maryland, Baltimore County

Rivka Fleischman is a senior at the University of Maryland, Baltimore County, where she is currently pursuing a bachelor of arts in psychology and philosophy. She is an undergraduate research assistant in Dr. Jason Schiffman's schizophrenia lab and was a teacher's assistant in a philosophical ethics course. After she graduates, she intends to teach special needs children in inner city public schools. Rivka has always had a particular interest in disorders such as schizophrenia, autism, and psychopathy. In her free time, she enjoys working with children and discussing philosophy.

Was there a particular experience that sparked your research interests?

In college I took a psychology course called "Schizophrenia" in which we spent a lot of time discussing the stigma surrounding mental illness and the impact it can have on people. Therefore, in order to help individuals who are struggling with mental health concerns, I decided to research the causes of schizophrenia and why many people in the prodromal phase do not end up developing the disorder.

Who has been an influential person in your life?

My four year old nephew is most influential in my life. His innocence gives me hope for society. Additionally, he gives me reason to continue to strive to make this world a better place, because I want to give him the best possible world to grow up in.

When and where are you the most productive?

I am most productive in my bedroom in the middle of the night when most of the world is asleep. The silence and stillness helps me focus.

Where do you see yourself in 10 years?

In 10 years I plan on being a special education teacher in the inner city and a foster parent.

© 2016 URJP at UCLA / urjp.psych.ucla.edu

An Analysis of the Two-Hit Model of Schizophrenia

Rivka Fleischman, Camille Wilson, Jason Schiffman Ph.D.
University of Maryland, Baltimore County

The two-hit model, which can be used to describe the causal pathway of schizophrenia, has many strengths and limitations. Although the model can help explain the origins of schizophrenia and may account for the complexity of the disorder, its weaknesses include an inability to effectively describe the heterogeneity of the disorder, non-specificity to schizophrenia, a non-falsifiable approach to assimilating individual differences, challenges in knowing where each risk factor falls in the model, and difficulties ascribing causality and direction of effects. Despite its limitations, this model has many clinical implications for the early identification of schizophrenia. However, given the limitations of the model, it may be difficult to use the model in early intervention efforts.

The Two-Hit Model of Schizophrenia:

Schizophrenia is a complex, multiply determined disorder. Characterized by 'positive' symptoms (e.g., hallucinations, delusions, disorganization), 'negative' symptoms (e.g., alogia, apathy, anhedonia), and cognitive impairment (e.g., issues with executive function and attention), the illness is often debilitating and associated with a great deal of impairment (Tandon, Nasrallah, & Keshavan, 2009). Due to heterogeneity in symptom presentation, outcome, and origin, the etiology of schizophrenia has been difficult to define. Despite these challenges, researchers have developed several theories to help guide the understanding of this mysterious condition. One such theory is the "two-hit" model of schizophrenia, which attempts to explain the causal pathways that lead to illness development (Bayer, Falkei, & Maier, 1999; Mednick et al., 1998).

The two-hit model provides an explanatory path to schizophrenia in which it predicts that two etiologically relevant "hits" are required for the development of the illness (Bayer et al., 1999). The first hit is thought to be a central nervous system (CNS) disruption resulting in a neural lesion, or injury. Researchers hypothesize that this hit is caused by either genetically preprogrammed or environmentally determined (e.g., maternal influenza) factors (King, St-Hilaire, & Heidkamp, 2010). Evidence of the first hit may manifest over the course of development through various non-specific biomarkers, neuro-behavioral difficulties, and/or social problems (Schiffman et al., 2003), but these issues tend to be non-clinical in nature. Although the first hit is not thought to lead directly to clinical symptoms of schizophrenia, the model suggests that individuals who experience the first hit are left particularly vulnerable to future stressors.

According to the model, the first hit alone is not sufficient to cause schizophrenia. Rather, a second hit, or stressor, is needed in order for an individual to develop the disorder. The second hit can take many forms, with researchers proposing factors such as sexual abuse (Janssen et al., 2004), cannabis use (Caspi et al., 2011), disruptive family environments (Siira, Wahlberg, Hakko, & Tienari, 2013), living in an urban environment (Vassos, Pedersen, Murray, Collier, & Lewis, 2012; Boydell & Murray, 2003), inflammation of the immune system (Feigenson, Kusnecov, & Silverstein, 2013), and the stress of acculturation as a result of immigrant status (Hollander et al., 2016; Veling, Hoek, Selten, & Susser, 2011) as possible culprits.

According to the model, two hits together lead to schizophrenia. The first hit presumably leaves an individual susceptible to the impact of the second hit in a way that is specific to schizophrenia. The mechanisms behind this model are varied, but generally involve some interaction between various neurological factors and environmental stressors. For example, the first hit may leave a lesion relevant to alterations in the hypothalamic–pituitary–adrenal axis, a system involved in the modulation of response to stress. If this person is later the victim of a second hit, such as bullying, she/he may be overly sensitive, resulting in a cascade of neurological and psychological factors that result in the development of psychotic symptoms and possibly schizophrenia (Corcoran et al., 2003).

Both hits, according to the model, are essential in the

© 2016 URJP at UCLA / urjp.psych.ucla.edu

development of schizophrenia. Without the neural damage from the first hit, the model suggests that an individual only subjected to the second hit will not develop schizophrenia, but rather may be vulnerable to some other psychopathology. Likewise, if an individual experiences the neurodevelopmental disruption from the first hit, but not the environmental stressor from the second, the model suggests a milder presentation along the schizophrenia spectrum, such as schizotypal personality disorder, rather than diagnosable schizophrenia (Mednick et al., 1998).

Advantages of the Two-Hit Model

The two-hit model is advantageous in its ability to develop testable hypotheses, which may facilitate a more comprehensive understanding of the development of schizophrenia. The flexibility of the model can account for variability in its outcomes, such as in cases where a genetic vulnerability does not lead to the expression of schizophrenia. In cases of monozygotic twins, for instance, if one twin has schizophrenia, the other has approximately a 48% chance of developing the disorder (Davis, Phelps, & Bracha, 1995). Both twins, according to the model, are at increased risk of developing schizophrenia given that the same genetic factors led to a first hit for both. The two-hit model can explain the discordance between twins in situations where one did not develop schizophrenia; according to the model, the non-symptomatic twin must not have experienced a schizophrenia-relevant second hit. In this example, although both twins experienced some genetically determined first hit, perhaps one twin used cannabis (a possible second hit for some) and the other did not, with the cannabis possibly serving as the second hit that dictated the outcome (Pogue-Geile & Yokley, 2010).

The two-hit model can also account for the complexity of the myriad of causal pathways that lead to schizophrenia. As research continues to uncover risk factors for schizophrenia, new correlates to illness can be categorized and assimilated into the model. For example, as new technology has been developed to help further the understanding of molecular genetics, at least twenty different gene loci have been implicated in the development of schizophrenia (McCarthy et al., 2014) that may contribute to CNS disruptions (e.g., disrupted neural pruning), thus possibly constituting a first hit (Sekar et al., 2016). Similarly, advances in neuroimaging have allowed for a more precise understanding of the putative lesions related to schizophrenia (Jaaro-Peled, Ayhan, Pletnikov, & Sawa, 2010). Additionally, recent research has begun to clarify the role of traumatic experiences (Varese et al., 2012), cannabis use (Caspi et al., 2005), and urbanicity (Vassos, Pedersen, Murray, Collier, & Lewis, 2012; Boydell & Murray, 2003) as second hit risk factors.

Empirical evaluation of the two-hit model is important in establishing its utility. In an effort to systematically evaluate the model, Lim, Taylor, and Malone (2012) conducted an experiment using rats to demonstrate that two hits can explain the causal pathway of schizophrenia better than one hit alone. Working from the assumption that in humans the hypo-functioning of the receptor for the neurotransmitter NMDA can cause psychosis-like symptoms (Lim et al., 2012), the authors induced schizophrenia-like behaviors in rats through exposure to the drug MK-801, which they suggested served as the first hit by harming NMDA receptors. To create a second hit, the rats were then isolated from others. Rats exposed to both hits developed more schizophrenia-like behaviors, while the rats in the other conditions, who were either exposed to one hit or none at all, did not develop schizophrenia-like behaviors. The biological similarities between rats and humans suggest a similar mechanism may unfold in humans as well. It is important to point out, however, that symptoms in rats do not necessarily map onto the symptoms of schizophrenia in humans. Additionally, animal models thought to represent schizophrenia may be manifestations of various other disorders with similar symptomology, or no disorder at all, leaving more to study in animal models of schizophrenia. Despite these limitations, animal models afford the opportunity to conduct formal experiments that would be unethical in humans, which can add unique knowledge to the two-hit model.

Potential Limitations of the Two-Hit Model

Despite its advantages, the two-hit model suffers from notable limitations. Some first hits implicated in the development of schizophrenia are not unique to the disorder. For example, the CNTNAP2 gene is linked to both schizophrenia and autism (Burbach & Zwaag, 2009); deletion of the 22q11 gene leads to velo-cardio facial syndrome, which is a genetic disorder that is hypothesized to increase the risk of developing both schizophrenia and autism (Williams et al., 2013); and loci on chromosomes such as 1q21.44, 5q22.31 and 6p24.21 have been associated with the development of both schizophrenia and bipolar disorder (Thaker, 2008). The two-hit model's lack of specificity raises concerns about its use in distinguishing between schizophrenia and other psychopathology.

Another limitation is that given the current state of the model, it is difficult to tell whether a given first hit is contributing to multiple disorders, or whether multiple

© 2016 URJP at UCLA / urjp.psych.ucla.edu

disorders are actually behaviorally distinct variants of the same condition. For instance, certain difficulties with social and fine motor skills that are considered observable signs and/or consequences of the first hit occur in both schizophrenia and autism (Schiffman et al., 2004). The two-hit model is unable to distinguish whether these signs are non-specific markers of an early neurodevelopmental disruption in the form of a first hit, or whether these indicators suggest a conceptual and clinical overlap between schizophrenia and autism of which our current nosology does not incorporate. In addition to the overlap in non-specific markers, some of the stressors implicated as being the second hit are present in many disorders. For instance, child maltreatment can lead to schizophrenia, post-traumatic stress disorder (PTSD), and major depressive disorder (Rudnick & Lundberg, 2012). In its current form, the model is limited to predicting abnormal behavior, and is unable to zero in on schizophrenia relative to other conditions.

Another factor to note in the evaluation of the two-hit model is that each potential first hit may result in differences in clinical correlates, level of risk, symptom profiles, and long-term prognosis. For instance, exposure to *Toxoplasma gondii (T. Gondii)* has been implicated as an environmental risk factor that could be considered a first hit for schizophrenia, as studies report elevated rates of this infection among people with schizophrenia compared to those without (Dickerson, Borownow, & Stallings, 2007). The strength of this finding is modest, which is a finding consistent with other environmental risk factors for the first hit such as maternal influenza infection or maternal famine during pregnancy. However, when differentiating the course of those with various first hits, researcher have discovered that, among individuals with schizophrenia, those with higher levels of *T. Gondii* antibodies are more likely to die younger from natural causes (Dickerson et al., 2007). As *T. Gondii* infection may have different outcomes from other first hits, it is possible that each first hit may influence the course of schizophrenia uniquely, posing challenges to the falsifiability of the model. Since different hits may lead to different outcomes, it is difficult to test a priori whether what was thought to be a first hit actually contributed to the development of schizophrenia.

Animal models have not always been supportive of the two-hit model. In a study by Chen, Wang, and Li (2010), the authors found that three hits rather than two were better at explaining the origins of psychosis-like symptoms in rats. In their study, the authors used stressful hits such as maternal separation, avoidance conditioning in which the rats were shocked, and phencyclidine treatment, finding that three triggers were needed to produce psychosis-like symptoms in the rats. The results of the experiment suggest that at least some first hits may require both a second and third hit, and therefore, in some cases, the label "two-hit" model may be misleading or insufficient to explain the development of schizophrenia. Not unrelated in terms of model accuracy, certain second hits seem to only lead to schizophrenia in the presence of specific first hits. For example, it is possible that cannabis use may only act as a second hit given certain conditions (e.g., mutation of the COM-T gene), but with other first hits, such as maternal influenza, cannabis use would not be expected to trigger schizophrenia (Malone, Hill, & Rubino, 2010). In this example, identifying the actual hits, and subsequently who is actually at risk, still remains elusive.

Another challenge to the two-hit model is the difficulty in differentiating between what constitutes a first and second hit. Conceptually, it seems that the two would be distinct, however, in reality, the lines may be quite blurred. For instance, in a study by Schiffman et al. (2003), the authors provided multiple interpretations of the link between minor physical anomalies (MPAs) in childhood and the future development of schizophrenia, speculating that MPAs could either be a sign of the first hit, or a result of some early prenatal, non-genetic environmental stressor (i.e., a second hit). Both positions could be argued, and the two-hit model fails to offer a satisfying testable means of determining the more accurate interpretation.

Not unrelated to differentiating the two hits, the two-hit model is not well enough developed to account for possible interactions between the first and second hits. For example, some have asserted that social impairment could be a sign of the first hit (Schiffman et al., 2004). Presumably, first-hit induced social impairment often leads to social challenges (e.g., bullying), which might constitute a second hit. In this case, it is possible that the first hit is essentially driving the onset of the second hit, such that the two are interdependent. Similarly, it is difficult to determine the causal role of any correlate speculated to be part of the model. For example, Caspi et al. (2005) propose that cannabis use may serve as a risk factor (second hit) for a genetically vulnerable subgroup (first hit). It is possible, however, that for some individuals, early signs of schizophrenia may cause a person to use cannabis in an attempt to self-medicate (Hambrecht & Hafner, 2000). In such cases, what is perceived as the second hit may be strictly a result of the first hit, with no explanatory power in its own right.

Although the two-hit model is generally assumed to show the causal pathway of schizophrenia, the actual

mechanisms driving the development of schizophrenia are not always clear. As discussed earlier, there are multiple biological and environmental stressors that have been shown to increase the risk of developing schizophrenia. Those correlations, however, do not always imply causality. It is possible that the true cause of schizophrenia is an underlying variable that has not been discovered, which causes both hits as well as schizophrenia.

Evaluating Practical Applications of the Two-Hit Model

Due to many of the issues described above, the clinical accuracy of the two-hit model may be problematic. Given the state of the literature, there are likely many false positives and negatives, leaving doubt as to the utility of the model. With poor predictive ability, as well as the stigma associated with schizophrenia in our society, being told that one has experienced a first hit may have a variety of adverse consequences without much associated gain. It is conceivable that internal and external stigma associated with a fear of developing schizophrenia could lead to a variety of maladaptive outcomes, such as low self-esteem, depression, anxiety, or any number of problems. These problems can be exacerbated if the family and surrounding community do not fully understand the implications of identification (Mittal, Dean, Mittal, & Saks, 2015). All of these concerns would be triggered by clinically responding to a model with significant limitations in accuracy.

Identification of risk for schizophrenia can also have public policy and societal implications. Insurance companies, teachers, and potential employers may be less inclined to invest in a person who has been labeled as having a high probability of developing schizophrenia (Cassetta & Goghari, 2014; Mittal et al., 2015). Furthermore, given the significant increase in the number of mass shootings (Blair & Schweit, 2014), with media often linking these events to mental illness, being identified as having a first hit in the two-hit model offers additional considerations and concerns for the individual (Mittal et al., 2015). As such, the two-hit model may inappropriately put an individual in the crosshairs of the existent discrimination towards those with mental illness.

Despite the need to refine and tighten identification, however, the two-hit model may offer some clinical advantages if used appropriately. For instance, individuals who have been exposed to prenatal or other genetic insults may benefit from non-specific, non-stigmatizing early intervention that could potentially ameliorate the negative effects of second hits, regardless as to whether schizophrenia was to be the ultimate outcome. Relaxation and coping skills, for example, if infused into a context that is low in stigma, could be a valuable resource for anyone with a first hit or a second hit, irrespective of future risk for schizophrenia (DeRubeis & Crits-Christoph, 1998). Additionally, as research continues to refine the model, it is conceivable that future work will uncover more direct and specific clinical opportunities. For example, if the link between certain genetic liability and cannabis use becomes clearer, identifying those with the liability and explaining to them their heightened risk in the face of cannabis use may be a beneficial intervention strategy.

Conclusion

The two-hit model has both advantages and disadvantages with respect to shedding light on the unknown aspects of schizophrenia. The model also sets a theoretical backdrop, which is useful when generating hypotheses for future research. The simplicity of conceptualizing two hits as necessary and sufficient for the development of schizophrenia provides a framework from which researchers and clinicians can work to facilitate understanding, early identification, and intervention. The two-hit model allows for the assimilation of research that uncovers correlates to risk by incorporating prenatal and developmental experiences into first or second hits that can help facilitate understanding.

The two-hit model, however, is still riddled with limitations, which requires additional study. Issues such as unfalsifiablity, non-specificity to schizophrenia, unclear distinctions between first and second hits, and potential confusion between correlation and causation all serve as hurdles for the model which have yet to be overcome.

From a clinical perspective, the two-hit model offers avenues for future pursuits. Researchers and clinicians, however, need to be cognizant of the possibility that, if taken out of context or extended beyond the current knowledge base, the model can lead to unintended consequences (e.g., stigma, inappropriate treatment). Nonetheless, having a theoretical model from which to work can be a powerful tool. The two-hit model has already helped facilitate important gains in the understanding of this disorder, and with additional research, it has the potential to provide further clinical advances as well.

References

Bayer, T. A., Falkai, P., & Maier, W. (1999). Genetic and non-genetic vulnerability factors in schizophrenia: The basis of the “two-hit hypothesis”. *Journal of Psychiatric Research, 33,* 543-548. doi.org/10.1016/S0022-3956(99)00039-4

Blair, J. Pete, and Schweit, Katherine W. (2014). A study of active shooter incidents, 2000 - 2013. Texas State University and Federal Bureau of Investigation, U.S. Department of Justice,

Washington D.C. 2014.

Boydell, J. & Murray, R. (2003). Urbanization, migration and risk of schizophrenia. In R.M. Murray, P.B. Jones, E. Susser, J. van Os, & M. Cannon (Eds.), *The epidemiology of schizophrenia* (pp. 49-63). New York, NY: Cambridge University Press.

Burbach, J., & Zwaag, B. (2009). Contact in the genetics of autism and schizophrenia. *Trends in Neurosciences, 32*, 69-72. doi.org/10.1016/j.tins.2008.11.002

Caspi, A., Moffitt, T., Cannon, M., McClay, J., Murray, R., Harrington, H., ... Craig, I. (2005). Moderation of the effect of adolescent-onset cannabis use on adult psychosis by a functional polymorphism in the catechol-o-methyltransferase gene: Longitudinal evidence of a gene X environment interaction. *Biological Psychiatry, 57*, 1117-1127. doi.org/10.1016/j.biopsych.2005.01.026

Cassetta, B. D., & Goghari, V. M. (2014). Ethical considerations of screening and early intervention for clinical high-risk psychosis. *Ethics & Behavior, 25*(1), 1-20. doi.org/10.1080/10508422.2014.880920

Chen, J., Wang, Z., & Li, M. (2010). Multiple 'hits' during postnatal and early adulthood periods disrupt the normal development of sensorimotor gating ability in rats. *Journal of Psychopharmacology, 25*, 379-392. doi.org/10.1177/0269881109354929

Corcoran, C., Walker, E., Huot, R., Mittal, V., Tessner, K., Kestler, L., & Malaspina, D. (2003). The stress cascade and schizophrenia: Etiology and onset. *Schizophrenia Bulletin, 29*, 671-682. doi.org/10.1093/oxfordjournals.schbul.a007038

Davis, J., Phelps, J., & Bracha, H. (1995). Prenatal development of monozygotic twins and concordance for schizophrenia. *Schizophrenia Bulletin, 21*, 357-366. doi.org/10.1093/schbul/21.3.357

DeRubeis, R. J. & Crits-Christoph, P. (1998). Empirically supported individuals and group psychological treatments for adult mental disorders. *Journal of Consulting and Clinical Psychology, Special Section: Empirically Supported Psychological Therapies, 66*, 357-366. http://dx.doi.org/10.1037/0022-006X.66.1.37

Dickerson, F., Borownow, J., Stallings, C., Origoni, A., & Yolkin, R. (2007). Toxoplasma gondii in individuals with schizophrenia: Association with clinical and demographic factors and with mortality. *Schizophrenia Bulletin, 33*, 737-740. doi.org/10.1093/schbul/sbm005

Feigenson, K. A., Kusnecov, A. W., & Silverstein, S. M. (2014). Inflammation and the two-hit hypothesis of schizophrenia. *Neuroscience and Biobehavioral Reviews, 38*, 72-93.

Hambrecht, M., & Hafner, H. (2000). Cannabis, vulnerability, and the onset of schizophrenia: An epidemiological perspective. *Australian and New Zealand Journal of Psychiatry, 34*, 468-475. doi.org/10.1080/j.1440-1614.2000.00736.x

Hollander, A., Dal, H., Lewis, G., Magnusson, C., Kirkbride, J. B., & Dalman, C. (2016). Refugee migration and risk of schizophrenia and other non-affective psychoses: Cohort study of 1.3 million people in Sweden. *The BMJ, 352*, i1030-. doi.org/10.1136/bmj.i1030

Jaaro-Peled, H., Ayhan, Y., Pletnikov, M. V., & Sawa, A. (2009). Review of pathological hallmarks of schizophrenia: Comparison of genetic models with patients and nongenetic models. *Schizophrenia Bulletin, 36*, 301-313. doi.org/10.1093/schbul/sbp133

Janssen, I., Krabbendam, L., Bak, M., Hanssen, M., Vollebergh, W., De Graaf, R., & Van Os, J. (2004). Childhood abuse as a risk factor for psychotic experiences. *Acta Psychiatrica Scandinavica, 109*, 38-45. doi.org/10.1046/j.0001-690X.2003.00217.x

King, S., St-Hilaire, A., & Heidkamp, D. (2010). Prenatal factors in schizophrenia. *Current Directions in Psychological Science, 19*, 209-213. doi.org/10.1177/0963721410378360

Lim, A., Taylor, D., & Malone, D. (2012). A two-hit model: Behavioural investigation of the effect of combined neonatal MK-801 administration and isolation rearing in the rat. *Journal of Psychopharmacology, 26*, 1252-1264. doi.org/10.1177/0269881111430751

Malone, D., Hill, M., & Rubino, T. (2010). Adolescent cannabis use and psychosis: Epidemiology and neurodevelopment models. *British Journal of Pharmacology, 160*, 511-522. doi.org/10.1111/j.1476-5381.2010.00721.x

McCarthy, S., Gillis, J., Kramer, M., Lihm, J., Yoon, S., Berstein, Y., ... Corvin, A. (2014). De novo mutations in schizophrenia implicate chromatin remodeling and support a genetic overlap with autism and intellectual disability. *Molecular Psychiatry, 19*, 652-658. doi.org/10.1038/mp.2014.29

Mednick, S. A., Watson, J. B., Cannon, T. D., Katila, H., Machon, R., ...Wang, X. (1998). In M. F. Lenzenweger & R. H. Dworkin (Eds), *Origins and development of schizophrenia: Advances in experimental psychopathology* (pp. 27-66). Washington, DC: American Psychological Association.

Mittal, V., Dean, D., Mittal, J., & Saks, E. (2015). Ethical, legal, and clinical considerations when disclosing a high-risk syndrome for psychosis. *Bioethics, 29*, 543-556. doi.org/10.1111/bioe.12155

Pogue-Geile, M., & Yokley, J. (2010). Current research on the genetic contributors to schizophrenia. *Current Directions in Psychological Science, 19*, 214-219. doi.org/10.1177/0963721410378490

Rudnick, A., & Lundberg, E. (2012). The stress-vulnerability model of schizophrenia: A conceptual analysis and selective review. *Current Psychiatric Reviews, 8*, 337-341. doi.org/10.2174/157340012803520450

Schiffman, J., Ekstrom, M., LaBrie, J., Schulsinger, F., Sorensen, H., Mednick, S. (2003). Minor physical anomalies and schizophrenia spectrum disorders: A prospective investigation. *American Journal of Psychiatry, 159*(2), 238-243. doi.org/10.1176/appi.ajp.159.2.238

Schiffman, J., Walker, E., Ekstrom, M., Schulsinger, F., Sorensen, H., & Mednick, S. (2004). Childhood videotaped social and neuromotor precursors of schizophrenia: A prospective investigation. *American Journal of Psychiatry, 161*, 2021-2027. doi.org/10.1176/appi.ajp.161.11.2021

Sekar, A., Bialas, A. R., de Rivera, H., Davis, A., Hammond, T. R., Kamitaki, N., ...McCarroll, S. A. (2016). Schizophrenia risk from complex variation of complement component 4. *Nature, 530*, 177-183. doi: 10.1038/nature16549

Siira, V., Wahlberg, K., Hakko, H., & Tienari, P. (2013). Stability in MMPI among adoptees with high and low genetic risk for schizophrenia and with low communication deviance of their adoptive parents. *Psychiatry Research, 210*, 69-74. doi.org/10.1016/j.psychres.2013.05.021

Tandon, R., Nasrallah, H. A., & Keshavan, M. S. (2009). Schizophrenia, "just the facts" 4. Clinical features and conceptualization. *Schizophrenia Research, 110* (1), 1-23. doi.org/10.1016/j.schres.2009.03.005

Thaker, G. (2008). Neurophysiological endophenotypes across bipolar and schizophrenia psychosis. *Schizophrenia Bulletin, 34*,

760-773. doi.org/10.1093/schbul/sbn049

Varese, P., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., ...Bentall, R. P. (2012). Childhood adversities increase the risk of psychosis: A meta-analysis of patient-control, prospective- and cross-sectional cohort studies. *Schizophrenia Bulletin, 38*, 661-671. doi.org/10.1093/schbul/sbs050

Vassos, E., Pedersen, C. B., Murray, R. M., Collier, D. A., & Lewis, C. M. (2012). Meta-analysis of the association of urbanicity with schizophrenia. *Schizophrenia Bulletin, 38*, 1118-1123. doi.org/10.1093/schbul/sbs096

Veling, W., Hoek, H. W., Selten, J., & Susser, E. (2011). Age at migration and future risk of psychotic disorders among immigrants in the Netherlands: A 7-year incidence study. *American Journal of Psychiatry, 168*, 1278-1285. doi.org/10.1176/appi.ajp.2011.11010110

Williams, H. J., Monks, S., Murphy, K. C., Kirov, G., O'Donovan, M. C., & Owen, M. J. (2013). Schizophrenia two-hit hypothesis in veto-cardio facial syndrome. *American Journal of Medical Genetics Neuropsychiatric Genetics, 162B*, 177-182. doi.org/10.1002/ajmg.b.32129

Editors: Jake Gavenas, Carter Bedford, and Cheryl Li
Graduate Student Mentor: Elizabeth Dalton

Author Note: We wish to thank Katherine Kheel for assisting with editing.

Arianna Ulloa
University of Pennsylvania

Arianna Ulloa is a senior majoring in Psychology and minoring in Nutrition at the University of Pennsylvania. A first generation college student who migrated to the United States from Peru at age seven, Arianna is dedicated to developing research-based approaches to improve the health and quality of life of disadvantaged populations. Next year, she will be acquiring a Master's of Science in Psychological Research Methods in the U.K. through the Fulbright Program. Afterwards, she hopes to acquire a PhD in Psychology in order to continue her quest to assuring that everyone, regardless of their background, has an equal chance at radiant health and a satisfactory life. Arianna is passionate about living a balanced lifestyle; during her free time, she indulges in her two favorite pastimes: weight lifting and baking. She also loves traveling, trying bizarre foods, and listening to Christmas music well before November.

Was there a particular experience that sparked your research interests?

When Dr. Laura Kubzansky guest lectured in my positive psychology class about how a positive psychology intervention has been (at this point this was true) the only long-term intervention shown to decrease telomere shortening. The fact that positive psychology could have such a significant physiological impact was mind-blowing.

Who has been an influential person in your life?

Dr. Angela Duckworth has been an extremely influential person in my life. She trusted me enough to take me on as a work-study student when I was only a sophomore and her extremely high expectations coupled with the confidence and encouragement she has given me have made me achieve far more than what I would have believed myself capable of.

When and where are you the most productive?

I am most productive when I am wearing sound-cancelling headphones at the library and I have obtained eight hours of sleep.

Where do you see yourself in 10 years?

I see myself on the tenure track at a university as an associate professor. My research would combine my love for nutrition and psychology to investigate preventative health measures that everyone can adapt into their daily lives. Moreover, on the side, I would have a small, local, protein bar business.

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Stressed is Just Desserts Spelled Backwards: The Mediation Effects of a Healthy Diet on the Relationship Between Perceived Stress and Self-Rated Health

Arianna M. Ulloa
University of Pennsylvania

Research links perceived stress to health maladies. Stress impacts the individual behaviorally and physiologically. The current study explored whether the relationship between perceived stress and health outcomes is explained by diet. It hypothesized that a healthy diet mediates the relationship between perceived stress and self-rated health. Data were collected from the later-life cohort, year five of the Notre Dame Study of Health & Well-Being. Participants completed an in-person health battery with a questionnaire assessing perceived stress, diet, and self-rated health. Multiple regression models were used to analyze the mediation. Analyses showed that perceived stress predicted self-rated health (β = .12, t[130] = 2.29, p = .02). Healthy diet fully mediated the relationship between perceived stress and self-rated health (β = .04; CI = .0097 to .1006). The effect of perceived stress on self-rated health became nonsignificant (β = .08, t = 1.44, p = .15) when controlling for healthy diet. A Sobel test confirmed the reliability of our findings (Z = 2.12, p = .03). Results suggest that perceived stress is not fully accountable for health maladies, rather, the effects of perceived stress on other key metabolic pathways influences health. Future research can explore this idea more in depth by examining which specific behavioral and physiological pathways mediate the relationship between perceived stress and health, the length of time this mediation takes place (i.e., daily, weekly, monthly, yearly), and whether individuals differ in how they experience this mediation in order to better inform preventative care and intervention techniques.

Evolutionarily, the physiological response to acute stress benefitted the individual by temporarily activating the fight-or-flight mechanism responsible for protecting humans from imminent danger (Arun, 2004). In our current society, the body's stress response mechanisms may become deregulated due to chronic environmental, social, and physical stressors (Pearlin, Menaghan, Lieberman, & Mullan, 1981). These chronic stressors take a toll on the body through negative health outcomes such as reduced energy, physical health, and ability or desire to exercise (Breslow & Hochstim, 1971; McEwen, 2005). Diet also impacts health outcomes; a poor diet may serve as a risk factor towards maladies such as heart disease. On the contrary, a highly nutritious diet has the opposite effect (Mente, de Koning, Shannon, & Anand, 2009). Evidence suggests chronic stressors may also impact diet (Reich & Zautra, 1983). The purpose of this study is to investigate whether diet mediates the relationship between perceived stress and self-rated health.

Stress and Health

Chronic activation of the different stress pathways is associated with precursors of illnesses such as heart disease, rheumatoid arthritis, atherosclerosis, and asthma (Manuck, Marsland, Kapland, Kaplan, & William, 1995; McNeil, 1987; Pearlin et al., 1981). Cortisol, the main glucocorticoid in the stress response pathway, is stored in adipose tissue (Björntorp, 1996). Human visceral fat cells contain more cortisol enzymes than subcutaneous fat cells. An increased stress response causes cortisol to be released from the HPA axis and stored as adipocyte cells in visceral tissue around the abdomen (Epel et al., 2000; Kravitz & Schneider, 2005; Maglione-Garves, Tomlinson, Sinha, Bujalska, & Hewison, 2002). Abdominal adiposity, an indicator of cardiovascular disease risk, is measured through waist-to-hip ratio (WHR),

© 2016 URJP at UCLA / urjp.psych.ucla.edu

a biomarker of visceral fat. A WHR higher than 94% for men and 88% for women indicates heightened risk of cardiovascular disease (Lemieux, Prud'homme, Bouchard, Tremblay, & Després, 1996). Moreover, there are other specific physiological indicators of chronic stress. Past research has grouped these indicators together into *allostatic load*, a measure of the physiological perturbations of chronic exposure to stress (McEwen, 2000). Specifically, research on 1189 individuals ages 70-79 operationalized allostatic load as a combination of ten factors most indicative of a heightened stress response: systolic blood pressure, diastolic blood pressure, waist-to-hip-ratio (WHR), high density lipoprotein (HDL), total cholesterol, blood plasma levels of glycosylated hemoglobin, DHEA-S (a functional HPA-antagonist), cortisol levels, and norepinephrine and epinephrine levels (McEwen et al., 2001). Allostatic load predicts increased risk of mortality, cognitive decline, and physical decline, as well as cardiovascular disease (Seeman, McEwen, Rowe, & Singer, 2001; Seeman, Singer, Rowe, Horwitz, & McEwen, 1997).

Research shows that there are not only physiological, but also psychological components of stressors that strongly correlated with consequential health outcomes. Perceived stress is the feelings or thoughts that an individual has about how much stress he or she is under at a given point in time or over a given time period (Gellman, 2013, p. 1453). It does not measure the frequency or variety of stressors affecting an individual, but rather how an individual appraises the impact or gravity of the stressors in his or her life and his or her ability to handle such stressors (Gellman, 2013). As opposed to objective stress, perceived stress takes into consideration that people may be affected by the same stressors differently as a result of factors such as personality traits, psychosocial resources, and support (Gellman, 2013). It reflects the interaction between an individual and the way he or she appraises his or her environment (Lazarus & Folkman, 1984). Keller and colleagues (2012) utilized the 1998 National Health Interview Survey and the corresponding National Index Mortality Data through 2006 to examine the relationship between perceived stress and mental health outcomes. After controlling for sociodemographic status, health behavior, and access to health care, researchers found that higher reported levels of stress and stronger perceptions of stress impacting health independently related to greater negative physical and mental health outcomes (Keller et al., 2012). Moreover, the results revealed an interaction between perceived stress and perceiving that stress affects health: those that reported higher levels of stress and perceived that stress greatly impacted their health had a 43% increased risk of premature death (Keller et al., 2012). Another study of 75 married couples found that individuals with low psychosocial resources and stronger perceptions of chronic stressors were more vulnerable to illness, even if they had little objective stress in their lives (DeLongis, Folkman, & Lazarus, 1988). These studies suggest there is a strong relationship between perceived stress and health outcomes.

Diet and Health

Diet strongly predicts future health outcomes (Heidemann et al., 2005; Mente, de Koning, Shannon, & Anand, 2009). Cordain and colleagues (2005) explain that nutritionally optimal diets consist of foods that best support the individual's' biology through proper balance of seven nutritional characteristics: 1) glycemic load, 2) fatty acid composition, 3) macronutrient composition, 4) micronutrient density, 5) acid-base balance, 6) sodium-potassium ratio, and 7) fiber content. Universally recognized "healthy" diets such as the DASH (Dietary Approaches to Approach Hypertension) Diet, the Mediterranean diet, and the Okinawan diet, share a proper balance of several of these aforementioned characteristics (Sacks et al., 2001; Willcox, Willcox, Todoriki, & Suzuki, 2009). These diets include nutritionally dense, lower calorie meals rich in fruits, vegetables, herbs, and spices, and low consumption of fatty meats, refined grains, saturated fat, processed sugars, and full-fat dairy products (Willcox et al., 2009). These meal compositions contain health-enhancing anti-inflammatory properties that decrease risk of cancer, cardiovascular disease, and other chronic disease. The Western diet lacks these properties and instead contains an overabundance of easily available, nutritionally empty calories that activate inflammatory responses (Cordain et al., 2005). The clash between the human genome and current obesogenic environment at least partially explains the increase in average body mass index (BMI) and chronic disease in Western civilization (Danaei et al., 2013). Many current health problems in the Western world may be due to an overconsumption of palatable foods (Fine, 2013). Taken together, these studies suggest that contrary to the typical Western diet, individuals should pursue nutritionally optimal diets to maximize their health outcomes.

Stress and Diet

An effective way for individuals to manage how stress is perceived involves intentionally pursuing a healthy diet (Rutter, 1987). Greater BMI corresponds with a greater perception of stress, suggesting that individuals who perceive they are under high levels of chronic stress may not be effectively mitigating the stress response through diet

© 2016 URJP at UCLA / urjp.psych.ucla.edu

(Tomiyama, Dallman, & Epel, 2011). Stress-coping strategies are reflected in dietary choices (Fine, 2013). Stressful circumstances such as financial stress, unemployment, and highly competitive work environments are predictors of stress-driven consumption of highly palatable foods (Reich & Zautra, 1983). Individuals are more likely to eat extremely appetizing, highly caloric foods to alleviate a day of stress, and repeatedly experiencing stressful days may result in unhealthy weight gain (Dallman, Pecoraro, & Akana, 2003; Tomiyama et al., 2011; Vgontzas & Bixler, 2006).

There is a physiological basis to perceived stress and diet. The *Cortisol Cravings* theory posits that cortisol increases appetite and the motivation to eat (Lemieux, Prud'homme, Bouchard, Tremblay, & Després, 1996). Once a stressful episode is over, cortisol levels should decrease. If the stressor is chronic, meaning a person's stress response is chronically elevated due to the constant perception of stressors in the environment, cortisol levels may stay abnormally high and cause a constant indefinite increase in appetite. Furthermore, the chronic release of cortisol that results from the constant perception of stress increases the desire for highly palatable foods through increased signaling in the sympathetic nervous system (SNS) pathways (Warne & Dallman, 2007). Adam and Epel (2007) explain that these "cortisol craving" pathways operate through a feedback inhibition *Reward Based Stress Eating Model*. This model stipulates that cortisol motivates calorically dense food intake in order to stimulate endogenous opioid release in the brain's reward system. The opioid release causes decreased activity of the HPA axis, attenuating cortisol release, reducing stress.

In addition, research links cortisol with sugar cravings (Epel, Lapidus, & McEwen, 2001). A study of healthy pre-menopausal women found that females with high cortisol reactivity consumed significantly more sugary foods on stressful days, resulting in a corresponding higher caloric intake (Epel et al., 2001). In another study of undergraduate women, researchers sat participants in a room with four bowls containing the following snacks: grapes, dry roasted peanuts, potato chips, and M&Ms (Zellner et al., 2006). Experimenters randomly assigned participants to either a stress group, in which they were given ten unsolvable anagrams, or a non-stress group, in which they were given ten solvable anagrams. The participants were given ten minutes to solve the anagrams. Results revealed the women in the stress group ate more M&Ms than in the non-stress group, and the women in the non-stress group ate more grapes (Zellner et al. 2006). Although grapes contain high amounts of sugar, M&M's contain both high levels of fat and sugar, making it the more caloric option between the two. This finding strengthens pre-existing evidence that those in highly stressful situations crave highly palatable, caloric sugar and fat combinations (Oliver, Wardle, & Gibson, 2000). In addition to cravings for palatable food, chronic stress is also associated with other dietary problems such as eating pathologies (Avena, Rada, & Hoebel, 2009). Research on binge eating disorder (BED), anorexia, and bulimia has found that people with eating pathologies have greater basal cortisol levels and/or greater cortisol reactivity (Gluck, Geliebter, Hung, & Yahav, 2004; Gluck, 2006). Thus, the linkages between stress and health may be at least partially explained by the physiological and psychological basis of stress and diet.

The Current Investigation

The physiological effects of stress, such as cortisol cravings, may psychologically impact the individual, resulting in a desire to eat more calorically dense foods. After excessive caloric consumption, the continued activation of the body's stress response may cause the excess calories to be stored in visceral tissue around the abdomen, leading to a heightened risk for metabolic diseases. Thus, chronic stress detrimentally affects diet through a compilation of effects that in conjunction may lead to negative health outcomes (Adam & Epel, 2007).

Although past research has focused on how chronic stress affects diet, how diet affects health, and how stress affects health, little research has looked among the relations between these three factors. Moreover, research has seldom looked at how the nutrient quality of specific foods and the frequency that these foods are consumed over time relates to the stress response and its associated health outcomes. This study tests the hypothesis that increased levels of stress influence poor dietary choices, which in turn take a toll on health outcomes. Specifically, it tests the hypothesis that a healthy diet (or lack thereof) plays a mediating role in the relationship between stress and health.

Method

Participants

Participants included a subsample of 153 adults in a later-life cohort from the Notre Dame Study of Health and Well-Being (NDHWB), a longitudinal study exploring the correlates of stress and well-being. Data for the current analyses came from year five of the study, when the in-person assessment began to incorporate measures of nutritional and health choices. We obtained CITI training for Human Subjects Research in order to conduct the in-person assessment. Demographic characteristics for the subsample were as follows: 64% of participants were female;

88.2% were Caucasian; 7.2% were African-American; 2% were Hispanic and Latino; 1.3% were Native American and 1.3% were Pacific Islander. In regard to annual income, 1.3% made less than $7500; 14.3% made between $7,500 and $14,999; 21.8% made between $15,000 and $24,999; 27.9% made between $25,000 and $39,999; 25.1% made between $40,000 and $74,999; 4.8% made between $75,000 and $99,999; and 4.8% made $100,000 or more. Education levels were as follows: 35.3% of participants have at least a high school education, 20% have a college degree, and 10% have a graduate degree. Regarding marital status, 8.7%% were single, 44% were married, 1.3% were separated, 24.2%were widowed, and 21.5% were divorced. This subsample was obtained from the Later Life Questionnaire participants (LLQ), so all participants were 55 years old or older.

Procedure

The in-person health battery was conducted in Year 5 by a registered nurse at the South Bend Medical Foundation (SBMF). It followed the American Drug Administration Regulations and Guidelines (South Bend Medical Foundation) and included a basic physical assessment, and a questionnaire that was later mailed to the participants. The questionnaire included various measures such as a stress measure, a health measure, and a dietary measure. Participants received $100 in compensation for participation in the health battery of approximately two-hour duration and $25 in compensation for completion of the questionnaire.

Measures

Diet. The 36-item *Typical Week Measure* was extracted from the *Eating Habits Questionnaire*, as shown in Appendix A (Sorensen et al., 1992). It assessed how often participants consumed a variety of common foods such as crackers, green salad, yogurt, cake, and fresh fruit. Participants were asked to indicate how often they eat the foods on a range from 1 *(never or less than once a week)* to 5 *(more than once a day)*. About 37% of participants did not fully complete the survey or provided illegible responses, so mean substitution was utilized for missing values. After all the data were collected, a descriptive factor analysis was conducted to extract a factor grouping of healthy diet foods from the Typical Week Measure. The results yielded a factor grouping that consisted of 8 foods commonly recognized as healthy. This factor grouping accounted for 2.48 of the variance. Simple statistics for the healthy diet food factors, including means, standard deviations, and correlations with totals, are included in Table 1.

Table 1

Descriptive Statistics for Factors in Healthy Foods Factor Grouping

Variable Name	Raw Variables		Standardized Variables			
	Correlation With Total	α	Correlation With Total	α	Mean	SD
Green Salad	0.49	0.58	0.48	0.59	2.70	0.93
Fresh Vegetables	0.52	0.57	0.49	0.59	3.01	0.97
Fresh Fruit	0.58	0.54	0.56	0.57	3.12	1.13
Yogurt	0.19	0.67	0.18	0.67	2.08	1.17
Peanuts/ Mixed Nuts	0.27	0.64	0.25	0.65	2.08	1.06
Fish	0.28	0.64	0.31	0.63	1.91	0.65
Chicken	0.19	0.65	0.22	0.66	2.37	0.69
Beans	0.30	0.63	0.32	0.63	1.88	0.73

Perceived Stress. Perceived stress was assessed with a modified version of a measure intended to measure the degree to which occurrences are perceived as stressful, as shown in Appendix B (Cohen et al., 1983, p. 385). The original source material utilizes a 5-point scale (1 = Never, 2 =Almost Never, 3 = Sometimes, 4 = Fairly Often, 5 = Very Often). Prior pilots of this study showed that older adults have trouble differentiating between "Almost Never" and "Sometimes" and between "Fairly Often" and "Often." To prevent participant confusion in this study, the original source material was modified to a 4-point scale (1 = Never, 2 = Sometimes, 3 = Often, 4 = Always). The measure consists of 14 self-report questions, 7 of which are reverse-scored. Example questions include, "How often have you been able to control irritations in your life?" (reverse-scored) and "How often you been upset because of something that happened unexpectedly?" Higher overall scores reflect a greater amount of stress (Cronbach's α = .85).

Self-Rated Health. Self-rated health was examined with six multiple-choice questions extracted from the "Measurement of Physical Health," as shown in Appendix C (Breslow & Hochstim, 1971). This was designed to categorize individuals along a spectrum of physical health that ranged from a minimum state (ability to work and/or care for personal needs) to an optimal state (no complaints and a high level of energy; p. 328). Example questions include, "On average, how much exercise do you get?" (Choices: I hardly get any exercise; I get some exercise, but not a lot; I exercise an average amount; I get a lot of exercise) and "How would you rate your general health status?" (Choices: Excellent; Good; Reasonable; Poor). Possible scores ranged from 6-17, and higher overall scores indicated better health (Cronbach's α = .84).

Results

Descriptive statistics for the Later Life Cohort of the NDHWB, including effects of education and income, are included in Table 2.

Table 2

Frequencies for the Full Sample on Gender, Race, Marital Status, and Income

	Number (%)
	Year 5
Gender[a]	
Females	98 (64%)
Males	55 (34%)
Race	
White	135 (88.2%)
African American	11 (7.2%)
Hispanic, Asian, or Other	7 (4.6%)
Marital Status	
Single	13 (8.7%)
Married	66 (44.3%)
Divorced	36 (24.2%)
Widowed	32 (21.5%)
Separated	2 (1.3%)
Education[b]	
Grade School (Grade 1-9)	4 (2.7%)
High School	50 (32.7%)
Vocational Education	10 (6.5%)
College Classes	34 (22.2%)
College Degree	30 (19.6%)
Post-College/ Professional	10 (6.5%)
Graduate/ Medical/ Law	15 (9.8%)
Income[c]	
< $7,500	2 (1.4%)
$7,500 - $14,999	21 (14.3%)
$15,000 - $24,999	32 (21.8%)
$25,000 - $39,999	41 (27.9%)
$40,000 - $74,999	37 (25.2%)
$75,000 - $99,999	7 (4.7%)
$100,000+	7 (4.7%)

[a]*T*-tests revealed no significant gender differences in self-rated health, perceived stress, or healthy diet ($t(133) = -.805$, $p = .42$), although the mean self-rated health for women was -.78 (SD = 2.97), while mean self-rated health for men was -.36 (SD = 2.96).
[b]Linear regression revealed that higher education was predictive of higher scores of healthy eating ($\beta(135) = .36$, $p < .01$) and of lower scores of perceived stress ($\beta(134) = -.21$, $p = .015$)
[c]Linear regression revealed that higher income was predictive of healthier eating ($\beta(130) = .28$, $< .01$) and of lower scores of perceived stress ($\beta(128) = -.21$)/

Additional descriptive statistics of the variables of interest (perceived stress, healthy diet, and self-rated health) are shown in Table 3.

Table 3

Descriptive Statistics of the Model Variables

	N	Mean	SD	Median	Skewness	Kurtosis
Perceived Stress	137	28.05	4.85	28	.28	.85
Healthy Diet	138	19.28	4.14	19	.097	-.22
Self-Rated Health	135	-0.51	2.96	-1	.80	.44

The proposed mediation model, as illustrated by Figure 1, of healthy diet mediating the perceived stress and self-rated health relationship, was tested as follows: (a) Pathway 1: healthy diet is regressed on perceived stress; (b) Pathway 2: self-rated health problems is regressed on healthy diet; and (c) Pathway 3: self-rated health problems is regressed on perceived diet, (c') Pathway 4: self-rated health is regressed on perceived stress controlling for healthy diet (Baron & Kenny, 1986). A mediational relationship exists if Pathway 4 is no longer significant.

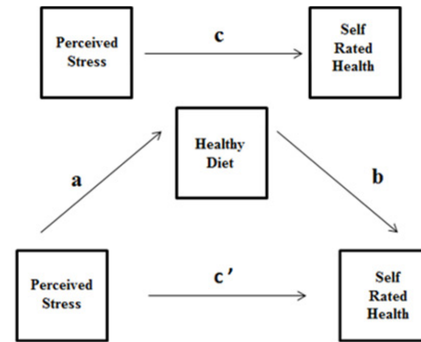


Figure 1. Mediation model of Healthy Diet Mediating the relationship between Perceived Stress and Self-Rated Health (on the basis of Baron & Kenny, 1986).

As shown by Table 4, stress perception significantly predicted self-rated health problems ($\beta = .12$, $t(130) = 2.29$, $p = .02$), and healthy diet ($\beta = -.27$, $t(130) = -3.62$, $p < .01$). Healthy diet significantly predicted self-rated health problems ($\beta = -.16$, $t(130) = 2.61$, $p = .01$). Because both the a-path and the b-path were significant, mediation analyses were tested using the bootstrapping method with bias-corrected confidence estimates (MacKinnon, Lockwood & Williams, 2004; Preacher & Hayes, 2004). In the present study, the 95% confidence interval of the indirect effects was obtained with 5000 bootstrap samples (Preacher & Hayes, 2008). Results of the mediation analysis confirmed the mediating role of healthy diet in the relation between perceived stress and self-reported health problems ($\beta = .04$; *CI* = .0097 to .1006). In addition, Pathway C' indicates that the direct effect of perceived stress on self-reported health problems became nonsignificant ($\beta = .08$, $t = 1.44$, $p = .15$) when controlling for healthy diet, suggesting full mediation. The model summary of the amount of variation of the dependent variable, self-rated health problems, accounted by the mediation model, resulted as follows: $F(130) = 6.15$, $R^2_{\text{adjusted}} = .073$, $p < .01$. Sobel's test confirmed the full mediation, ($z = 2.12$, $p = .03$).

Table 4

Testing the Mediation of Healthy Diet on the Relationship between Stress and Self-rated Health

Perceived Stress on Healthy Diet (Path A)	-.26 (.07) $p < .01$
Healthy Diet on Self-Rated Health (Path B)	-.16 (.06) $p = .01$
Stress on Self-Rated Health without Healthy Diet (C')	.08 (.05) $p = .15$
Stress on Self-Rated Health With Healthy Diet (C)	.12 (.05) $p = .02$

Note. Sobel = 2.12, $p = .03$.

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Discussion

Results supported the hypothesis that diet fully mediates the relationship between perceived stress and self-rated health problems. This suggests that chronic stress negatively impacts diet, and that this dietary toll results in chronic health problems. The mediating effect of diet conveys that chronic stress itself may not be what causes health maladies, but rather, the effects of chronic stress on other key metabolic pathways account for the relationship between stress and health. One such pathway is the physiological feedback inhibition pathway (Lemieux, Prud'homme, Bouchard, Tremblay, & Després, 1996). The *Rewards Based Eating Model*, in conjunction with the *Cortisol Cravings* theory, suggests that stress causes a desire for unhealthy high-fat high-sugar foods through the release of cortisol. As a result, cortisol drives cravings of highly palatable foods that halt the stress response (Lemieux et al., 1996; Adam & Epel, 2007). However, stress also affects health through psychological dietary pathways. For example, individuals are more likely to seek "comfort food" on highly stressful days (Dallman et al., 2003). Moreover, chronic stressors are highly correlated with psychological dietary disorders such as BED and bulimia in women—disorders correlated with excess caloric intake—and thus are predictive of both negative mental and physical health outcomes (Gluck, 2006; Gluck, Geliebter, Hung, & Yahav, 2004). Lastly, chronic stressors also affect health through pathways independent of dietary choices: increased cortisol levels predict higher amounts of adipocyte storage in visceral abdominal tissue, a biomarker for cardiovascular diseases (Wallerius et al, 2003; Watson et al., 1989).

Health is a complex, multi-faceted construct that is influenced by oxidative stressors, social and economic stressors, physical stressors, and intra-person stressors (McEwen & Stellar, 1993). Although the amount of variance in health for which each pathway in the stress and diet relationship accounts for (either physiological or psychological), it is particularly momentous that a healthy diet fully accounts for the variance in health outcomes explained by stress. The results of the mediational hypothesis, in conjunction with the existing literature, suggest that stress affects health through diet, and provide preliminary evidence of the possibility of using diet as a buffer against the negative health consequences associated with stress.

Although this study portrays advancement towards delineating the intricate relations between stress, diet, and health, the results do not reveal the directionality of the relations. Thus, future studies can utilize longitudinal mediation models to examine how a healthy diet affects long-term health outcomes (a month, a year, or multiple years from when the healthy diet questionnaire was administered) to establish causality. Moreover, future studies can utilize different measures to examine the effects of a healthy diet. Whereas this study only utilized the Typical Week Measure to examine how often participants consumed the listed foods on a 1-5 scale, future studies should examine specific quantities of food consumed per day or number of calories eaten per day. In addition, this study is limited because it solely uses an older cohort, and it is difficult to discern which health maladies are due to stress and which health maladies are due to the inevitable decline in health associated with the aging process. A study focusing on generally healthier, younger age groups, or one that controls for prior health outcomes, would increase generalizability. Also, although the racial make-up of the current study accurately reflects the surrounding Indiana population, it does not accurately reflect the racial makeup of the United States. Future investigations could investigate whether these mediating effects differ in ethnic and racial minority groups.

Conclusion

In conclusion, this study provides preliminary evidence that a healthy diet may increase or decrease the effect that the perception of chronic stress has on self-rated health. This research provides hopeful but still preliminary evidence that even if an individual cannot dissipate their chronic stress, he or she may be able to buffer the negative consequences of that stressor through his or her eating habits. These results provide insight for preventative care and intervention techniques, specifically those that concern helping individuals undergoing currently unchangeable or unavoidable chronic stressors. The pathways through which healthy diet mediates the relationship between chronic stress and health should be discerned to effectively develop better dietary strategies that mitigate the relationship between chronic stress and negative health outcomes.

References

Adam, T. C., & Epel, E. S. (2007). Stress, eating and the reward system. *Physiology & Behavior, 91*(4), 449-458. doi: 10.1016/j.physbeh.2007.04.011

Arun, C. P. (2004). Fight or flight, forbearance and fortitude: the spectrum of actions of the catecholamines and their cousins. *Annals of the New York Academy of Sciences, 1018*(1), 137-140. doi: 10.1196/annals.1296.016

Avena, N. M., Rada, P., & Hoebel, B. G. (2009). Sugar and fat bingeing have notable differences in addictive-like behavior. *The Journal of Nutrition, 139*(3), 623-628. doi: 10.3945/jn.108.097584

Baltes, P. B., & Mayer, K. U. (2001). *The Berlin aging study: Aging from 70 to 100.* Cambridge University Press. doi: 10.1017/

cbo9780511586545

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173. doi: 10.1037/0022-3514.51.6.1173

Belloc, N. B., Breslow, L., & Hochstim, J. R. (1971). Measurement of physical health in a general population survey. *American Journal of Epidemiology, 93*(5), 328-336. doi: 10.1016/0049-089X(74)90017-9

Bennermo, M., Held, C., Stemme, S., Ericsson, C. G., Silveira, A., Green, F., & Tornvall, P. (2004). Genetic predisposition of the interleukin-6 response to inflammation: implications for a variety of major diseases? *Clinical Chemistry, 50*(11), 2136-2140. doi: 10.1373/clinchem.2004.037531

Björntorp, P. (1996). The regulation of adipose tissue distribution in humans. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity, 20*(4), 291-302.

Cohen, S., Kamarch, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, Vol. 24* (4), 385-396. doi: 10.2307/2136404

Cohen, S., & Herbert, T. B. (1996). Health psychology: Psychological factors and physical disease from the perspective of human psychoneuroimmunology. *Annual Review of Psychology, 47*(1), 113-142. doi: 10.1146/annurev.psych.47.1.113

Cordain, L., Eaton, S. B., Sebastian, A., Mann, N., Lindeberg, S., Watkins, B. A., & Brand-Miller, J. (2005). Origins and evolution of the Western diet: health implications for the 21st century. *The American Journal of Clinical Nutrition, 81*(2), 341-354.

Dallman, M. F., Pecoraro, N., Akana, S. F., La Fleur, S. E., Gomez, F., Houshyar., & Manalo, S. (2003). Chronic stress and obesity: a new view of "comfort food". *Proceedings of the National Academy of Sciences, 100*(20), 11696-11701. doi: 10.1073/pnas.1934666100

Danaei, G., Singh, G. M., Paciorek, C. J., Lin, J. K., Cowan, M. J., Finucane, M. M., & Ezzati, M. (2013). The Global Cardiovascular Risk Transition Associations of Four Metabolic Risk Factors with National Income, Urbanization, and Western Diet in 1980 and 2008. *Circulation, 127*(14), 1493-1502. doi: 10.1161/circulationaha.113.001470

DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: psychological and social resources as mediators. *Journal of Personality and Social Psychology, 54*(3), 486. doi: 10.1037/0022-3514.54.3.486

Diener, E., & Lucas, R. E. (1999). 11 Personality and Subjective Well-Being. *Well-Being: Foundations of Hedonic Psychology*. 213. doi: 10.1017/s0953820806231972

Epel, E. S., McEwen, B., Seeman, T., Matthews, K., Castellazzo, G., Brownell, K. D. & Ickovics, J. R. (2000). Stress and body shape: stress-induced cortisol secretion is consistently greater among women with central fat. P*sychosomatic Medicine, 62*(5), 623-632. doi: 10.1097/00006842-200009000-00005

Epel, E., Lapidus, R., McEwen, B., & Brownell, K. (2001). Stress may add bite to appetite in women: a laboratory study of stress-induced cortisol and eating behavior. *Psychoneuroendocrinology, 26*(1), 37-49. doi: 10.1016/s0306-4530(00)00035-4

Fine, B. (2013). *The Political Economy of Diet, Health and Food Policy*. Routledge. doi: 10.4324/9780203445297

Gluck, M. E., Geliebter, A., Hung, J., & Yahav, E. (2004). Cortisol, hunger, and desire to binge eat following a cold stress test in obese women with binge eating disorder. *Psychosomatic Medicine, 66*(6), 876-881.

Gellman, M. D. (2013). Behavioral Medicine. E*ncyclopedia of Behavioral Medicine,* 193-194. doi: 10.1007/978-1-4419-1005-91544

Gluck, M. E. (2006). Stress response and binge eating disorder. *Appetite, 46*(1), 26-30. doi: 10.1016/j.appet.2005.05.004

Heidemann, C., Hoffmann, K., Spranger, J., Klipstein-Grobusch, K., Möhlig, M., Pfeiffer, A. F. H., & Boeing, H. (2005). A dietary pattern protective against type 2 diabetes in the European Prospective Investigation into Cancer and Nutrition (EPIC)—Potsdam Study cohort. *Diabetologia, 48*(6), 1126-1134. doi: 10.1007/s00125-005-1743-1

Keller, A., Litzelman, K., Wisk, L. E., Maddox, T., Cheng, E. R., Creswell, P. D., & Witt, W. P. (2012). Does the perception that stress affects health matter? The association with health and mortality. *Health Psychology, 31*(5), 677. doi: 10.1037/a0026743

Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping.* Springer publishing company. doi: 10.4135/9781412952576.n198

Lazarus, R. S., & Launier, R. (1978). Stress-related transactions between person and environment. In *Perspectives in Interactional Psychology* (pp. 287-327). Springer US. doi: 10.1007/978-1-4613-3997-712

Lemieux, S., Prud'homme, D., Bouchard, C., Tremblay, A., & Després, J. P. (1996). A single threshold value of waist girth identifies normal-weight and overweight subjects with excess visceral adipose tissue. *The American Journal of Clinical Nutrition, 64(5)*, 685-693.

Maglione-Garves, C. A., Kravitz, L., & Schneider, S. (2005). Cortisol connection: Tips on managing stress and weight. *ACSM's Health & Fitness Journal, 9*(5), 20-23. doi: 10.1097/00135124-200509000-00008

Manuck, S. B., Marsland, A. L., Kaplan, J. R., & Williams, J. K. (1995). The pathogenicity of behavior and its neuroendocrine mediation: an example from coronary artery disease. P*sychosomatic Medicine, 57*(3), 275-283. doi: 10.1097/00006842-199505000-00009

McEwen, B. S. (1998). Stress, adaptation, and disease: Allostasis and allostatic load. A*nnals of the New York Academy of Sciences, 840*(1), 33-44. doi: 10.1111/j.1749-6632.1998.tb09546.x

McEwen, B. S. (2000). Allostasis and allostatic load: implications for neuropsychopharmacology. *Neuropsychopharmacology, 22*(2), 108-124. doi :10.1016/s0893-133x(99)00129-3

McEwen, B. S. (2005). Stressed or stressed out: what is the difference? *Journal of Psychiatry and Neuroscience, 30*(5), 315.

McEwen, B. S., & Stellar, E. (1993). Stress and the individual: mechanisms leading to disease. *Archives of Internal Medicine, 153*(18), 2093-2101. doi: 10.1001/archinte.153.18.2093

McNeil G. N. (1987). Depression. In *Handbook of Psychiatric Differential Diagnosis,* 57–126. doi: 10.1016/b978-0-7236-0490-7.50074-4

Mente, A., de Koning, L., Shannon, H. S., & Anand, S. S. (2009). A systematic review of the evidence supporting a causal link between dietary factors and coronary heart disease. *Archives of internal medicine, 169*(7), 659-669. doi: 10.1001/archinternmed.2009.38

Oliver, G., Wardle, J. F., & Gibson, E. L. (2000). Stress and food choice: a laboratory study. *Psychosomatic Medicine, 62*(6), 853-865. doi: 10.1097/00006842-200011000-00016

Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. C. (2005).

Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior, 46*(2), 205-219. doi: 10.1177/002214650504600206

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behavior Research Methods, Instruments, & Computers, 36(4), 717-731. doi: 10.3758/bf03206553

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891. doi: 10.3758/brm.40.3.879

Reich, J. W., & Zautra, A. J. (1983). Demands and desires in daily life: Some influences on well-being. A*merican Journal of Community Psychology, 11*(1), 41–58. doi: 10.1007/bf00898418

Rutter, M. (1993). *Developing minds: Challenge and Continuity Across the Life-Span.* Basic books. doi: 10.1097/00004583-199502000-00023

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry, 57*(3), 316. doi: 10.1017/cbo9780511752872.013

Sacks, F. M., Svetkey, L. P., Vollmer, W. M., Appel, L. J., Bray, G. A., Harsha, D., & Cutler, J. A. (2001). Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. *New England Journal of medicine, 344*(1), 3-10. doi: 10.1097/00008483-200105000-00012

Seeman, T. E., Singer, B. H., Rowe, J. W., Horwitz, R. I., & McEwen, B. S. (1997). Price of adaptation—allostatic load and its health consequences: MacArthur studies of successful aging. *Archives of Internal Medicine, 157*(19), 2259-2268. doi: 10.1001/archinte.157.19.2259

Seeman, T. E., McEwen, B. S., Rowe, J. W., & Singer, B. H. (2001). Allostatic load as a marker of cumulative biological risk: MacArthur studies of successful aging. *Proceedings of the National Academy of Sciences, 98*(8), 4770-4775. doi: 10.1073/pnas.081072698

South Bend Medical Foundation. (n.d.). In *South Bend Medical Foundation.* Retrieved from http://www.sbmf.org.

Sorensen, G., Morris, D. M., Hunt, M. K., Hebert, J. R., Harris, D. R., Stoddard, A., & Ockene, J. K. (1992). Work-site nutrition intervention and employees' dietary habits: the Treatwell program. *American Journal of Public Health, 82*(6), 877-880. doi: 10.2105/ajph.82.6.877

Tomiyama, A. J., Dallman, M. F., & Epel, E. S. (2011). Comfort food is comforting to those most stressed: evidence of the chronic stress response network in high stress women. *Psychoneuroendocrinology, 36*(10), 1513-1519. doi: 10.1016/j.psyneuen.2011.04.005

Tomlinson, J. W., Sinha, B., Bujalska, I., Hewison, M., & Stewart, P. M. (2002). Expression of 11β-hydroxysteroid dehydrogenase type 1 in adipose tissue is not increased in human obesity. *The Journal of Clinical Endocrinology & Metabolism, 87*(12), 5630-5635. doi: 10.1210/jc.2002-020687

Vgontzas, A. N., & Bixler, E. O. (2008). Short sleep and obesity: are poor sleep, chronic stress, and unhealthy behaviors the link. *Sleep, 31*(9), 1203. doi: 10.1038/ijo.2008.4

Wallerius, S., Rosmond, R., Ljung, T., Holm, G., & Björntorp, P. (2003). Rise in morning saliva cortisol is associated with abdominal obesity in men: a preliminary report. Journal of *Endocrinological Investigation, 26*(7), 616-619. doi: 10.1007/bf03347017

Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: exploring the central role of negative affectivity. *Psychological Review, 96*(2), 234. doi: 10.1037/0033-295x.96.2.234

Warne, J. P., & Dallman, M. F. (2007). Stress, diet and abdominal obesity: Y? *Nature Medicine, 13*(7), 781-783. doi: 10.1038/nm0707-781

Willcox, D. C., Willcox, B. J., Todoriki, H., & Suzuki, M. (2009). The Okinawan diet: health implications of a low-calorie, nutrient-dense, antioxidant-rich dietary pattern low in glycemic load. *Journal of the American College of Nutrition, 28*(sup4), 500S-516S. doi: 10.1080/07315724.2009.10718117

Zellner, D. A., Loaiza, S., Gonzalez, Z., Pita, J., Morales, J., Pecora, D., & Wolf, A. (2006). Food selection changes under stress. *Physiology & Behavior, 87*(4), 789-793. doi: 10.1016/j.physbeh.2006.01.014

Appendix A

Typical Week Measure

In a typical week how often do you eat…?

	Never or less than once a week	Once or twice a week	Three to five times a week	Once a day	More than once a day
White bread/toast	☐	☐	☐	☐	☐
Croissants/ pastries	☐	☐	☐	☐	☐
Donuts	☐	☐	☐	☐	☐
Crackers	☐	☐	☐	☐	☐
Granola bars	☐	☐	☐	☐	☐
Green Salad	☐	☐	☐	☐	☐
Fresh Vegetables	☐	☐	☐	☐	☐
Canned Vegetables	☐	☐	☐	☐	☐
French fries	☐	☐	☐	☐	☐
Canned fruit	☐	☐	☐	☐	☐
Fresh Fruit	☐	☐	☐	☐	☐
Applesauce	☐	☐	☐	☐	☐
Yogurt	☐	☐	☐	☐	☐
Cheese stick	☐	☐	☐	☐	☐
Pudding	☐	☐	☐	☐	☐
Candy or chocolate	☐	☐	☐	☐	☐
Pretzels	☐	☐	☐	☐	☐
Potato chips	☐	☐	☐	☐	☐
Peanuts/ mixed nuts	☐	☐	☐	☐	☐
Sausage	☐	☐	☐	☐	☐
Bacon	☐	☐	☐	☐	☐
Eggs	☐	☐	☐	☐	☐
Fish	☐	☐	☐	☐	☐
Chicken	☐	☐	☐	☐	☐
Hot dogs or burgers	☐	☐	☐	☐	☐
Beans	☐	☐	☐	☐	☐
Cookies	☐	☐	☐	☐	☐
Popcorn	☐	☐	☐	☐	☐
Pie	☐	☐	☐	☐	☐

© 2016 URJP at UCLA / urjp.psych.ucla.edu

Appendix B

Perceived Stress Scale

	Never	Almost Never	Sometimes	Fairly Often	Very Often
How often have you been upset because of something that happened unexpectedly?	☐	☐	☐	☐	☐
How often have you felt that you were unable to control the important things in your life?	☐	☐	☐	☐	☐
How often have you felt nervous and stressed?	☐	☐	☐	☐	☐
How often have you dealt successfully with irritating life hassles?	☐	☐	☐	☐	☐
How often have you felt that you were effectively coping with important changes that were coming in your life?	☐	☐	☐	☐	☐
How often have you felt confident about your ability to handle your personal problems?	☐	☐	☐	☐	☐
How often have you felt that things were going your way?	☐	☐	☐	☐	☐
How often have you found that you could not cope with all the things you had to do?	☐	☐	☐	☐	☐
How often have you been able to control irritations in your life?	☐	☐	☐	☐	☐
How often have you felt that you were "on top of things?"	☐	☐	☐	☐	☐
How often have you been able to control the way you spend your time?	☐	☐	☐	☐	☐
How often have you found yourself thinking about things that you have to do?	☐	☐	☐	☐	☐
How often have you been angered because of things that happened that were outside of your control?	☐	☐	☐	☐	☐
How often have you felt difficulties were piling up so high that you could not overcome them?	☐	☐	☐	☐	☐

Appendix C

Self-Rated Health Measure (Extracted from the Measurement of Physical Health)

Health Aspect	Question
Energy	Would you say that you have more or less energy than most people your age? 1 Less 2 About the same 3 More
Exercise	On average, how much exercise do you get? 1 I hardly get any exercise 2 I get some exercise, but not a lot 3 I exercise an average amount 4 I get a lot of exercise
General Health	How would you rate your general health status? 1 Excellent 2 Good 3 Reasonable 4 Poor
Previous Health	How would you rate your present health status compared to five years ago? 1 Better 2 About the same 3 Worse
Health Limits	Do you think your health prevents you from doing things you would like to do? 1 Not at all 2 Partly 3 To a great extent
Health Comparison	How would you rate your health status compared to others in your age group? 1 Better 2 About the same 3 Worse
Future Health	Looking ahead five years into the future, what do you expect your health will be like at that time? 1 Better 2 About the same 3 Worse

Editors: Vincent Nguyen, Julia Yi, and Cindy Xiong
Graduate Student Mentor: Natsuki Atagi

Author Note: This research was supported in part by the National Institute of Aging. The Notre Dame Study of Health & Well-being is supported by a grant from the National Institute of Aging (1 R01 AG023571-A1- 01; PI: CS Bergeman).
Special thanks to Cindy Bergeman, Ph.D. and the University of Notre Dame.
Correspondence concerning this article should be addressed to Arianna Ulloa, 8586 Key Biscayne Dr., Apt. 203, Tampa, FL 33614.
Contact: ariulloa@sas.upenn.edu

© 2016 URJP at UCLA / urjp.psych.ucla.edu

©URJP 2016