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## CONTENTS

- 1 THE FOUNDATIONAL PRINCIPLES AS PSYCHOLOGICAL  
LODESTARS: THEORETICAL INSPIRATION AND EMPIRICAL  
DIRECTION IN REHABILITATION PSYCHOLOGY**  
*Rehabilitation Psychology*  
February 2016  
by Dana S. Dunn, Dawn M. Ehde, and Stephen T. Wegener
  
  - 7 FEELING OLDER AND RISK OF HOSPITALIZATION:  
EVIDENCE FROM THREE LONGITUDINAL COHORTS**  
*Health Psychology*  
Online First Publication — February 11, 2016  
by Yannick Stephan, Angelina R. Sutin, and Antonio Terracciano
  
  - 11 SPECIAL ISSUE ON eHEALTH AND mHEALTH:  
CHALLENGES AND FUTURE DIRECTIONS FOR ASSESSMENT,  
TREATMENT, AND DISSEMINATION**  
*Health Psychology*  
December 2015  
by Belinda Borrelli and Lee M. Ritterband
  
  - 15 RACIAL AND SEXUAL MINORITY WOMEN'S RECEIPT OF MEDICAL  
ASSISTANCE TO BECOME PREGNANT**  
*Health Psychology*  
June 2015  
by Bernadette V. Blanchfield and Charlotte J. Patterson
  
  - 24 A PROSPECTIVE STUDY OF ADOLESCENTS' NONMEDICAL  
USE OF ANXIOLYTIC AND SLEEP MEDICATION**  
*Psychology of Addictive Behaviors*  
March 2015  
by Carol J. Boyd, Elizabeth Austic, Quyen Epstein-Ngo, Philip T. Veliz,  
and Sean Esteban McCabe
  
  - 32 CANNABIS USE HISTORY AND CHARACTERISTICS OF QUIT  
ATTEMPTS: A COMPARISON STUDY OF TREATMENT-SEEKING  
AND NON-TREATMENT-SEEKING CANNABIS USERS**  
*Experimental and Clinical Psychopharmacology*  
December 2014  
by Lauren R. Pacek and Ryan Vandrey
-

**39 THE TEEN SLEEP LOSS EPIDEMIC: WHAT CAN BE DONE?**

*Translational Issues in Psychological Science*

March 2015

by Natalie B. Bryant and Rebecca L. Gómez

**49 RESILIENCE IN THE STUDY OF MINORITY STRESS AND  
HEALTH OF SEXUAL AND GENDER MINORITIES**

*Psychology of Sexual Orientation and Gender Diversity*

September 2015

by Ilan H. Meyer

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# The Foundational Principles as Psychological Lodestars: Theoretical Inspiration and Empirical Direction in Rehabilitation Psychology

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Historically, the Foundational Principles articulated by Wright (1983) and others guided theory development, research and scholarship, and practice in rehabilitation psychology. In recent decades, these principles have become more implicit and less explicit or expressive in the writings and work of rehabilitation professionals. We believe that the Foundational Principles are essential lodestars for working with people with disabilities that can guide inquiry, practice, and service. To introduce this special issues, this commentary identifies and defines key Foundational Principles, including, for example, Lewin's (1935) person–environment relation, adjustment to disability, the malleability of self-perceptions of bodily states, and the importance of promoting dignity for people with disabilities. We then consider the role the Foundational Principles play in the articles appearing in this special issue. We close by considering some new principles and their potential utility in rehabilitation settings. Readers in rehabilitation psychology and aligned areas (e.g., social–personality psychology, health psychology, rehabilitation therapist, psychiatry, and nursing) are encouraged to consider how the Foundational Principles underlie and can shape their research and practice.

*Keywords:* adjustment to disability, foundational principles, person–environment relation, psychosocial assets, value-laden principles

A lodestar is something, or someone, that provides guidance or inspiration, particularly to a group of people. The term is an apt one for our “Foundational Principles”, based on Beatrice Wright's (1983) and other leader's classic works, which guide the empirical research, theory, and practice in rehabilitation psychology. Rehabilitation psychology is concerned with the psychological, biological, social, environmental, and political factors that influence the lives and well-being of people with disabilities or chronic health conditions. The goal of this article is to review these Foundational Principles and their importance to science and practice to provide a framework for the articles that comprise this special section of *Rehabilitation Psychology*.

Why dedicate a special section to the Foundational Principles? The primary reason is concern among members of the rehabilitation psychology community that the importance and utility of the Principles is being overlooked as the discipline advances. New and

future rehabilitation psychologists may be unaware of the Principles and the rich empirical, theoretical, and practice heritage they represent. As evidence, consider Ryan and Tree's (2004) survey of the American Board of Professional Psychology Diplomates in rehabilitation psychology regarding the field's essential list of books. Of the 167 books listed, only six met the study's inclusion criteria and were endorsed by 20% of the respondents. None of these books appeared before 1987, nor did any explicitly emphasize the Foundational Principles, though one, the *Handbook of Rehabilitation Psychology* edited by Frank and Elliott (2000), did allude to the Principles and related constructs within some chapters (see also Frank, Caplan, & Rosenthal, 2010).

Notably absent from the list was Wright's (1983) *Physical Disability: A Psychosocial Approach*, a classic text that specifically advocated for the Foundational Principles in research, educational, and practice settings (see also Dunn & Elliott, 2005). Indeed, Wright (1972) also championed what are known as the value-laden beliefs and principles for rehabilitation psychology, which were designed to aid researchers and practitioners as they work on behalf of clients with disabilities and their families (the 20 beliefs and principles also appear in Wright, 1983).

We believe that this is a propitious time for rehabilitation psychologists to revisit the Foundational Principles and to consider whether they can inform theory development, research, education, and practice now, in the 21st century. In fact, it is quite possible

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that other principles have emerged as rehabilitation psychology has grown as a subfield. If so, these heretofore-implicit principles should be made explicit and added to those that represent the best theoretical and clinical traditions of rehabilitation psychology. Further, by highlighting the Principles, we hope to provide a resource for those colleagues who work in rehabilitation sciences, disability studies, health services research, and health policy. We now turn to the Foundational Principles.

### Leveraging the Foundational Principles

As the subfield's lodestars, the Foundational Principles are meant to represent more than an abstract or aspirational philosophy. Instead, rehabilitation professionals should consciously and intentionally rely on them in research, practice, and therapeutic settings, doing so to achieve the most favorable outcomes for clients or colleagues with disabilities or other chronic health conditions. Table 1 lists the core Foundational Principles of rehabilitation psychology, each of which will be reviewed in turn.

### The Person–Environment Relation

Social psychologist Kurt Lewin's (1935) seminal contribution to the larger discipline was to recognize that numerous factors in social situations routinely override the impact of person factors, including personality or other dispositional variables. Lewin (1948/1997) pointed out that the ways that people perceive their social and physical environments (also referred to as the *situation*) has a decided influence on both their behavior and subjective experiences. Although both personal and situational factors are important independently, Lewin (1935) posited that the interaction between the two is actually what produces behavior. Lewin (1935) offered a quasi-mathematical formula to explain his view:  $B = f(P, E)$ , or behavior is a function of the person and his or her perceived environment.

Lewin's students, including Tamara Dembo and Beatrice Wright, among others, applied the person–environment relation broadly to the arena of disability. Consider someone with a physical disability who uses a wheelchair to navigate daily life. This individual likely frequently confronts barriers in building (lack of

ramps outside, or elevators inside, older structures) and obstacles in the environment (missing curb cuts, uneven sections of sidewalk) that impede her speed, progress, and even access to places she needs to be. As the person in the situation, she knows that it is not her disability that affects her behavior—it is the situation in which she sometimes finds herself, one generally designed for able-bodied individuals rather than one with a universal design that will accommodate persons both with and without a disability.

At the same time, a casual observer might see this same woman in the wheelchair struggle to gain entry to a building. Instead of attributing her challenge to the situation, the observer is likely to assume the problem lies within her, as a result of her disability. As social psychologists construe it (e.g., Jones & Nisbett, 1971), actors (here, the woman in the wheelchair) look to the situation to explain their behavior (“There is no accessible entry here, so how am I going to get inside?”), whereas observers (the casual onlooker) focus on the actor (“She must really be unhappy or even angry; that disability must hold her back all the time”), thereby neglecting to consider the impact of various factors literally present in the environment. Indeed, the observer is apt to explain the actor's behavior by appealing to internal or even dispositional factors, rather than the external or situational ones that are largely responsible. When observers identify dispositions as being more powerful than the situation in their attributed explanations for others' behavior, they fall prey to the social psychological bias known as the *fundamental attribution error* (Ross, 1977).

For their part, rehabilitation psychologists have long recognized that the person–environment relation is a Foundational Principle that can be used to constructively consider and shape the opportunities for people with disabilities. It is conceptually linked to the next Principle, the insider–outsider distinction.

### The Insider–outsider Distinction

Attributionally speaking, we know that behavior engulfs the field of perception, so that observers routinely attribute the origin for behavior to the person rather than the situation. Dembo (1902–1993) added a further attributional concept related to both the person–environment relation and the actor–observer effect. Specifically, Dembo (1964, 1970, 1982) drew a distinction between

Table 1  
*Foundational Principles of Rehabilitation Psychology*

Principle	Definition
The Person–Environment Relation	Attributions about people with disabilities tend to focus on presumed dispositional rather than available situational characteristics. Environmental constraints usually matter more than personality factors to living with a disability.
The Insider–Outsider Distinction	People with disabilities ( <i>insiders</i> ) know what life with a chronic condition is like (e.g., sometimes challenging but usually manageable) whereas casual observers ( <i>outsiders</i> ) who lack relevant experience presume that disability is defining, all encompassing, and decidedly negative.
Adjustment to Disability	Coping with a disability or chronic illness is an ongoing dynamic process, one dependent on making constructive changes to the social and the physical environment.
Psychosocial Assets	People with disabilities possess or can acquire personal or psychological qualities that can ameliorate challenges posed by disability and also enrich daily living.
Self-Perception of Bodily States	Experience of bodily states (e.g., pain, fatigue, distress) is based on people's perceptions of the phenomena, not exclusively the actual sensations. Changing attitudes, expectations, or environmental conditions can constructively alter perceptions.
Human Dignity	Regardless of the source or severity of a disability or chronic health condition, all people deserve respect, encouragement, and to be treated with dignity.

individuals who have a disability or who receive some rehabilitation therapy (a group she termed *insiders*) and nondisabled observers (or *outsiders*) who imagine what a disability or some rehabilitation experience must be like. The insider–outsider distinction is important because outsiders often assume what a disability, whether congenital or acquired, *must be like*—and they frequently conclude that it is not only negative and disruptive to daily living but also defining for the individual with the disability. Disability, then, is not considered to be *one* quality among the myriad qualities of a person’s life; rather it is presumed to be an—and perhaps *the*—ongoing preoccupation for him or her. In contrast, insiders know what the experience of being disabled is like, that its presence does not necessarily predict (let alone preclude) quality of life or well-being. Instead, disability is one among many qualities of life (e.g., mental health, stress, physical health, career, hobbies, role in the home or community; [Duggan & Dijkers, 2001](#)) that becomes a focus of the affected individual only when it is made salient by others (outsiders) or situational constraints. In point of fact, a disability can be part of a person’s identity, which means it is a positive rather than a negative quality (e.g., [Dunn, 2015](#)).

As part of their training, rehabilitation psychologists learn not to *essentialize* disability, that is, to see a physical, cognitive, emotional, or other disability as the defining or essential feature of a person. Simply put, the presence of a disability should not be used to categorize people so that this one feature supersedes all other aspects of an individual ([Bloom, 2010](#); [Dunn, Fisher, & Beard, 2013](#)). If a disability did override all other aspects of the person, then adjusting to it would hardly seem possible.

### Adjustment to Disability

When crafting psychosocial terms to refer to how newly disabled people cope with their conditions, rehabilitation psychology strives to be specific. The term *adaptation*, for example, entails how people with acquired disabilities understand and how the psychological and physical changes are gradually integrated into their identities, body images, and daily living. Adaptation, then, is an active somatopsychological process experienced by those with acute disabilities as they move toward an idealized state known as *adjustment* ([Livneh & Antonak, 1997](#); [Smedana, Bakken-Gillen, & Dalton, 2009](#)). Adjustment, in turn, occurs once individuals are satisfied with and accepting of their own person–environment relations, so that any physical or psychological losses or changes do not represent preoccupations (however, this perspective is not shared universally; see, e.g., [Olkin, 1999](#)). Thus, after disabling events, adjustment occurs when people adopt constructive perspectives on their abilities and what can be accomplished in the future ([Wright, 1983](#)). Other markers of adjustment include

- being independent, having problem-solving skills for daily living;
- possessing a sense of personal mastery;
- being able to navigate social and physical environments; and
- developing and maintaining a positive self-concept.

As descriptive models, the linked processes of adaptation and adjustment to disability imply that not all people with disabilities become equally accustomed to their conditions; some will fare better than others. [Wright \(1983\)](#) introduced a third process called

*acceptance* into the general discussion of adjusting to an acquired disability. An individual with a disability displays acceptance when the disability does not reduce his or her self-worth or future outlook, thereby representing a realistic appraisal of the circumstances accompanied by positive efforts and attention to available assets.

### Psychosocial Assets

[Wright \(1983\)](#) believed that regardless of how severe a disability might be, every person with a disability should be seen as possessing or being capable of developing some psychosocial *asset* or set of assets. In this principle, Wright was an early contributor to the field of positive psychology, which emphasizes the importance of positive factors in theory and practice. This Foundational Principle highlights the potential array of resources that are distinctive in each person and can be a point of pride during or after a rehabilitation experience. Rehabilitation psychologists should inquire about a person’s assets or strengths for individuation purposes and to encourage maintaining and/or developing positive perspectives for the future.

An asset can be tangible (e.g., income) or intangible (e.g., self-concept), linked to personality (e.g., sense of humor, resilience), attainable or already achieved (e.g., degree, awards), or even a motivational quality (e.g., self-discipline) or an outside interest or esoteric hobby (e.g., coin collecting, memorizing baseball scores or team rosters). Thus, an asset can remind people with a disability about what they have accomplished or are capable of doing in the future, as well as what skills can be learned or even relearned in the face of bodily changes or injuries (for a broader discussion of assets, including additional examples, see [Dunn, 2015](#)).

### Self-Perception of Bodily States

Research in both social psychology and rehabilitation psychology has indicated that subjective perceptions often determine how people think, feel, and act (e.g., [Wegner & Gilbert, 2000](#)). The attribution literature is rife with studies demonstrating that we do not see reality from a veridical perspective, rather, our perceptions of our reality (or the reality of others) are tempered, even biased, by our expectations, stereotypes, and past experiences (e.g., [Fiske & Taylor, 2013](#)). Within rehabilitation psychology, practitioners know that the experience of particular bodily states, such as pain or fatigue, is based on individuals’ and others’ self-perceptions of the phenomena and not only the actual sensations (e.g., [Fordyce, 1976, 1984](#); [Mann, Keefe, Jensen, Vlaeyen, & Vowles, 2015](#)). People’s perceptions and, in turn, their behaviors are malleable, so they can be influenced or altered in adaptive or maladaptive directions on the basis of attitudes (their own and those of observers, including health care providers), expectations (their own or those offered by family, friends, and medical staff), and environmental reinforcement (physical, social, and psychological). The influence of psychosocial factors on the perception of bodily states does not negate the validity of the individuals’ experience or pathologize their response. Naturally, rehabilitation researchers and practitioners work to encourage clients’ perceptions in positive directions that promote adjustment to disability and a beneficial person–environment relation emphasizing their individual worth.



## Human Dignity

No matter its severity, any form of disability—physical, intellectual, cognitive, or other—or the presence of some chronic illness has no bearing on an individual’s right to be respected, encouraged, and treated as a person. As Wright (1987, p. 12) expressed it, “An essential core-concept of human dignity is that a person is not an object, not a thing.” Indeed, Wright (1983, pp. x–xxvi) created a list of 20 “value-laden beliefs and principles” aimed at promoting rehabilitation research, practice, and services for people with disabilities (see also Wright, 1972). In the main, these beliefs and principles capture the spirit of the Foundational Principles, and we encourage rehabilitation psychologists to either reacquaint or familiarize themselves with these additional principles. A particular focus of the value-laden beliefs and principles is the desirable development of therapeutic alliances between clients and their health care givers, thereby promoting comanagement rather than a traditional professional–patient hierarchy. We see in these value-laden beliefs and principles the seeds of the current emphasis on patient-centered care, self-management programs, and the active engagement of persons with chronic health conditions in their care.

## Foundational Principles in Action

The Foundational Principles have served generations of rehabilitation psychologists well. How are they currently being used in research and practice? To explore the current role of the Principles, we provide an overview of this special section of *Rehabilitation Psychology* to look at how authors have been guided by their application across the entire range of rehabilitation psychology in clinical practice, theoretical research, education and training, and public health. These articles demonstrate, to paraphrase Kurt Lewin, “there is nothing so useful as a good set of Foundational Principles.”

Nierenberg et al. (2016) remind us the burgeoning focus on positive psychology is grounded in the Foundational Principle indicating the need to be mindful of an individual’s *psychological assets* in addition to any impairments that may be present. They argue that rather than understanding the distress that can accompany disability solely as the presence of psychopathology, it can be understood from a positive psychology standpoint as a deficit of well-being. They go on to describe how treatment can be guided by a focus on assisting in the development of a sense of well-being rather than ameliorating pathology, echoing the principle that *adjustment to disability* is a dynamic process that involves making constructive changes. Building on and integrating the foundational work of Fordyce (1976) and Wright (1983), Alschuler, Kratz, and Ehde (2016) present a study that identifies the independent contribution of vulnerability factors and resilience factors to pain-related outcomes among individuals with spinal cord injury, amputation, or multiple sclerosis and chronic pain. Their findings also support the importance of including Psychological Assets in our theoretical models and clinical approaches. Their results suggest that both resilience and vulnerability factors are critical to understanding pain outcomes, noting that resilience factors uniquely impact specific outcomes—particularly those that are more psychosocially focused. This article utilizes data from persons with disabilities (PwDs) who have received cognitive-behavioral therapy–based treatment, which is guided by the principle that

*self-perception of bodily states* is influenced by attitudes, expectations, or environmental conditions.

Continuing the emphasis on the importance of the individuals’ perceptions, *adjustment to disability* and the importance of *psychological assets*, Monden, Trost, Scott, Bogart, and Driver (2016) provide a review of the impact of injustice appraisals on physical and psychological outcomes after injury. Guided by these principles, the authors cite literature that has suggested that by attending to appraisals of injustice, rehabilitation psychologists can better understand, and work with, PwDs. Perhaps more important, by attending to the Foundational Principle of Fundamental Negative Bias, one may reconsider injustice appraisals, which are usually construed as an intrapersonal variable, as a reflection of repeated and ongoing injustices in the social and physical environment.

Two articles explore the role of the Foundational Principles in education and training. Tackett, Nash, Stucky, and Nierenberg (2016) describe how the Principles can guide clinical supervision in rehabilitation psychology. They emphasize the importance of values clarification—on the basis of the Principle of Human Dignity—and that rehabilitation psychologists need to *explicitly* incorporate foundational principles into the process and content of supervision. The authors take a clinical approach, presenting several case presentations and how the Principles can be used to guide the supervision interaction and be reflected in the clinical care of the trainee. Stiers (2016) expands the focus to broader education in rehabilitation psychology. He groups Wright’s Foundational Principles into three categories: individual psychological processes, social psychological processes, and values related to social integration, reflecting the key education topics. He then goes on to review the literature supporting the inclusion of the Principles in each category and provides the key points for teaching, suggested readings, discussion questions, and specific suggestions for teaching methods.

The final two articles look at the application of the Foundational Principles as they inform the WHO *International Classification of Functioning, Disability and Health* (ICF; 2011) and rehabilitation psychology in public health. Sánchez, Rosenthal, Tansey, Frain, and Bezyak (2016) remind us that the ICF is rooted in Principle that person and environmental variables interact to determine participation and quality of life (QoL). They investigate the ICF model in persons with serious mental illness and report that after controlling for other factors, environmental variables of social support and societal stigma are key factors in predicting QoL, confirming the ICF model and reinforcing the value of the Person–Environment principle in shaping theory and understanding outcomes in rehabilitation. Bentley, Bruyère, LeBlanc, and MacLachlan (2016) apply the Principles to global health issues as outlined in the *World Report on Disability* (World Health Organization & World Bank, 2011). They assert that the principles of person–environment interaction, importance of social context, and need for involvement of persons with disabilities can guide rehabilitation psychology as we embrace global health demands. It is clear in reading the recommendations from the World Report on Disability (World Health Organization & World Bank, 2011), the task force writers were, at least implicitly, guided by our Foundational Principles.



## Lodestars for Rehabilitation Psychology's Future?

Are there any new or emerging foundational principles to guide rehabilitation psychology? One new principle may be the evolving language for disability and its role in promoting cultural competence regarding disability. In the psychological community, the idea of cultural competence for psychologists refers to acquiring skills for understanding, appreciating, respecting, and interacting with people whose beliefs and experiences are different from one's own due to a diverse array of factors (e.g., race, ethnicity, social class), including the presence of a disability or chronic health condition. Recently, [Dunn and Andrews \(2015\)](#) suggested that to develop cultural competence regarding disability, psychologists should adopt identity-first language alongside person-first constructions when interacting with people with disabilities. For example, interchangeably using *person with a disability* and *disabled person*, or *people with diabetes* and *diabetics*, can help to address the concerns of disability groups while promoting human dignity as well as scientific and professional rigor.

Although the American Psychological Association (APA) has championed person-first language for disability (and sometimes membership in other minority groups), particularly where writing and speaking are concerned ([APA, 2010](#)), advocates of disability culture and disability studies have challenged both the rationale for, and implications of, exclusive use of person-first constructions. Instead, they suggest also using identity-first language, which treats disability as a function of political and social forces that occur within circumstances that are largely designed for nondisabled people. Identity-first language has the advantage of being linked to disability culture, thereby encouraging

connection, camaraderie, and shared purpose among the diverse range of people with disabilities; it entails pride in being associated with the largest minority group in the United States, as well as motivation to positively and constructively address . . . social, political, and economic needs. ([Dunn & Andrews, 2015](#), p. 5)

With time and when used in appropriate contexts, identity-first language may well be recognized as a new Foundational Principle or at least as a clarifying extension of person-first language.

Another emerging paradigm that has its roots in the Foundational Principles is the inclusion of stakeholders in the rehabilitation research enterprise. *Participatory action research* ([White, Nary, & Froehlich, 2001](#); [White, Suchowierska, & Campbell, 2004](#)), *community-based participatory research* ([Agency for Healthcare Research and Quality, 2004](#)), and, more recently, *stakeholder engagement* ([Selby, Forsythe, & Sox, 2015](#)) are some of the terms that have been used to describe the practice of engaging people with, and affected by, impairments as equal, authentic partners in all aspects of the research enterprise, including designing, conducting, implementing, and disseminating research. Earlier in our field's history various rehabilitation scholars—including [Tamara Dembo \(1964\)](#) and [Rhoda Olkin \(1999\)](#)—and agencies, most notably the National Institute on Disability and Rehabilitation Research (now the National Institute on Disability, Independent Living, and Rehabilitation Research), have emphasized the importance of the insider perspective in rehabilitation research. However, the integration of stakeholders has not become common practice in

the rehabilitation research environment ([Ehde et al., 2013](#)). The Patient-Centered Outcomes Research Institute (PCORI), established by the U.S. Congress in 2010 to fund comparative clinical effectiveness research, has brought considerable attention to the necessity of engaging stakeholders in clinical research by requiring PCORI-funded research to be stakeholder-driven across all stages of research ([Selby et al., 2015](#)). PCORI provides methodological guidelines for stakeholder engagement in research ([PCORI, 2015](#)) that may guide rehabilitation psychology research and inform this foundational principle of inclusion.

## Looking Ahead

The Foundational Principles play an important role in the history of rehabilitation psychology, as they have guided theory development, scholarly inquiry, and informed practice. But their true value lies in the manner in which they inform our current and future work as rehabilitation psychologists and lead to improved QoL for people with disabilities. We are grateful to the authors in this special section for demonstrating the continuing utility of the Principles as lodestars for research, training, and clinical practice in rehabilitation psychology. We trust that their work will encourage readers to incorporate the Foundational Principles into their own science, teaching, and practice. By doing so, the Principles will continue to guide developments in and advance the cause of rehabilitation psychology.

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# Feeling Older and Risk of Hospitalization: Evidence From Three Longitudinal Cohorts

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**Objective:** Subjective age is a biopsychosocial marker of aging with a range of health-related implications. Using 3 longitudinal samples, this study examined whether subjective age predicts hospitalization among older adults. **Method:** Participants were adults aged from 24 to 102 years old, drawn from the 1995–1996 and 2004–2005 waves of the Midlife in the United States Survey (MIDUS,  $N = 3209$ ), the 2008 and 2012 waves of the Health and Retirement Study (HRS,  $N = 3779$ ), and the 2011 and 2013 waves of the National Health and Aging Trends Study (NHATS,  $N = 3418$ ). In each sample, subjective age and covariates were assessed at baseline and hospitalization was assessed at follow-up. **Results:** Consistent across the 3 samples, participants who felt subjectively older at baseline had an increased likelihood of hospitalization (combined effect size: 1.17, 95% CI 1.11–1.23), controlling for age, sex, race, and education. Further adjusting for disease burden and depression reduced the magnitude of the association between subjective age and hospitalization in the 3 samples, but it remained significant in the MIDUS and HRS. **Conclusion:** This study provides consistent evidence that subjective age predicts incident hospitalization. Subjective age assessment can help identify individuals at greater risk of hospitalization, who may benefit from prevention and intervention efforts.

*Keywords:* depressive symptoms, disease burden, hospitalization, subjective age

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Hospitalization in old age is a significant life event with a range of adverse outcomes. Hospitalization accelerates disability in activities of daily living and declines in function (Zisberg, Shadmi, Gur-Yaish, Tonkikh, & Sinoff, 2015) as well as cognition (Wilson et al., 2012). Such hospitalization-related declines could lead to rehospitalization (Jencks, Williams, & Coleman, 2009), precipitate nursing home placement (Goodwin, Howrey, Zhang, & Kuo, 2011), and culminate in higher mortality risk (Sleiman et al., 2009). Therefore, beyond poor health, identifying the factors that contribute to older adults' risk of hospitalization is critical to prevent these adverse consequences and the substantial cost of health care service utilization. The present study examined whether individuals' subjective age, which refers to how old or young they feel relative to their chronological age, could be one risk factor for hospitalization.

Subjective age is a novel biopsychosocial marker of aging that is associated with a range of health-related outcomes, independent of chronological age. Specifically, feeling older than one's age is related to increased risk of depression (Choi & DiNitto, 2014), higher disease burden (Demakakos, Gjonca, & Nazroo, 2007), systemic inflammation (Stephan, Sutin, & Terracciano, 2015a), and faster cognitive decline (Stephan, Sutin, Caudroit, & Terracciano, in press). In addition, an older subjective age has been related to premature mortality (Kotter-Grühn, Kleinspehn-Ammerlahn, Gerstorf, & Smith, 2009). Furthermore, subjective age is sensitive to the biological aging of critical body systems that are involved in health and functioning (Stephan, Sutin, & Terracciano, 2015b). In particular, markers of better muscular and pulmonary function, and lower adiposity are reflected in a younger subjective age (Stephan et al., 2015b). Therefore, subjective age shows promise as an indicator of individuals at risk for worsening health leading to hospitalization. However, despite existing evidence for the health-related outcomes of subjective age, no study has yet tested whether it contributes to risk of hospitalization.

Using data from three large longitudinal cohorts that differed in age and time of assessment, the present study tested the hypothesis that an older subjective age is prospectively associated with an increased risk of incident hospitalization. In addition, the study tested the extent to which chronic conditions and depressive symptoms accounted for this association.

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## Method

### Participants

Participants were drawn from the Midlife in the United States Survey (MIDUS), the Health and Retirement Study (HRS), and the National Health and Aging Trends Study (NHATS). All participants provided informed consent for participation. The analytic sample included individuals who provided complete data on the variables of interest at baseline and follow-up. At baseline, individuals with a recent history of hospitalization, that is in the past 12 months for the MIDUS ( $N = 359$ ) and the NHATS ( $N = 919$ ), and the last two years in the HRS ( $N = 1,281$ ), were excluded from the primary analyses.

The MIDUS is a national survey of noninstitutionalized English-speaking adults. The MIDUS I study was supported by the John D. and Catherine T. MacArthur Foundation Research Network on Successful Midlife Development, and the MIDUS II was supported by a grant from the National Institute on Aging (P01-AG020166). The first (1995–1996, MIDUS I) and the second (2004–2005) waves were used in the present study. The MIDUS survey complied with institutional review board standards of the University of Wisconsin and of the Harvard Medical School. Data from 3209 participants aged from 24 to 75 years (46% male, Mean age = 47.22,  $SD = 12.22$ ) were analyzed. The HRS is a nationally representative longitudinal study of Americans aged 50 and older and their spouses. The HRS is sponsored by the National Institute of Aging (Grant No. NIA U01AG009740) and conducted by the University of Michigan. Data from the 2008 and 2012 waves were used, leaving a sample of 3779 participants with complete data (39% male, mean age = 67.63,  $SD = 9.05$ , age range = 50–96 years). The NHATS is a nationally representative prospective cohort study of Medicare enrollees aged 65 years and older. NHATS is funded by the National Institute on Aging (NIA-U01AG032947) and conducted by the Johns Hopkins Bloomberg School of Public Health. For the present study, data from the 2011 and 2013 waves were analyzed. Complete data were obtained from 3418 participants (42% male, mean age = 76.47,  $SD = 7.36$ , age range = 65–102 years). Attrition analyses for the three samples are reported in online supplemental material.

### Measures

**Subjective age.** In the three samples, participants were asked to specify, in years, how old they felt. Consistent with previous research (Stephan et al., 2015), proportional discrepancy scores were calculated by subtracting chronological age from felt age, divided by chronological age. A positive value indicated an older subjective age. Responses three standard deviations above or below the mean were considered outliers and were excluded (Stephan et al., 2015). Based on this criteria 40 participants from MIDUS, 64 from HRS, and 51 from NHATS were excluded.

**Hospitalization.** At follow-up, MIDUS participants were asked how many times they had been hospitalized overnight in the last 12 months. The number of hospitalization was converted to a dichotomous variable of hospitalized versus not hospitalized. HRS and NHATS participants were asked whether they had an overnight hospital stay (yes/no) in the last two years and 12 months, respectively.

**Covariates.** In line with existing research on the prediction of hospitalization (Wilson et al., 2014), age (in years), sex (coded as 1 for men and 0 for women), race (coded as 1 for white and 0 for other), and educational level were included as demographic covariates given their association with the risk of hospitalization. Educational level was reported in years in the HRS. In MIDUS, education was reported on a scale composed of 12 intervals corresponding to sequential educational milestones, ranging from 1 (*no grade school*) to 12 (*doctoral level degree*). In the NHATS, the scale ranged from 1 (*No schooling completed*) to 9 (*Master's, professional or doctoral degree*). In addition, disease burden and depression were included to examine whether poor physical and psychological health could account for the association between subjective age and hospitalization. In the three samples, the sum of diagnosed conditions (i.e., high blood pressure, diabetes, cancer, lung disease, heart condition, stroke, osteoporosis or arthritis) was computed to obtain a measure of disease burden. Depressive symptoms were assessed with the Composite International Diagnostic Interview Short Form scales (CIDI-SF; score ranging from 0 to 7; Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998) in the MIDUS, an 8-item version of the Centers for Epidemiologic Research Depression (CES-D; score ranging from 0 to 8; Wallace et al., 2000) in the HRS, and the Patient Health Questionnaire-2 (PHQ-2; score ranging from 1 to 4; Kroenke, Spitzer, & Williams, 2003) in the NHATS.

### Data Analysis

In each sample, logistic regressions were used to examine the association between subjective age at baseline and risk of hospitalization at follow-up. The baseline model tested the association between subjective age and hospitalization, controlling for age, sex, education, and ethnicity. In the second model, depressive symptoms and disease burden were added. The odds ratios from the three samples were combined using a random model meta-analysis with the comprehensive meta-analysis software.

## Results

Descriptive statistics for the three samples, including the rate of hospitalization at follow-up, are presented in Table 1. Supplemental

Table 1  
*Baseline Characteristics of the Samples*

Variable	MIDUS		HRS		NHATS	
	<i>M</i> %	<i>SD</i>	<i>M</i> %	<i>SD</i>	<i>M</i> %	<i>SD</i>
Age (years)	47.22	12.22	67.63	9.05	76.47	7.36
Sex (% male)	46%	—	39%	—	42%	—
Race (% white)	94%	—	85%	—	77%	—
Education	7.24	2.47	12.87	3.00	5.34	2.25
Subjective age	-.16	.15	-.17	.15	-.17	.16
Depressive symptoms	.63	1.73	1.13	1.75	1.41	.62
Disease burden	2.18	2.22	1.76	1.20	2.32	1.47
Hospitalization (% hospitalized)	13%	—	24%	—	22%	—

*Note.* MIDUS:  $N = 3209$ ; HRS:  $N = 3779$ ; NHATS:  $N = 3418$ . Education, depression, disease burden, and hospitalization were assessed using different methods in the three samples (see Method).



Table 2  
*Logistic Regression Predicting Follow-Up Hospitalization From Baseline Subjective Age*

Predictor	MIDUS		HRS		NHATS	
	Model 1 Odds ratio (95% CI)	Model 2 Odds ratio (95% CI)	Model 1 Odds ratio (95% CI)	Model 2 Odds ratio (95% CI)	Model 1 Odds ratio (95% CI)	Model 2 Odds ratio (95% CI)
Age	1.04 (1.03–1.05)***	1.04 (1.03–1.05)***	1.04 (1.03–1.05)***	1.04 (1.03–1.05)***	1.03 (1.01–1.04)***	1.02 (1.01–1.04)***
Sex	.99 (.80–1.21)	1.05 (.85–1.31)	1.14 (.98–1.33)	1.15 (.98–1.35)	1.09 (.92–1.29)	1.18 (.99–1.40)
Race	.72 (.48–1.08)	.74 (.49–1.12)	1.08 (.87–1.35)	1.16 (.93–1.46)	.84 (.70–1.03)	.88 (.72–1.07)
Education	.87 (.78–.97)**	.89 (.80–.99)*	1.00 (.97–1.02)	1.01 (.98–1.04)	.87 (.80–.95)**	.91 (.84–1.00)*
Subjective age	1.24 (1.12–1.39)***	1.19 (1.06–1.33)**	1.17 (1.08–1.26)***	1.11 (1.02–1.20)*	1.12 (1.03–1.21)*	1.05 (.96–1.14)
Depression		1.08 (.98–1.20)		1.09 (1.01–1.18)*		1.15 (1.06–1.24)**
Disease burden		1.09 (1.05–1.14)***		1.28 (1.20–1.37)***		1.21 (1.14–1.28)***

Note. MIDUS:  $N = 3209$ ; HRS:  $N = 3779$ ; NHATS:  $N = 3418$ .

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

tal analysis revealed that prior experience of hospitalization was associated with an older subjective age at baseline in the MIDUS and the HRS but not in the NHATS (supplemental Table 1). In the three samples, participants who felt subjectively older at baseline had an increased likelihood of hospitalization, controlling for demographic covariates (see Table 2). Overall, the results suggested that for every standard deviation increase in an older subjective age (e.g., an increased tendency to feel older than one's age) at baseline, the risk of future hospitalization increased by 10% (NHATS) to almost 25% (MIDUS). A random effect meta-analysis of the three samples produced a combined effect size of 1.17 (95% CI: 1.11–1.23), with little variation across samples ( $Q = 2.30$ ,  $p = .32$ ,  $I^2 = 13$ ). The analyses were repeated without excluding individuals with recent hospitalizations at baseline, and revealed that the association between subjective age and future hospitalization persisted when controlling for prior hospitalization (supplemental Table 2). Adjusting for disease burden and depression reduced the magnitude of the association between subjective age and hospitalization in the three samples (see Table 2), but it remained significant in the MIDUS, the HRS, and the three samples combined (1.11, 95% CI: 1.04–1.18;  $Q = 3.01$ ,  $p = .22$ ,  $I^2 = 33$ ).

## Discussion

Using three large longitudinal cohorts of older adults, the present study tested whether subjective age is associated with hospitalization. As expected, the results revealed that an older subjective age predicted higher risk of incident hospitalization, independent of chronological age and other demographic factors. This association was consistent across the three samples and different time periods.

This study provides novel evidence that subjective age is a risk factor for hospitalization. The health and psychological correlates of subjective age may explain this association. Indeed, an older subjective age is predictive of worse physical and mental health (Choi & DiNitto, 2014; Demakakos et al., 2007), which may necessitate health service use. Additional analysis confirmed this assumption and revealed that disease burden and depressive symptoms accounted for part of the association between subjective age and hospitalization. Disease burden and depressive symptoms had a noticeable impact especially in the NHATS sample, which was the oldest of the three samples. There could also be other biolog-

ical pathways, in addition to diagnosed diseases, that explain this association. The higher inflammation associated with feeling older (Stephan et al., 2015a) increases vulnerability to acute conditions that require hospitalization. Subjective age is also sensitive to nonpathophysiological processes indicative of muscular, pulmonary, and metabolic functions (Stephan et al., 2015b) that are likely to convert to illness and health service use over time. Cognitive processes are also likely to operate. An older subjective age, for example, is associated with lower cognition and steeper cognitive decline (Stephan et al., 2015), which have recently been related to an increased rate of hospitalization (Wilson et al., 2014). Finally, individuals who feel older than their age are more likely to be sedentary (Stephan et al., 2015), which may amplify the risk of developing or worsening chronic conditions leading to hospital stay.

Taken as a whole, this study suggests that subjective age, with demographic, cognitive, behavioral, and health-related factors, could be a valuable tool to help identify individuals at risk of future hospitalization. Individuals with an older subjective age may benefit from standard interventions, for example through physical activity and exercise programs, which may reduce their risk of depression and chronic disease, and ultimately their hospitalization risk. In addition, such programs may also directly target subjective age. Indeed, it is likely that exercise and physical activity may promote a younger subjective age, by fostering its determinants such as respiratory and muscular functions, self-rated health, and positive affect (Stephan et al., 2015b). Successful activity programs may also challenge negative aging stereotypes and promote positive attitudes toward aging and youthful self-perceptions. Future research could test whether programs that promote a more active lifestyle have an impact on subjective age and ultimately on hospitalization risk.

The current study had several limitations that should be considered when interpreting the results. In the three samples, hospitalization was self-reported. Hospitalization is a significant event that should be recalled with some accuracy, but self-report biases are still possible. Future research is needed to replicate the present findings using Medicare claims among those aged 65 years and older. In addition, this study focused only on the predictive role of subjective age on hospitalization. Supplemental analyses did suggest that hospitalization may lead individuals to feel older; further research is needed to identify the reciprocal relations between

subjective age and hospitalization over time. Despite these limitations, this study provides new evidence that subjective age, a biopsychosocial marker of aging, is a consistent predictor of hospitalization across three large national samples of middle age and older adults.

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## INTRODUCTION

# Special Issue on eHealth and mHealth: Challenges and Future Directions for Assessment, Treatment, and Dissemination

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Health care costs continue to escalate while considerable challenges remain to improve health outcomes. The United States, in particular, has the highest health care costs and the poorest health outcomes compared to other countries (Murray & Frenk, 2010; World Health Organization, 2012). However, there is an unprecedented opportunity to utilize technologies to prevent, assess, inform, and treat health behaviors across large segments of the population never before thought imaginable. This is now made possible by the ubiquity of the Internet and mobile phones across the life span and across ethnic and income groups (Borrelli, Bartlett, Tooley, Armitage, & Wearden, 2015; Duggan, 2013; Fox & Rainie, 2014; International Telecommunication Union, 2014; Pew Research Center, 2014; Smith, 2011).

“eHealth” generally refers to the use of information technology, including the Internet, digital gaming, virtual reality, and robotics, in the promotion, prevention, treatment, and maintenance of health. “mHealth” refers to mobile and wireless applications, including text messaging, apps, wearable devices, remote sensing, and the use of social media such as Facebook and Twitter, in the delivery of health related services. These two areas encompass the preponderance of growth and tend to be used as the umbrella terms for the explosion of research currently being conducted at the intersection of technology and health psychology.

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This special issue focuses on the role of eHealth/mHealth in Health Psychology. There are many benefits of eHealth and mHealth interventions including their availability and accessibility (use anywhere, anytime), cost-effective delivery, scalability, ability to personalize and tailor content, capability to provide real-time strategies to users in their everyday settings, and capacity to calibrate intervention intensity to user’s needs (Kaplan & Stone, 2013). The proliferation of eHealth and mHealth has implications for the full spectrum of patient care, from prevention and health promotion through maintenance of health behavior change. eHealth and mHealth have implications for providers as well, in terms of their ability to interface with patients across a variety of platforms, ability to track patient change over time, receipt of anticipatory guidance in real time, and coordination of patient care across systems. Hospitals are also devising innovative ways to encourage eHealth and mHealth use. For example, a few hospitals have set up on-site digital health stores, in which patients, family members and medical professionals can learn about health apps and wearable devices and also purchase smartphone connected medical devices like weight scales and blood pressure cuffs (Comstock, 2015; Dolan, 2015). At one hospital in New Jersey (Dolan, 2015), physicians can now use a mobile app prescription pad that patients can take to the on-site store, where a member of the health IT team walks the patient through how to install and use the app. Whether or not these changes motivate and ultimately sustain behavior change remains an open question, but conceptually it makes sense to provide patients with interactive and individualized information during this period of heightened health awareness, when they might be more receptive to receiving this information (e.g., “teachable moment;” McBride, Emmons, & Lipkus, 2003).

Along with the many advantages of eHealth and mHealth technologies, there are also challenges, including the necessity for rigorous methods to help guide the development and evaluation of eHealth/mHealth interventions, the demand for sophisticated data-analytic processes to capture voluminous real-time data, the push for innovative interventions utilizing state-of-the-art technologies, and the need to address program specific issues such as user engagement with technologies over the short- and long-term. One key concern that has emerged is the lack of health behavior theory for most of the currently available technology-based interventions. For example, content

analyses of health apps have shown low levels of integration of health behavior theory (Azar et al., 2013; Crane, Garnett, Brown, West, & Michie, 2015). Research suggests that health interventions designed around health behavior theory are more effective in changing behavior than those which are not (Noar & Zimmerman, 2005; Zakarian et al., 2004). Lack of theory based technology interventions not only reduces the likelihood that an intervention will be effective, but also limits the ability to better understand possible mechanisms of change. Although some programs have incorporated elements of theory, it is the rare case that all theoretical constructs within a particular theory are targeted (Hale, Capra, & Bauer, 2015), and that valid measures were of theoretical constructs are utilized. It may be that the existing theories need to be revised to incorporate both the limitations and constraints as well as the creativity and wide reach of these technologies.

### Articles in the Special Issue

This special issue includes 11 articles that begin to address the need for more rigorous methodology, valid assessment, innovative interventions, and increased access to evidenced-based programs and interventions. Two articles focus predominantly on theory testing; one paper tests a video game physical activity intervention with and without health behavior theory features (Peng, Pfeiffer, Winn, Lin, & Sutton, 2015), whereas another utilizes multiple mediator analyses to examine the mechanisms of change of an Internet intervention that aims to improve work-related strain, including its effects on sleep (Ebert et al., 2015). A third paper integrates big data approaches, text analysis of online language, and psychological theory by testing whether future-oriented messages on Twitter are associated with lower HIV rates (Ireland, Schwartz, Ungar, Chen, & Albarracín, 2015).

The special issue also focuses on the development and optimization of intervention components. For example, several papers involve just-in-time adaptive interventions (JITAs), an innovative framework for developing interventions that adapt over time based on the situation of the user and/or user response, resulting in the provision of real-time intervention delivery and tailored support (Klasnja et al., 2015; Nahum-Shani, Hekler, & Spruijt-Metz, 2015; Thomas & Bond, 2015). These studies articulate the range of functionality of JITAs, offer ideas about how they can be best utilized to influence patterns of behavior, and describe methods for data analysis. Additionally, the results from the Thomas and Bond (2015) trial on reducing sedentary behavior in obese adults suggest how to design JITAs for maximum effect. Microrandomized trials are also highlighted in the special issue as a method to optimize the delivery of the most effective intervention components by modeling the causal effects for individual intervention components. An article by Stavrakakis and colleagues (2015) reports on the importance of real-time data collection, suggesting that group level data may mask important individual effects when examining the relationship between mood and physical activity.

Two other articles focus on user engagement. One describes the acceptability and preliminary behavioral outcomes from a pilot randomized controlled trial of a Web-based indoor tanning intervention (Stapleton et al., 2015). The other study, by Graham, Papandonatos, Erar, and Stanton (2015), addresses the vexing prob-

lem of how to analyze the effects of user engagement on outcomes given self-selection biases. The authors examined automated tracking metrics from a smoking cessation Internet intervention, assessing the effects of passive engagement (e.g., reading forum posts, viewing member profiles) and active engagement (e.g., writing posts, sending messages) on smoking cessation, using novel analytic approaches (propensity modeling) to account for selection bias.

The issue also includes two randomized, controlled pilot studies; one is an Internet-based physical activity intervention for women with a family history of breast cancer (Hartman et al., 2015) and the other is a trial of bidirectional text messaging for ART adherence among substance users with HIV (Ingersoll et al., 2015). Both trials are good examples of careful formative research and targeting theoretical mediators during intervention implementation.

Overall, the issue covers a range of targeted health behaviors (smoking cessation, substance abuse, physical activity, tanning, sleep, stress, medication adherence), across a variety of populations (depressed patients, women at risk for breast cancer, obese adults, young adults, HIV+) using a mix of platforms (Web based, text messaging, twitter, gaming). This highlights the growing areas of interest and emerging research to readers of Health Psychology who are interested in eHealth and mHealth.

One issue that is not addressed by the articles in the special issue is the challenge of dissemination of eHealth and mHealth interventions, particularly for health psychologists, the majority of whom need to collaborate with industry to build and implement eHealth and mHealth interventions. Commercialization has only recently begun to be seen by academics as a viable form of dissemination with considerable potential for widespread population reach. The process of commercialization, however, depends on many external factors including identifying a team of people with specialized skills (e.g., business, marketing, sales, management, and economics), and rapidly securing significant financial commitments for start-up. There may be a steep learning curve for health psychologists, with numerous new terms to absorb (e.g., bootstrapping, capitalization rate, liquidity, value proposition), negotiations to navigate (e.g., licensing, intellectual property, royalties), and important decisions to be made, such as what functions, if any, to serve in a commercial entity, and how to manage conflicting interests and multiple roles. The “health psychologist/entrepreneur” may be forced to step down as principal investigator of current grants, unable to have any contact with study participants, restricted from handling any data and conducting any analyses, and required to include other faculty to oversee compliance to new rules to ensure study integrity with ongoing evaluations of research activities. Despite these adjustments and compromises, the success rate of new startup companies is low (Griffith, 2014). However, the desire and aspiration of seeing one’s work come to fruition and be utilized by the target population in a significant and meaningful way—to be truly disseminated—may be worth the effort, energy, time and expense.

### Conclusion

This special issue is intended to promote a discussion of eHealth and mHealth and its connection with health psychology. It is our hope

that the “bench to bookshelf” trajectory (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012) that has plagued the majority of clinical research and treatment studies will not perpetuate with this new wave of eHealth and mHealth efforts. Creative methods are necessary to engage the target populations in the design, development, and implementation of these interventions. Innovative approaches are needed to promote cross-sector engagement for intervention adoption and sustainability. The realization that academicians and industry are dependent on one another’s skills to achieve these goals has led to increased collaboration. The academics are working to decrease the time that is required to create and test eHealth/mHealth applications without losing scientific integrity, for example, through the use of new methods (Klasnja et al., 2015; Mohr et al., 2015; Nahum-Shani et al., 2015). The commercial side is working to increase scientific rigor by involving behavioral scientists in their development and evaluation process without slowing down the pace of innovation. This unified, transdisciplinary approach will result in effective theory-based, empirically validated, and engaging applications that result in improved health.

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# Racial and Sexual Minority Women's Receipt of Medical Assistance to Become Pregnant

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**Objective:** This study aimed to determine rates at which racial minority (i.e., non-White) and sexual minority (i.e., lesbian and bisexual-identified) women in the United States receive medical help to become pregnant. Income and insurance coverage discrepancies were hypothesized to mediate differences in receipt of medical help as a function of race and sexual orientation. **Method:** Two studies compared rates at which adult women ages 21–44 reported receiving medical help to become pregnant as a function of race and sexual orientation, using data from 2 cycles of the National Survey of Family Growth (the 2002 wave in Study 1, and the 2006–2010 wave in Study 2). Mediation analyses controlling for age and education level evaluated whether race and sexual orientation were positively associated with receipt of medical pregnancy help, as mediated by insurance coverage and income. **Results:** Heterosexual White women reported receiving medical fertility assistance at nearly double the rates of women who identified as non-White, sexual minority, or both. Differences in rates of help received by White and non-White groups were only partially mediated by insurance coverage and income in both studies. Insurance and income discrepancies accounted for all differences between sexual minority and heterosexual women's receipt of pregnancy help in Study 1; insurance coverage alone explained differences in Study 2. **Conclusions:** Researchers often indicate that economic differences are responsible for health disparities between minority and majority groups, but this may not be the case for all women pursuing medical fertility assistance. Possible origins of these disparities are discussed.

**Keywords:** sexual minorities, racial minorities, reproduction, fertility, assisted reproductive technology

For many people, becoming a parent is a highly desired and anticipated life goal. More than 90% of adult women in the United States either have or report intending to have children (Chandra, Martinez, Mosher, Abma, & Jones, 2005). In 2002, more than 7 million women reported ever having used infertility services (Chandra & Stephen, 2010), and data from the U.S. Assisted Reproductive Technologies (ART) Surveillance System showed a 92% increase in procedures between 2000 and 2008 (Vahratian, 2008). Despite this increase in documented ART procedures, there is evidence that the percentage of women who have ever used fertility services has been on the decline (Vahratian, 2008). Infertility rates (defined by a year of unprotected intercourse not resulting in conception), however, have remained largely consistent over time (Bitler & Schmidt, 2006). Who are the women receiving this growing number of fertility services and, perhaps more criti-

cally, who are those not receiving medical help to become pregnant?

Research on health disparities in the United States has exposed important differences in access to and use of health care across minority groups (Institute of Medicine, 2006, 2011). Investigations of reproductive disparities have focused especially on differences between White and racial minority individuals. Pooled data from the 1982–2002 United States National Surveys of Family Growth (NSFG) found rates of infertility to be nearly 3 times higher among Black women (at 20%) and Hispanic women (18%) than White women (7%; Bitler & Schmidt, 2006). Despite these differences, 16% of White women reported receiving medical aid to become pregnant compared with fewer than 12% of Black and Hispanic women (Bitler & Schmidt, 2006).

Reasons for overrepresentation of White women in the use of medical fertility assistance despite their underrepresentation among women experiencing infertility issues are not yet clear. Some investigations reported that differences in age, marital status, and socioeconomic factors explained discrepancies in receiving fertility help (Chandra & Stephen, 2010; Staniec & Webb, 2007). Other work indicated that enabling conditions such as high levels of social support were more predictive than socioeconomic differences (Bitler & Schmidt, 2006). Socioeconomic status is clearly associated with receiving fertility assistance, but the magnitude of its influence in predicting women's use of medical fertility services is uncertain.

Evidence for disparities in reproductive assistance has given rise to the concept of "stratified reproduction," a framework recognizing the political, social, and economic structures that benefit

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some—particularly White women—and disadvantage others who want to have children (Colen, 1986, as cited in Greil, McQuillan, Shreffler, Johnson, & Slauson-Blevins, 2011). Discourse pathologizing underprivileged women’s family planning choices has historically been embedded in harmful ideologies of gender, race, and class (McCormack, 2005). Stratified reproductive frameworks can explain how such ideologies led to, for example, the racialized stereotype of “welfare mothers” in the late 1990s, a concept denigrating the lifestyles of poor Black and Hispanic women and perpetuating the “deservingness” of some women over others (Bell, 2009). Similarly, this explains why Medicaid (which serves low-income individuals) covers contraceptive but not infertility care (King & Meyer, 1997). Current policy debates surrounding rights of sexual minorities to marry and adopt children suggest that “deservingness” of parenthood for nonheterosexuals is contentious; sexuality may interact with gender, race, and class, contributing to reproductive care disparities. Furthermore, it is unclear whether shifting social climates may contribute to changing trends in fertility service use over time.

Whereas research on disparities as a function of racial group has received substantial attention, the topic of fertility among sexual minority women has been discussed less often. Historically, sexual minority individuals have faced barriers consistent with stratified reproduction, such as social hostility and legal impediments to having children outside of traditional heterosexual marriages (Patterson, 2007). Recent changes in public policy have afforded many sexual minority individuals new options in forming families, including foster care, adoption, surrogacy, donor insemination, and/or in vitro fertilization (Golombok, 2002). The fertility industry is, however, unregulated in the United States (Arons, 2007), and clinics demonstrate considerable variability in providing access to care (Stern, Cramer, Garrod, & Green, 2001). Information regarding access to or use of ART by sexual minorities is limited; even if they do not experience infertility, many lesbian or bisexual women without ready access to sperm may still need reproductive help. More than 35% of lesbian-identified women in the United States report having given birth (Gates, 2007), but no investigation has determined the rates of ART use among these women.

Although the fertility industry provides opportunities for those who wish to pursue parenthood, discrimination against sexual minority individuals and same-sex couples may also exist. Discrimination based on origin (i.e., race/ethnicity) in health care is illegal (Civil Rights Act of 1964), but no federal law protects the health care rights of sexual minority individuals. The 2008 California Supreme Court case *Benitez v. North Coast Women’s Care Medical Group* held that denial of fertility services to a lesbian woman on the grounds of her physician’s religious beliefs was unconstitutional. However, this ruling does not guarantee access for sexual minority individuals to fertility services in other states. A 2001 (Stern et al.) survey of fertility centers across the United States found that fewer than 75% of clinics served sexual minorities. A study surveying sexual minority women served by Canadian fertility clinics confirmed that many women perceived physicians as unable to address their needs (Ross, Steele, & Epstein, 2006). On the other hand, policy statements from major medical organizations consistently affirm rights of sexual minority individuals, including their pursuit of biological parenthood, in statements akin to those that uphold health-related rights of racial minority individuals. The American Medical Association’s bylaws include

a policy “to oppose any discrimination based on an individual’s sex, sexual orientation, gender identity, race [. . .] and any other such reprehensible policies”—explicitly safeguarding racial and sexual minorities in all health care (American Medical Association, 2007). Likewise, the American Society for Reproductive Medicine states that requests for assisted reproduction should be treated equally, regardless of marital status or sexual orientation (Ethics Committee of the American Society for Reproductive Medicine, 2009). Despite these policies, it is unclear to what degree sexual minority women seek reproductive help and to what degree practitioners serve them.

Race and sexual orientation represent different dimensions of identity, but individuals with either or both minority identities face some common disadvantages in health contexts. Compared with their majority counterparts, sexual minority and racial minority individuals report lower rates of insurance coverage, which are in turn associated with disparities in physical and mental health (Institute of Medicine, 2006, 2011). According to 2011 U.S. Census data, 17% of individuals of Asian origin, 20% of Black individuals, and 30% of individuals of Hispanic origin had no health insurance (DeNavas-Walt, Proctor, & Smith, 2012). These numbers contrast to the only 11% of uninsured White individuals (DeNavas-Walt et al., 2012). Similarly, in a study employing data from the nationally representative Behavioral Risk Factor Surveillance System, individuals in same-sex relationships were less likely than their peers in heterosexual relationships to have insurance coverage, and they reported more unmet medical needs (Buchmueller & Carpenter, 2010). As yet, there is no research on the reproductive health access of individuals with intersecting sexual and racial identities (i.e., non-White women who also identify as members of a sexual minority).

The current study overcomes limitations of previous work by using data from the NSFG, which present an opportunity to study sexual minority women within a large, nationally representative sample, as well as to replicate established findings among racial minority women. The central hypothesis was that sexual minority and/or non-White women would be less likely to report receiving medical help to become pregnant. Expectations were that minority women would report lower education levels and incomes and less insurance coverage and likelihood of being in legalized relationships compared with heterosexual White women. Consistent with an additive framework, it was also expected that women who endorsed two minority identities (i.e., both a sexual minority and non-White) would report the lowest rates of help receipt. Finally, it was predicted that (controlling for age, education, and marital status) income and health insurance would at least partially mediate any association between race or sexual orientation and the receipt of pregnancy help. Given that stratified reproduction reflects social climates surrounding procreation of socially and economically underprivileged people, it was considered important to investigate whether identity-based trends in health care might change over time. Expectations were that increased legal recognition of same-sex relationships in the United States might yield fewer sexual orientation-based disparities over time. Consistent with prior work, expectations were that race-related disparities would persist. All hypotheses were tested using NSFG data from 2002 (Study 1) and 2006–2010 (Study 2).



Study 1

Method

**Participants and procedure.** Study 1 used data from the 2002 (Cycle 6) NSFG. The 2002 NSFG included 12,571 individuals of child-bearing years, 15 to 44 years of age (7,463 females). Data were based on a nationally representative multistage area probability sample drawn from 121 strata across the United States. Survey weights, determined by oversampling reflecting the census-determined age, race, and ethnicity of residents in each stratum, were assigned to each participant. As the present studies included sexual orientation (not accounted for in the NSFG’s original weighting procedure) as a subgrouping factor, weights were further trimmed to prevent inflated response rates associated with a small number of highly weighted individuals within subgroups. Any participant whose assigned weight estimate was more than 6 times its subgroup’s median weight (as assigned and determined by the NSFG oversampling techniques) was excluded from analysis to prevent the skewing of results. All results include these trimmed weighted estimates, and therefore reflect a conservative balance between unweighted and weighted response rates. Responses were collected through in-home, in-person interviews by trained female interviewers. For sensitive questions, participants used audio computer-assisted self-interviewing, ensuring participants’ privacy. For more details about the overall 2002 NSFG sample and methodology, see Chandra and colleagues (2005).

Analyses for Study 1 were designed to compare adult sexual minority and heterosexual female, as well as adult racial minority and White/Caucasian subsamples of the 2002 NSFG data. For this reason, only data provided by women ages 21 and older were included here. Participants’ sexual orientation was defined on two dimensions: self-reported identity and self-reported attraction. Women were included in the heterosexual subsample if they self-identified as heterosexual and also described only opposite-sex attractions. Women were included in the sexual minority subsample if they self-identified as lesbian or bisexual, and also identified attractions that were not exclusively to members of the opposite sex (i.e., varying degrees of same-gender or bigender preference). Participants who did not disclose sexual identity or described inconsistent patterns of attraction and identity (i.e., lesbian women who identified exclusively heterosexual attraction) were excluded. Women were included in the White group if they identified as White (71%) and, because of limited cell sizes once accounting for race and sexual orientation, were considered non-White if they identified as Black (22% of the total sample) or any other racial identity (7% of the total sample). The final weighted sample for Study 1 is representative of the population of 39,418,795 women. The heterosexual White population consisted of 25,109,072 (approximately 64% of the total sample) women; the heterosexual non-White population included 12,779,994 women (approximately 32%). The sexual minority White population consisted of 1,094,274 women (approximately 3% of the total population); and the sexual minority non-White population consisted of 435,454 women (approximately 1%). See Table 1 for a full factorial demographic breakdown.

**Measures.** Items of interest focused on demographic information as well as on the receipt of medical reproductive assistance. Demographic variables studied were age at time of interview (in

Table 1  
Demographic Characteristics of Women as a Function of Race and Sexual Orientation, Study 1 (2002 National Survey of Family Growth; N = 39,418,794)

Variable	White heterosexual (n = 25,109,072)	Non-White heterosexual (n = 12,779,994)	White sexual minority (n = 1,094,274)	Non-White sexual minority (n = 435,454)	Race	Sexual orientation	Race × Sexual orientation
Mean age (years)	33.30	32.08	33.03	30.95	df = 1, 39418794**	df = 1, 39418794**	df = 1, 39418794**
Mean education (years) <sup>a</sup>	14.04	12.81	13.45	13.53	df = 1, 39418794**	df = 1, 39418794**	df = 1, 39418794**
Mean annual household income (\$)	46,704	33,877	35,164	32,180	df = 1, 37138242**	df = 1, 37138242**	df = 1, 37138242**
Insurance coverage, %						$\chi^2 = 319.66^{***}$	
Private	78.5	54.5	64.9	58.3			
Public	9.9	21.7	12.8	19.6			
None	11.5	23.8	22.3	22.1			
Ever married, %	77.8	63.0	47.5	44.4			$\chi^2 = 188.18^{***}$

<sup>a</sup> Twelve years is equivalent to completion of high school.  
\* p < .05. \*\* p < .001.

years), total years of education, annual household income (averaged across categories from <\$5,000 to >\$75,000), insurance coverage (no insurance, Medicare/Medicaid/other/military/public/government insurance, or private insurance), and formal marital status (never married, ever married). All participants were asked whether they had ever sought medical help to become pregnant, rephrased to be applicable to all women, reflecting whether they reported ever having zero, one, or more partners: “(During any of your relationships,) (have/did) you (or your husband/or your husband or partner at the time) ever been to a doctor or other medical care provider to talk about ways to help you become pregnant?” Participants who responded affirmatively were asked the types of help received: “Think about all of the medical help you or your partners have received to help you become pregnant. Which of the[se] services did you or your partner have to help you become pregnant?” along with a list of various possible services (advice/infertility testing/drugs to improve ovulation, surgery to correct blocked tubes, artificial insemination, other types of medical help). This item was presented as many times as participants received any such care. All participants were also asked, “(Not counting routine check-ups, prenatal care, or advice about a pregnancy,) have you ever been to a doctor or other medical care provider to talk about ways to help you prevent miscarriage or pregnancy loss?”

**Analysis.** Initial analyses were designed to compare demographic and socioeconomic characteristics of heterosexual White, heterosexual non-White, sexual minority White, and sexual minority non-White subsamples. Factorial analyses of variance compared the average age, annual household income, and total years of education for the heterosexual White, heterosexual non-White, sexual minority White, and sexual minority non-White groups, testing for interactions between race and sexual orientation. Chi-square tests compared all four groups of women’s insurance coverage (none, Medicare/Medicaid/other military/public/government insurance, or private), marital status (0 = never married, 1 = ever married), whether or not women received pregnancy help or miscarriage prevention help (0 = no, 1 = yes), and the types of pregnancy help(s) they received. Finally, a mediation analysis tested the proposed models. Direct effects and indirect effects were

calculated using the KHB method (Kohler, Karlson, & Holm, 2011). All variable coding remained the same for mediation analysis except for insurance (recoded: 0 = none/Medicare/Medicaid/other military, public, or government insurance, 1 = private insurance). Because the models were fully saturated, no fit indexes are reported. Approximately 5% of income responses were missing at random; values were estimated using full information maximum likelihood. No other values were missing. All analyses were run in Stata 13.

## Results and Discussion

Our central question was whether there were differences in rates of receiving medical assistance to become pregnant as a function of racial or sexual minority group membership. As expected, heterosexual White women received the most fertility assistance; 13% reported ever having received medical help to become pregnant (see Figure 1). Sexual minority White women and heterosexual non-White women both received pregnancy assistance at the same rates, approximately 7%, and sexual minority non-White women reported receiving assistance about 1% of the time,  $\chi^2 = 49.94, p < .001$ . Sexual minority non-White women were also less likely to report receiving medical miscarriage prevention help (at a rate of 2%); approximately 5–7% of all other groups reported receiving medical miscarriage prevention assistance,  $\chi^2 = 12.41, p < .01$  (see Figure 1).

No differences were observed as a function of race or sexual orientation in the type or number of fertility treatments received. For all women, advice was the most commonly received medical pregnancy assistance, with approximately 75% of all help-receiving women reporting having received it in Study 1. This was followed by infertility tests (50%), ovulation drugs (46%), artificial insemination (16%), tubal surgery (10%), and other (17%). Women who reported receiving any help reported receiving, on average, a total of two types of medical assistance to become pregnant ( $M = 2.18, SD = 1.3$ ).

To provide proper socioeconomic context for our investigation of differences in pregnancy help between heterosexual White women and racial and/or sexual minority women, we compared

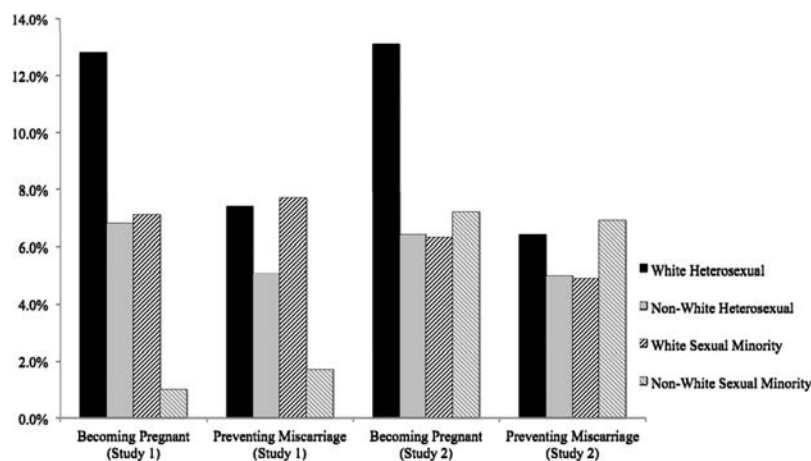


Figure 1. Percentage of women receiving types of medical help as a function of race and sexual orientation for Study 1 (2002 National Survey of Family Growth) and Study 2 (2006–2010 National Survey of Family Growth).

group-level outcomes of demographic variables that have been previously associated with receiving pregnancy help (see Table 1). Main effects and interaction effects of sexual orientation and race were significant for age, education, and income (see Table 1). As expected, significantly smaller proportions of sexual minority White women (65%), heterosexual non-White women (55%), and sexual minority non-White women (58%) reported having private health insurance coverage, as compared with heterosexual White women (79%) with private coverage,  $\chi^2 = 312.66, p < .001$ . All minority women were approximately equally likely to report no insurance coverage (22–24%), whereas half as many heterosexual White women (12%) reported not having health insurance  $\chi^2 = 188.18, p < .001$ . Finally, heterosexual White women were more likely to report ever being married (79%) compared with heterosexual non-White women (55%), sexual minority White women (65%), and sexual minority non-White women (58%),  $\chi^2 = 319.66, p < .001$ .

Age and marital status were correlated,  $r = .42, p < .01$ ; there were also small but significant correlations between education and marital status,  $r = -.01, p < .01$ , and education and age,  $r = .01, p < .01$ . Marital status was thus not included in further analysis. Mediation assessed whether the association between racial group membership, sexual orientation, and the receipt of pregnancy help was mediated by insurance coverage and/or annual household income. As an independent predictor, race was inversely associated with the receipt of pregnancy help ( $\beta = -.09, p < .001$ ), such that non-White women were less likely to receive medical help. Likewise, sexual orientation was also independently associated with the receipt of pregnancy help ( $\beta = -.03, p < .05$ ). Together, controlling for their covariance (*ns*), race ( $\beta = -.02, p < .001$ ) and sexual orientation ( $\beta = -.04, p < .05$ ) both remained negatively associated with receipt of pregnancy help. In the final model, with income and insurance included as mediators, race ( $\beta = -.04, p < .01$ ) but not sexual orientation remained negatively associated with pregnancy help receipt when controlling for age, years of education, and covariation among all factors (see Figure 2 for an illustration of the effects of the variables of interest). In this final model, race was inversely associated with

income level ( $\beta = -.15, p < .001$ ). Sexual orientation was also inversely associated with income level ( $\beta = -.06, p < .05$ ). Income in turn was associated with receipt of pregnancy help ( $\beta = .09, p < .001$ ). Race was also inversely associated with insurance coverage ( $\beta = -.17, p < .001$ ), as was sexual orientation ( $\beta = -.03, p = .05$ ). Insurance coverage was associated with receipt of help ( $\beta = .05, p < .05$ ). Race explained 7% of the variance in whether or not women received help. Tests of direct and indirect effects demonstrated that when controlling for age and education, race decreased log odds of receiving medical help to becoming pregnant by  $-0.47 (p < .001)$ , and sexual orientation reduced the log odds by  $-.67 (p < .05)$ . Controlling for income and insurance coverage, the effect of race reduced to  $-.32 (p < .01)$  and sexual orientation reduced to  $-.56 (ns)$ , leaving significant indirect effects of  $-.11 (p < .001)$  and  $-.15 (p < .05)$ , respectively. For race, insurance coverage contributed to 43% of the indirect effect, and income contributed to 57%. For sexual orientation, insurance contributed to 30% of the indirect effect, and income contributed to 69%. In sum, results indicated that, when controlling for age and education, women's income and insurance coverage fully mediated the association between sexual orientation and help receipt, but only partially mediated the association for race and help.

Heterosexual White women were almost twice as likely as sexual and racial minority women to report receiving medical help to become pregnant. An additive effect of race and sexual orientation was observed across all measures, such that non-White sexual minority women were least likely to receive help. Women who identified as sexual minorities, racial minorities, or both reported lower incomes, lower rates of private insurance coverage, less education, and fewer legally recognized relationships than did heterosexual White women. Mediation analysis demonstrated that, when controlling for age and education, discrepancies in insurance and income fully mediated the association between sexual orientation and receipt of pregnancy help. Sexual minority women's lower incomes and lower likelihood of private insurance coverage accounted for their reduced likelihood of receiving fertility help. The same did not hold true for racial minority women. Even when controlling for demographic, insurance, and income differences, non-White women were less likely than White women to receive medical assistance to become pregnant.

## Study 2

To assess whether fertility assistance trends have remained stable over time, a second study (Study 2) replicated Study 1, including hypotheses, using data from the 2006–2010 NSFG.

## Method

The 2006–2010 NSFG included data from 22,682 individuals (12,279 females), aged 15 to 44 years. Data were based on a nationally representative multistage area probability sample drawn from 110 areas across the United States, using a continuous interview method over 4 years. All other methodology was identical to that described in Study 1. For more information on the 2006–2010 NSFG, see Groves, Mosher, Lepkowski, and Kirgis (2009). Selection criteria of participants for heterosexual and sexual minority subsamples were identical to those in Study 1. The total weighted

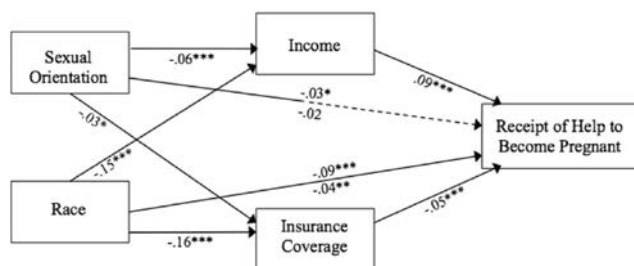


Figure 2. Race and sexual orientation predicting pregnancy help (variables of interest), Study 1 (2002 National Survey of Family Growth). Age, education, and covariates were controlled for but are not represented in the figure. Standardized coefficients appear above the line, and the independent effect of the path without controls or mediators appears below the line; dashed lines were tested but were not significant. Sexual orientation (heterosexual = 0, sexual minority = 1); race (White = 0, non-White = 1); insurance (none/public/other nonprivate = 0, private = 1); pregnancy help (no = 0, yes = 1); income (continuous). \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

population represented 32,889,398 women (66% of the total sample White, 15% Black or African American, 11% Hispanic, or 8% other racial identity). These women were finally grouped as 20,587,768 heterosexual White women (approximately 63% of the total population), 10,174,826 heterosexual non-White women (approximately 31% of the total population), 1,677,214 sexual minority White women (approximately 5% of the population), and 449,590 sexual minority non-White women (approximately 1% of the total sample). See Table 2 for additional demographic details. Measures in Study 1 from the 2002 NSFG were identical to those employed in Study 2 from the 2006–2010 NSFG. All analyses from Study 1 were repeated.

**Results and Discussion**

As hypothesized, heterosexual White women reported receiving medical assistance more often than any of the minority groups, with 13% reporting that they had ever received fertility help,  $\chi^2 = 92.56, p < .001$  (see Figure 1). This percentage was approximately double that of all remaining groups. Only 6% of heterosexual non-White women reported receiving reproductive assistance, as did 7% of White sexual minority women, and 7% of non-White sexual minority women.

Although heterosexual White women were twice as likely to receive medical help of any kind to become pregnant as their non-White heterosexual peers, they were equally likely to receive help maintaining a pregnancy by way of medical miscarriage prevention assistance (see Figure 1). Approximately 5% of all minority women and 6% of White heterosexual women received medical miscarriage prevention aid, with no effect for sexual orientation or race. Consistent with the results of Study 1, women who sought assistance in Study 2 sought, on average, approximately two types of medical assistance in becoming pregnant, regardless of sexual orientation or race. As in Study 1, the four groups of women did not differ in the types of treatments that they reported. For all women, advice (from a doctor) was the most commonly received medical assistance (75%). This was followed by infertility tests (61%), ovulation drugs (46%), artificial insemination (16%), tubal surgery (11%), and other (17%).

Nearly all demographic and socioeconomic differences and similarities between majority (heterosexual and White) women and minority (sexual minority and non-White) women that were found in Study 1 were replicated in Study 2 (see Table 2). Interaction effects between race and sexual orientation emerged as significant across all groups (see Table 2). As expected, heterosexual White women were the most likely to report having private insurance (at 72%),  $\chi^2 = 471.64, p < .001$  (see Table 2). This was a 20% difference from the next most likely group to have private insurance, sexual minority White women (at 52%). Non-White heterosexual women followed with 48% reporting private coverage, and finally non-White sexual minority women, 47% of whom reported having private insurance. Although this group was the least likely to have private insurance, they were the most likely (30%) to possess Medicare, Medicaid, military, other public, or other government-based insurance. Of the White heterosexual women, 11% had public insurance, as compared with 23% of non-White heterosexuals and 24% of the White sexual minority women who had Medicaid or government insurance. White and non-White sexual minority women, on the other hand, were equally likely

Table 2  
Demographic Characteristics of Women as a Function of Race and Sexual Orientation, Study 2 (2006–2010 National Survey of Family Growth;  $N = 32,889,398$ )

Variable	White heterosexual ( $n = 20,587,768$ )	Non-White heterosexual ( $n = 10,174,826$ )	White sexual minority ( $n = 1,677,214$ )	Non-White sexual minority ( $n = 449,590$ )	Race	Sexual orientation	Race × Sexual orientation
Mean age (years)	33.09	32.04	28.74	29.65	$df = 1, 32889397^{**}$	$df = 1, 32889397^{**}$	$df = 1, 32889397^{**}$
Mean education (years) <sup>a</sup>	14.10	12.89	13.30	12.76	$df = 1, 32889397^{**}$	$df = 1, 32889397^{**}$	$df = 1, 32889397^{**}$
Mean annual household income (\$)	49,444	37,710	42,969	29,103	$df = 1, 30831478^{**}$	$df = 1, 30831478^{**}$	$df = 1, 30831478^{**}$
Insurance coverage, %						$\chi^2 = 462.07^{**}$	
Private	71.9	47.8	51.6	46.5			
Public	11.0	23.4	24.2	30.0			
None	17.1	28.8	24.2	23.5			
Ever married, %	73.5	56.2	50.8	27.8			$\chi^2 = 54.66^{**}$

<sup>a</sup> Twelve years is equivalent to completion of high school.

\*  $p < .05$ . \*\*  $p < .001$ .



report no insurance coverage (at 24%), although non-White heterosexual women (29%) were most likely to be uninsured. Only 17% of White sexual minority women reported being uninsured. Finally, as expected, White heterosexual women were the most likely to have ever been married at 72%,  $\chi^2 = 462.07, p < .001$  (see Table 2). Whereas 56% of non-White heterosexual women reported ever being married, followed by 51% of White sexual minority women; only 28% of non-White sexual minority women reported ever being married.

Age and marital status were highly correlated,  $r = .43, p < .01$ ; there were also small but significant correlations between education and marital status,  $r = .03, p < .01$ , and education and age,  $r = .01, p < .01$ . Marital status was thus not included in further analysis. As an independent predictor, race was inversely associated with the receipt of pregnancy help ( $\beta = -.09, p < .001$ ), such that non-White women were less likely to receive medical help to become pregnant. Likewise, sexual orientation independently was negatively associated with the receipt of pregnancy help, such that sexual minority women were less likely to report receiving medical help to become pregnant ( $\beta = -.05, p < .01$ ). Together, when controlling for their covariance ( $r = -.06, p < .001$ ), race ( $\beta = -.10, p < .001$ ) and sexual orientation ( $\beta = -.04, p < .01$ ) remained negatively associated with help receipt. In the final model, when income and insurance were included as mediators, race ( $\beta = -.05, p < .001$ ) but not sexual orientation remained negatively associated with pregnancy help receipt when controlling for age, years of education, and covariation among all factors (see Figure 3 for an illustration of the variables of interest). In the final model, race but not sexual orientation was inversely associated with income ( $\beta = -.15, p < .001$ ). Income in turn was associated receipt of pregnancy help ( $\beta = .06, p < .01$ ). Sexual orientation was inversely associated with insurance coverage ( $\beta = -.04, p < .05$ ), as was race ( $\beta = -.13, p < .001$ ). Income was associated with help receipt ( $\beta = .04, p < .01$ ). Tests of direct and indirect effects demonstrated that race decreased log odds of receiving medical help to becoming pregnant by  $-.72 (p < .001)$ , and sexual orientation reduced the log odds by  $-.52 (p < .05)$ . Controlling for income and insurance coverage, the effect of race

reduced to  $-.44 (ns)$  and sexual orientation reduced to  $-.36 (p < .001)$ , leaving significant indirect effects of  $-.27 (p < .001)$  and  $-.15 (p = .05)$ , respectively. For race, insurance coverage contributed to 45% of the indirect effect, and income contributed to 55%. For sexual orientation, insurance contributed to 49% of the indirect effect, and income contributed to 51%.

Results indicated that, when controlling for age and education, women’s income and insurance coverage fully mediated the association between sexual orientation and help receipt, but only partially mediated the association between race and receipt of pregnancy help.

As in Study 1, heterosexual White women reported considerable advantage compared with all other women. Heterosexual White women were more likely than any other group to receive medical assistance to become pregnant. All other women reported receiving medical help to become pregnant at lower rates. In contrast to Study 1, there was no additive effect on help for women endorsing multiple minority identities in Study 2. Results of mediation analysis showed that, although differences in insurance coverage accounted for disparate rates in help receipt based on sexual orientation, disparities in income and insurance coverage did not fully explain differences in racial minority women’s receipt of fertility assistance.

### General Discussion

This investigation was designed to assess, with a nationally representative sample, whether, when compared with their heterosexual White counterparts, racial minority and/or sexual minority women received less reproductive medical assistance. The study also aimed to establish whether any disparities between groups in receiving medical help to become pregnant could be accounted for indirectly, at least in part, by income and health insurance type. As expected, in both Study 1 and Study 2, all groups of minority women (operationalized by sexual minority and/or non-White group membership) were less likely to report receiving medical help to become pregnant than were heterosexual White women. Indeed, the rates at which heterosexual White women sought medical assistance were almost double those of any other group. In Study 1, women who identified as members of both sexual and racial minorities were also less likely to report receiving pregnancy or miscarriage prevention help compared with women who endorsed only one minority identity. Study 1 results were consistent with an expectation for an additive effect of intersecting minority identities on help receipt. However, this additive effect did not emerge in Study 2: Non-White sexual minority women were just as likely as non-White heterosexual and White sexual minority women to receive any type of help. Given the results between studies with respect to sexual orientation and income (discussed further below), contexts may be shifting in positive ways for sexual minority women, thus mitigating the previously observed additive effects of intersecting minority identities on help receipt.

Across both studies, however, women who identified as racial minorities were less likely to receive medical pregnancy help, regardless of sexual orientation. Accounting for income and health insurance disparities did not fully explain these differences in either Study 1 or Study 2. The results on racial differences are consistent with previous findings in the use of reproductive help (Bitler & Schmidt, 2006; Greil et al., 2011). The differences

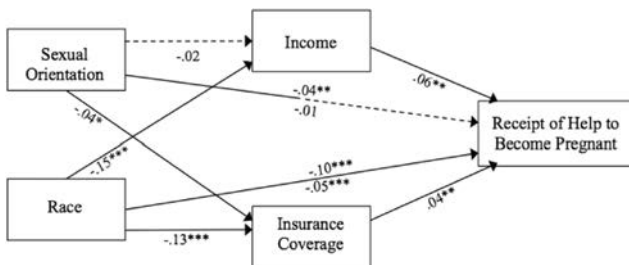


Figure 3. Race and sexual orientation predicting pregnancy help (variables of interest), Study 2 (2006–2010 National Survey of Family Growth). Age, education, and covariances were controlled for but are not represented in the figure. Standardized coefficients appear above the line, and the independent effect of the path without controls or mediators appears below the line; dashed lines were tested but were not significant. Sexual orientation (heterosexual = 0, sexual minority = 1); race (White = 0, non-White = 1); insurance (none/public/other nonprivate = 0, private = 1); pregnancy help (no = 0, yes = 1); income (continuous). \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

observed as a function of sexual orientation are the first of their kind. Regardless of racial group membership, sexual minority women were less likely than heterosexual women to report receiving pregnancy help. For disparities based on sexual orientation, the current results suggest that access-based economic disparities are particularly important. However, the relative associations of income and insurance coverage in women's receipt of care appear to have changed over time. Lower income and insurance coverage explained lower rates of pregnancy help receipt by sexual minority women in Study 1, but sexual minority status was not associated with lower incomes in Study 2. Only differences in insurance coverage contributed to sexual orientation-based disparities in Study 2. This shift may suggest that socioeconomic disparities have been decreasing for sexual minority individuals over time, but that they are still less likely than others to have health care coverage. Many heterosexual individuals gain access to private insurance via marriage. However, many members of sexual minority couples, even in comparable same-sex unions, do not receive equivalent coverage because of failure to recognize same-sex marriages in some jurisdictions.

The results concerning miscarriage prevention have further implications for understanding the point at which discrepancies in the receipt of fertility services emerge. In Study 1, sexual minority non-White women reported receiving miscarriage prevention help at lower rates compared with all other women, replicating the additive effect observed in respect to pregnancy help receipt. In Study 2, as with pregnancy help, this additive effect was not maintained for receiving miscarriage prevention help. If already pregnant, all women reported receiving comparable medical assistance to maintain their pregnancies. The disparity in receiving any kind of fertility help apparently lies at the initial effort to become pregnant.

As investigations of stratified reproduction emphasize how systemic disparities in economics and policy can disadvantage the reproductive choices of underprivileged women, this study focused on how income and health care coverage disparities might contribute to sexual minority and racial minority women's receipt of medical assistance to become pregnant. However, previous research on racial disparities in seeking medical fertility assistance has indicated that factors such as social support may also be important in the association of race and help seeking in reproductive contexts (Greil et al., 2011). Social support networks can be limited for minority group members, especially those who claim more than one minority identity, such as non-White sexual minority women (Dewaele, Cox, Van den Berghe, & Vincke, 2011). A supportive social network might have a substantial impact on whether minority women seek medical assistance in forming families. For example, lesbian and gay individuals who report interacting regularly with same-sex couples that have children are more likely to express desires and capacity-driven intentions to one day have children, as compared with their sexual minority counterparts who do not have a similar social network (Riskind, Patterson, & Nosek, 2013).

It is possible that accounting for other social climate factors might more fully explain the relationship between race and help seeking. The results of the current study have implications for contemporary public policies concerning same-sex families that may disincline some individuals from pursuing reproductive assistance in the United States. Although the *Benitez v. North Coast*

*Women's Care Medical Group* (2008) case ensured that sexual minority women in California can receive reproductive care equivalent to that available to their heterosexual counterparts, the lack of comparable legal protection in most states may be a factor influencing whether women have access to care or feel secure in pursuing medical help to become pregnant. Even in regions with supportive state-level policies, lack of regulation within the fertility industry may allow for discrimination against sexual and/or racial minority individuals through screening procedures or other processes that favor majority women (Gurmankin, Caplan, & Braverman, 2005). For example, qualitative analyses of U.S. fertility service providers' Websites have exposed disproportionate representation of White infants in Website photos (Hawkins, 2013), as well as other implicit "gate-keeping" messages (Johnson, 2012). Care providers should be mindful of how even such seemingly benign practices might contribute to disparities in reproductive care.

Similarly, a history of medical negligence and malpractice against racial minority groups in the United States has contributed to increased mistrust of medical systems and practitioners among many non-White individuals (Institute of Medicine, 2006). It is possible that such mistrust extends to sexual minority individuals as well and may contribute to differences among minorities that are not accounted for in this study. Also, given that many sexual minority individuals have formed families even during periods of political persecution, it is possible that sexual minority women in this study are also more knowledgeable about alternative resources to family planning outside traditional medicine. A variety of contextual factors may contribute to the observed disparities in receipt of care in this investigation. Future research may help establish whether medical providers who proactively encourage minority women to consider a wide range of reproductive options may reduce observed disparities.

The large-scale, nationally representative nature of the NSFG data from which the current findings are drawn is a substantial strength in this study. The consistency of measurement in the NSFG over time allowed for a novel, systematic investigation of largely understudied minority women. The data do, however, have limitations. Given the structure of items in the NSFG, it was impossible to determine the partner sex (or if participants had a partner) when they received the reported assistance. The current investigation accounted for two dimensions of sexual orientation (i.e., attraction and identification), but no information on partner sex could be linked to timing of fertility assistance. Similarly, the NSFG's oversampling of racial but not sexual orientation subgroups inhibited a more nuanced understanding of interactions of race and sexual orientation in help receipt. Previously reported variations among non-White subgroups on help receipt (Greil et al., 2011) suggest varied trends even within the minority groups studied. Finally, although the central item examined women's interactions with medical providers to obtain pregnancy help, it did not account for potentially disparate desires in family formation. It is thus important to remember the variation of experience within the diverse sample of women studied here.

Despite the increase in assisted reproductive procedures recorded over the past decade, results of the current investigation suggest that access to medical help is not equal across groups of women. Heterosexual White women have evidently been the prime beneficiaries of the surge in medical fertility assistance. These



results stand in stark contrast to historically higher rates of infertility experienced by racial minority women (Bitler & Schmidt, 2006). The current results are consistent with the concept of stratified reproduction (Colen, 1986, as cited in Greil et al., 2010), and expand it to include sexual orientation. The results also reveal the import of social and economic factors including, but not limited to, income and insurance coverage. Although socioeconomic factors did not explain all differences based on racial group membership, the current results showed clearly that lack of insurance coverage limits access to reproductive health care among sexual minority women in the United States.

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# A Prospective Study of Adolescents' Nonmedical Use of Anxiolytic and Sleep Medication

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The purpose of this longitudinal study ( $N = 2,745$ ) was to determine whether adolescents' recent medical use of anxiolytic or sleep medication was associated with increased incidence of using someone else's prescription for these classes of medication (nonmedical use). Data were collected from adolescents attending 5 Detroit area secondary schools between December and April in 3 consecutive academic years between 2009 and 2012. Respondents were assigned to the following 3 mutually exclusive groups for the analyses: (1) never prescribed anxiolytic or sleep medication (in their lifetime); (2) prescribed anxiolytic or sleep medication in their lifetime, but not during the study period; or (3) prescribed anxiolytic or sleep medication during the study period. Almost 9% of the sample had received a prescription for anxiolytic or sleep medication during their lifetime, and 3.4% had received at least 1 prescription during the 3-year study period. Compared with adolescents never prescribed anxiolytic or sleep medication, adolescents prescribed these medicines during the study period were 10 times more likely to engage in nonmedical use for reasons such as "to get high" or "to experiment" (adjusted odds ratio [ $OR_{adj.}$ ] = 10.15; 95% CI [3.97–25.91]), and 3 times more likely to engage in nonmedical use to self-treat anxiety or to sleep ( $OR_{adj.}$  = 3.24; 95% CI [1.67–6.29]). Adolescents prescribed anxiolytics during their lifetime but not during the 3-year study were 12 times more likely to use another's anxiolytic medication, compared with adolescents never prescribed anxiolytics ( $OR_{adj.}$  = 12.17; 95% CI [3.98–37.18]). These risk factors have significant implications for later substance use problems.

*Keywords:* misuse of anxiolytic medication, misuse of sleep medication, prescription drug abuse, adolescents, web-based survey

Over the last decade there has been an upward trend in the prescribing of controlled anxiolytic and sleep medication in the United States (Comer, Olfson, & Mojtabai, 2010; Fenton, Keyes, Martins, & Hasin, 2010; Fortuna, Robbins, Caiola, Joynt, & Halterman, 2010; Thomas, Conrad, Casler, & Goodman, 2006) and a parallel increase in their misuse by adolescents (Ford & McCutcheon, 2012; McCabe, West, Cranford, et al., 2011a; Meier, Troost,

& Anthony, 2012; Rigg & Ford, 2014; Substance Abuse and Mental Health Services Administration [SAMHSA], 2012). The National Survey on Drug Use and Health (NSDUH) (SAMHSA, 2012) estimates indicate that approximately 3% of adolescents have engaged in prescription drug misuse with anxiolytics, sedatives, or hypnotics; medication often referred to as "ASH" medications (i.e., anxiolytics, sedatives, and hypnotics). In a recent report on adolescent psychotropic drug use, the Centers for Disease Control categorized ASH medication as one drug category (Jonas, Gu, & Albertorio-Diaz, 2013). This ASH categorization recognized the similar central nervous system depressant properties of these classes of medication and their similar abuse potential and schedule status (Schedule IV).

Using data from the NSDUH, Rigg and Ford (2014) found that 3% of adolescents had engaged in lifetime benzodiazepine misuse and that this misuse was associated with poly substance use and co-ingestion with other controlled medication (e.g., with other ASH medication). Although these are important findings, analyses of available NSDUH data have not been able to provide insight into the characteristics associated with different types of medical misuse because questions in the NSDUH fail to adequately distinguish between nonmedical users (using someone else's medication) and medical misusers (misusing one's own medication). The distinction between these two types of misusers might be important for the development of effective and tailored prevention messages (Boyd & McCabe, 2008) because one type of misuse involves both a prescriber in a clinical setting and the lack of adherence to a medication regimen by a patient (medical misuse).

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The other involves illegal behaviors (using someone else's prescription medication). In addition, when compared with adolescents who use their medication correctly, adolescents who misuse their own controlled medication are more likely to divert their medication to friends, which is a felony (i.e., diverted to nonmedical users) (McCabe, West, Teter, et al., 2011b). Thus, the distinction between these two types of misuse has notable clinical and legal implications.

Most of what we know about the motivations for prescription drug abuse comes from studies of opioid analgesics and stimulants. We have learned from these studies that adolescents' and young adults' motivations are important because they predict other risky behaviors (Boyd, McCabe, Cranford, & Young, 2006; Boyd, Young, Gray, & McCabe, 2009; McCabe, Boyd, Cranford, & Teter, 2009; McCabe, Cranford, Boyd, & Teter, 2007a; McCabe, West, & Boyd, 2013a). For example, an adolescent given a sleep medication by her parent because she has trouble sleeping before a big exam might have a different risk profile than an adolescent who steals her mother's sleep medication and mixes it with alcohol at a party. Yet both types of nonmedical users are collapsed into one group in the NSDUH. One nonmedical user was attempting to self-treat a condition (e.g., insomnia) without the benefit of an appropriate medical intervention, whereas the other was using the medication "to get high." Alternatively, a medical misuser might take two of his own sleeping pills because he is having trouble sleeping before an exam, whereas another adolescent might take two of his sleeping pills, along with a friend's opioid analgesic, to get high at a party. Researchers have found that adolescents who misuse opioid analgesics for sensation-seeking motivations (e.g., to get high) tend to demonstrate greater deviant behaviors, including more substance abuse problems than those who endorse self-treating motivations (Boyd, Young, et al., 2009). However, the relationships among prescription drug abuse, motivations, and other risky behaviors among adolescents engaged in nonmedical use and medical misuse with anxiolytic and sleep medication has not been established (Young, Glover, & Havens, 2012).

This is the first, three-wave longitudinal study to examine non-medical use and medical misuse of anxiolytic and sleep medication among adolescents. When we use the term *nonmedical use*, it refers to using another person's controlled (Schedule IV) anxiolytic or sleep medication.

### Purpose and Hypotheses

This study examined whether receiving a prescription for a Schedule IV anxiolytic or sleep medication was associated with higher incidence of adolescents' nonmedical use of these classes of medication.

*Hypothesis 1:* Compared with adolescents who were never prescribed controlled anxiolytic or sleep medication, adolescents with a recent prescription (i.e., during the 3-year study period) will demonstrate an increased incidence of past year nonmedical use. This hypothesis predicts that a recent prescription will be associated with a higher incidence of non-medical use.

*Hypothesis 2:* Compared with adolescents who were never prescribed controlled anxiolytic or sleep medication, adolescents prescribed these classes of medication at any point in the

past will demonstrate increased incidence of nonmedical use of these classes of medication for sensation-seeking motivations (e.g., to get high). This hypothesis predicts that once exposed to these classes of medication, some adolescents will be more likely to use someone else's prescription for these classes of medication for sensation seeking (e.g., to get high).

*Hypothesis 3:* During the study period, adolescents who received prescriptions for a greater number of years will demonstrate increased incidence of last year nonmedical use of the same classes of medication when compared with adolescents prescribed for fewer years. This third hypothesis predicts that acquiring more cumulative experience medically using anxiolytic or sleep medication will be associated with an increased incidence of using someone else's prescription for these classes of medication.

### Method

The present study uses a subsample ( $N = 2,745$ ) from a larger, mixed-method National Institute on Drug Abuse-funded study (DA024678) comprising 5,217 respondents who participated in cross-sectional, Web-based surveys between 2009 and 2012 in their Detroit area secondary school. Surveys were administered annually between December and April. All students attending the five schools were invited to participate in the study. The parent study aimed to characterize subtypes of adolescent prescription drug users on the basis of controlled medication status, nonmedical use, medical misuse (using too much of one's own prescription, or using one's own prescription to get high), motivations to engage in prescription drug abuse, and prescription drug classes abused (anxiolytics, sleep medication, stimulants, and opioid analgesics). Respondents in the parent study who completed both Time 1 and Time 2 were included in the present subsample, as were respondents who completed all three consecutive time points. The subsample did not notably differ from the cross-sectional sample, except in age distribution because older respondents aged out of the longitudinal sample.

### Data

The Web-based Secondary Student Life Survey (SSLS; Boyd, Teter, West, Morales, & McCabe, 2009) was used to collect data at all three time points between December and April during the following academic years: 2009–2010 (Time 1), 2010–2011 (Time 2), and 2011–2012 (Time 3). The final retention rate for the SSLS was 89% for Time 1–Time 2; 91% for Time 2–Time 3; and 83% for Time 1–Time 2–Time 3. This compares favorably with The Monitoring the Future study of substance use among high school seniors in the United States (Johnston, O'Malley, Bachman, & Schulenberg, 2011). The final sample was 50.5% girls and 65.4% White, with a mean age of 14.2 years at Time 1. The University of Michigan Institutional Review Board approved the study, and a Certificate of Confidentiality was obtained from the National Institutes of Health. Active parental consent and child assent were obtained. The SSLS takes approximately 40 min to complete and is maintained on a hosted secure Internet site running under a Secure Sockets Layer protocol to ensure safe transmission of data.

Medical use was assessed by asking, “On how many occasions in your lifetime (or last 12 months) has a doctor, dentist, or nurse prescribed the following types of medicines [the aforementioned examples of anxiolytic and sleep medication were inserted here] for you?” The response scale ranged from 1 (*0 occasions*) to 7 (*40 or more occasions*). Binary variables were created for each of the two drug classes, and binary variables indicating lifetime and past year use (*yes* or *no*) were created by aggregating data from the medical use of anxiolytic and sleep medication variables.

Nonmedical use was assessed by asking, “On how many occasions in the past 12 months have you used the following types of medicines [the aforementioned examples of anxiolytics and sleep medication were inserted here] *not* prescribed to you?”

Motivations for nonmedical use were assessed by asking, “Please provide the reason(s) why you used [relevant medication class—either anxiolytic or sleep] medication not prescribed to you?” Respondents were asked to select from a list of 9 motives (e.g., it helps decrease anxiety, it helps me sleep, it gives me a high, I am addicted) based on previous research (Boyd et al., 2006; Johnston & O’Malley, 1986; Teter, McCabe, Cranford, Boyd, & Guthrie, 2005). Respondents could select as many motives as they wished. Responses such as (it helps decrease anxiety or it helps me sleep) were coded as self-treating. If any sensation-seeking motive was endorsed, the adolescent was put into the sensation-seeking category. Some adolescents endorsed both self-treating motives and sensation-seeking motives, and they were categorized as sensation-seeking. This decision was based on earlier findings on opioid abuse; these revealed that any sensation-seeking motive was associated with greater risk for substance abuse problems and other risky behaviors (Boyd, Young, et al., 2009). Nine respondents endorsed both sensation-seeking and self-treating motivations. Seven of these respondents elected to rank order their three main reasons for engaging in nonmedical use and listed sensation-seeking motivations as either their first or second reason for engaging in nonmedical use (e.g., “because it gives me a high,” “for experimentation.”). Self-treating and sensation-seeking groups were mutually exclusive.

## Analysis

For the analyses, respondents were assigned to three mutually exclusive groups on the basis of their responses to SSLS questions about lifetime and recent medical use of anxiolytic medication (e.g., Ativan®, Xanax®, Valium®, Klonopin®, diazepam, lorazepam) and sleep medication (e.g., Ambien®, Lunesta®, Restoril®, temazepam, triazolam). The three groups were defined as follows: (1) never prescribed anxiolytic or sleep medication in their lifetime; (2) prescribed anxiolytic or sleep medication in their lifetime, but not during the 3-year study; or (3) prescribed anxiolytic or sleep medication during the 3-year study. Each time the SSLS was administered the respondents were asked about their medical use and nonmedical use (i.e., using someone else’s prescription) and about their motivations to engage in nonmedical use.

All the statistical analyses were performed using commercially available software (SPSS 20.0; SPSS Inc., Chicago, IL). No procedures were used to impute missing data and the two drug classes were pooled for analyses unless otherwise noted. When a drug class was analyzed independently, statistical results reflect prescription and nonmedical use of only the medication class listed.

Generalized estimating equation (GEE) models were used to compare the odds of adolescents in the three groups (never prescribed, prescribed during lifetime but not during study, and prescribed during study) engaging in last year nonmedical use. The comparisons are over the three time points. The GEE approach accounts for the correlation of repeated measures within the same individual over time and provides flexibility to retain the full sample of respondents (e.g., respondents with two or three consecutive time points of data can be included in the GEE analysis, while controlling for time point of administration; Hanley, Negassa, Edwardes, & Forrester, 2003; Zeger, Liang, & Albert, 1988). Several control variables were included in the analyses to account for factors that might influence nonmedical use: study time point, sex, race/ethnicity, age, parent’s highest level of education completed, and severity of depression and anxiety symptoms (at baseline) were tested and included in each GEE model when significant (Boyd, Young, et al., 2009; McCabe & Boyd, 2005; McCabe et al., 2009; McCabe, Boyd, & Young, 2007b; McCabe, West, Cranford, et al., 2011a).

The GEE models compared the odds of the three groups engaging in last year nonmedical use over time for two mutually exclusive types of motivations: (1) sensation seeking; or (2) self-treating (see Table 3). For all respondents, GEE models also compared the odds of the three groups engaging in last year nonmedical use over time (see Table 4). Adjusted odds ratios ( $OR_{adj.}$ ) and 95% confidence intervals (CIs) were computed to describe adjusted contrasts among groups.

## Results

The sample was evenly distributed by sex and grade. Sixty-five percent (65.4%) were White/Caucasian, 29% were African American, and 5.6% were “other” (Asian, Hispanic, and American Indian/Alaskan Native (AI/AN)). We collapsed adolescents who identified as Asian, Hispanic, and AI/AN in to “other” race given their small sample sizes among eligible respondents. The data were collected in the Detroit metropolitan area, which is predominantly White and Black. We include this “other” race category as a control to account for any possible bias in the statistical models because of racial identification. The average age was 14.8 ( $SD = 1.9$ ) years. The sample was relatively well educated, with 80% having at least one parent with a college degree or higher (see Table 1).

The first hypothesis predicting that a recent prescription would be associated with a higher incidence of nonmedical use was supported (see Table 2). Results from analyses by medication class indicated that adolescents with a recent prescription were 6 to 9 times more likely to engage in nonmedical use of the class of medication they were recently prescribed (see Table 2). These GEE analyses held race/ethnicity and levels of anxiety and depression at Time 1 constant. Compared with Black participants, White participants were two times more likely to use another person’s anxiolytic and sleep medication ( $OR_{adj.} = 2.52$ ; 95% CI [1.25–5.08],  $p < .05$ ). Respondents with higher levels of anxiety and depression at Time 1 were also more likely to engage in nonmedical use of these classes of medication ( $OR_{adj.} = 1.02$ ; 95% CI [1.02–1.10],  $p \leq .01$ ). Effects of time points, sex, age, and parent’s highest level of education were not significant.



ADOLESCENTS' NONMEDICAL USE OF MEDICATIONS

Table 1  
Demographic Characteristics of Sample at Time 1

Characteristic	Anxiolytic and sleep medication prescription history			N = 2,745
	Never prescribed in lifetime <sup>a</sup>	Prescribed in lifetime but not during the 3-Year study period <sup>b</sup>	Prescribed during the 3-year study period <sup>c</sup>	
Sex (%) <sup>d</sup>				
Male	51.0	53.3	38.6	50.5
Female	49.0	46.7	61.4	49.5
Race/ethnicity <sup>e</sup> of study participant (%)				
White	64.6	69.6	75.9	65.4
Black	29.8	26.1	17.2	29.0
Other	5.6	4.3	6.9	5.6
Age in years at Time 1				
11	0.1	1.1	0.0	0.1
12	17.6	14.1	13.8	17.3
13	21.9	18.5	17.4	21.5
14	16.5	23.9	13.8	16.7
15	19.9	18.5	20.2	19.9
16	17.4	13.0	25.7	17.6
17	6.4	10.9	9.2	6.7
18	0.2	0.0	0.0	0.1
Highest level of education completed by either parent				
High school degree or less	8.1	9.8	5.5	8.0
Some college	11.5	4.4	11.0	11.3
College degree	30.9	28.9	33.8	31.0
Graduate or Professional degree	49.4	56.7	49.7	49.7

<sup>a</sup> n = 2,508; 91.4%. <sup>b</sup> n = 92; 3.4%. <sup>c</sup> n = 145; 5.3%. <sup>d</sup> Valid percentages reported. <sup>e</sup> Race/ethnicity was reported by parent or legal guardian of child.

Hypothesis 2 predicted that once exposed to a prescribed anxiolytic or sleep medication, some adolescents would begin using them for sensation-seeking motivations, in contrast to self-treating motivations. This hypothesis was also supported. Once medical exposure occurred, there where highest odds of nonmedical use for sensation-seeking motivations ( $OR_{adj.} = 10.15$ ; 95% CI [3.97–25.91],  $p \leq .001$ ) in contrast to self-treating motivations ( $OR_{adj.} = 3.24$ ; 95% CI [1.67–6.29],  $p \leq .001$ ). Results of GEE

analyses indicated that the odds of engaging in sensation-seeking with someone else's prescribed medication were 10 times higher in respondents with their own prescription in the 3-year study period when compared with respondents never prescribed anxiolytic or sleep medication.

Respondents prescribed sleep medication during the study demonstrated higher incidence of nonmedical use for sensation seeking motivations ( $OR_{adj.} = 28.01$ ; 95% CI [9.34–84.00],  $p \leq .001$ ).

Table 2  
Last Year Nonmedical Use of Anxiolytic and Sleep Medication Based on Medication Class Prescription History

Binary outcome variable	Sleep and anxiolytic prescription history				
	Never prescribed in lifetime (Reference group) (n = 2,508)	Prescribed in lifetime but not during the 3-year study (n = 92)	Prescribed during the 3-year study (n = 145)	$OR_{adj.}$ for prescribed during lifetime but not during the 3-year study <sup>a</sup> (95% CI)	$OR_{adj.}$ for prescribed during the 3-year study (95% CI)
Past year nonmedical use only (%) during the 3-year study <sup>b</sup>					
Sleeping Medication <sup>c</sup>	0.9	2.0	5.6	2.18 (0.79–6.00)	6.40*** (2.78–14.78)
Anxiolytic Medication	0.4	5.3	3.8	12.17*** (3.98–37.18)	9.06*** (4.26–19.26)

<sup>a</sup> Generalized estimating equation (GEE) models held the year of study constant. Sex, race/ethnicity, age, parents' highest degree of education completed, and severity of depression and anxiety symptoms at Time 1 were tested and included in each GEE model when statistically significant. <sup>b</sup> Percentage reported is the sum of percentages from Time 1, Time 2, and Time 3 within each of the three prescription history subgroups by medication class (sleep medication, anxiolytic medication, or combined medication classes). <sup>c</sup> When a specific medication class is listed (sleep or anxiolytic medication), statistical results reflect prescription and nonmedical use of only the medication class listed.

\*  $p < 0.05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

Table 3  
 Motivations for Last Year Nonmedical Use

Binary outcome variable	Anxiolytic and sleep prescription history				
	Never prescribed in lifetime (Reference group) ( $n = 2,508$ )	Prescribed in lifetime but not during the 3-year study ( $n = 92$ )	Prescribed during the 3-year study ( $n = 145$ )	$OR_{adj.}$ for prescribed during lifetime but not during the 3-year study <sup>a</sup> (95% CI)	$OR_{adj.}$ for prescribed during the 3-year study (95% CI)
Last year nonmedical use (%) during the 3-year study by motivation					
Sensation seeking with sleep medication <sup>b</sup>	0.1	0.0	2.5		28.01*** (9.34–84.00)
Self-treating with sleep medication <sup>c</sup>	0.7	2.0	2.0	2.43 (0.88–6.75)	2.73 (0.98–.62)
Sensation seeking with anxiolytic medication	0.1	3.6	1.6	30.07*** (8.83–102.32)	14.29*** (4.56–44.81)
Self-treating with anxiolytic medication	0.2	0.9	1.6	2.78 (0.39–20.09)	3.88* (1.20–12.54)
Sensation seeking (combined medication classes) <sup>d</sup>	0.2	0.7	2.3	3.03 (0.67–13.75)	10.15*** (3.97–25.91)
Self-treating year (combined medication classes)	0.8	1.1	3.9	1.06 (0.33–3.42)	3.24*** (1.67–6.29)

Note. When “combined medication classes” is listed, statistical results reflect prescription and nonmedical use of sleep and/or anxiolytic medication. <sup>a</sup> Generalized estimating equation (GEE) models held time (year of study) constant. Sex, race/ethnicity, age, parent’s highest degree of education completed, and severity of depression and anxiety symptoms at Time 1 were tested and included in each GEE model when statistically significant. <sup>b</sup> When a specific medication class is listed (sleep or anxiolytic medication), statistical results reflect prescription and nonmedical use of only the medication class listed. <sup>c</sup> Sensation-seeking and self-treating are mutually exclusive motivation categories. \*  $p < 0.05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .

Respondents prescribed anxiolytic medication during the study were 3 to 14 times more likely to engage in nonmedical use for self-treating or sensation-seeking motivations (self-treating:  $OR_{adj.} = 3.88$ ; 95% CI [1.20–12.54],  $p < .05$ ; sensation-seeking:  $OR_{adj.} = 14.29$ ; 95% CI [4.56–44.81],  $p \leq .001$ ).

Results of GEE analyses indicated that being older (age range was 12 to 18) was associated with greater odds of nonmedical use

of anxiolytic or sleep medication for sensation-seeking motivations ( $OR_{adj.} = 1.33$ ; 95% CI [1.11–1.56],  $p \leq .01$ ), whereas being White, female, or reporting more symptoms of anxiety and depression at Time 1 was associated with greater odds of nonmedical use for self-treating motivations (White:  $OR_{adj.} = 2.44$ ; 95% CI [1.18–5.04],  $p < .05$ ; female:  $OR_{adj.} = 1.82$ ; 95% CI [1.06–3.11],  $p \leq .01$ ); anxious–depressed:  $OR_{adj.} = 1.06$ ; 95% CI [1.02–1.11],  $p < .05$ ). Effects of time and parent’s highest level of education completed were tested, but were not found to be significant in these models.

The third predicted that acquiring more cumulative experience medically would be associated with an increased incidence of nonmedical use. Hypothesis 3 was supported (see Table 4). Results of GEE analyses indicated that receiving a prescription for an anxiolytic or sleep medication for 2 or 3 years was associated with increased incidence of nonmedical use ( $OR_{adj.} = 4.83$ ; 95% CI [2.75–8.47],  $p \leq .001$ ).

Time was held constant in the GEE models, as was the interaction between cumulative prescription and time. The progression of time was associated with decreased odds of nonmedical use ( $OR_{adj.} = 0.70$ ; 95% CI [0.54–0.92],  $p \leq .01$ ), whereas an older age was associated with increased odds of nonmedical use ( $OR_{adj.} = 1.21$ ; 95% CI [1.09–1.36],  $p \leq .001$ ). Effects of parent’s highest level of education completed and anxiety and depression symptoms at Time 1 were tested but were not found to be significant in these models.

## Discussion

This is the first longitudinal, prospective study to examine the association between an adolescent having a legally prescribed prescription for an anxiolytic or sleep medication and their long-

Table 4  
 Last Year Nonmedical Use Based on Number of Prescriptions

Binary outcome variable	Number of prescriptions	
	$OR_{adj.}$ <sup>a</sup>	(95% CI)
Past year nonmedical use during the 3-year study		
Sleep medication <sup>b</sup>	5.37***	(2.58–11.20)
Anxiolytic medication	3.86***	(1.71–8.67)
Combined medication classes <sup>c</sup>	4.83***	(2.75–8.47)

Note.  $N = 2,745$ .

<sup>a</sup> Generalized estimating equation (GEE) models held time (year of study) constant and tested for an interaction between time and the cumulative prescription independent variable, which was coded as “0” for no prescription during the study period, “1” for one last year prescription during the study period, and “2” for two or three last year prescriptions during the study period. Sex, race/ethnicity, age, parents’ highest degree of education completed, and severity of depression and anxiety symptoms at Time 1 were tested and included in each GEE model when statistically significant. <sup>b</sup> When a specific medication class is listed (sleep or anxiolytic medication), statistical results reflect prescription and nonmedical use of only the medication class listed. <sup>c</sup> When “combined medication classes” is listed, statistical results reflect prescription and nonmedical use of sleep and/or anxiolytic medications.

\*  $p < 0.05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ .



term risk of using another person's prescription for these classes of medication. Our data show that being recently prescribed an anxiolytic or sleep medication was associated with a greater likelihood of nonmedical use (i.e., misusing another person's prescription) with the same class of medication recently prescribed. In addition, being prescribed an anxiolytic or sleep medication for a greater number of years during adolescence is associated with increased odds of nonmedical use. Specifically, the odds of nonmedical use were greater among respondents who received a prescription during the 3-year study period and even greater among those prescribed at least once a year for 2 to 3 years during the 3-year study period compared with those prescribed during only 1 year. Further, the odds of nonmedical use for sensation-seeking motivations were 10 times greater among respondents who were prescribed these classes of medication during the study compared with those who were never prescribed.

Temporality appears important. Respondents who received a prescription for anxiolytics during their lifetime but not during the 3-year study period demonstrated a higher incidence of nonmedical use of anxiolytics. However, we did not observe this association with sleep medication. Studies are needed to further clarify the time between medical use and later nonmedical use of controlled anxiolytic or sleep medication. One possible explanation is that respondents with a more recent prescription for sleep medication continued to experience symptoms such as insomnia after their medication ran out, and having run out, they decided to use someone else's sleep medication. However, this explanation is challenged by the finding that medical users of both classes of medication (anxiolytic and sleep medication) who had a prescription during the study period had far greater odds of using nonmedically for sensation-seeking motivations (such as to "get high") versus for self-treating motivations (such as to help them sleep). Alternatively, both of these controlled medication classes are well recognized for their abuse liability (Schedule IV), and the explanation might be that more recent exposure along with greater availability creates a desire for more of the drug.

We found a relatively high prevalence of recent anxiolytic and sleep prescriptions (5.3%), although this is still a relatively low estimate when compared with opioid analgesic prescriptions. Our prevalence estimates were higher than those of studies that used medical records or national databases (Fortuna et al., 2010; Jonas et al., 2013; Segool et al., 2013) but were consistent with an emergency department study conducted in southeastern Michigan (Whiteside et al., 2013). There are several possible explanations for our higher rates: our data are recent, longitudinal, and might reflect a new trend; prescription rates might be higher in southeastern Michigan; or data collected from medical records or the NSDUH might yield different estimates because of those study designs and data collection methods.

Across all age groups, adolescents and young adults are the most likely to abuse scheduled medications, including anxiolytic and sleep medication (Fenton et al., 2010; Ford & McCutcheon, 2012; Office of National Drug Control Policy, 2008; Rigg & Ford, 2014; SAMHSA, 2012; Schepis & Krishnan-Sarin, 2008; Young et al., 2012). Other studies of adolescents (Ford & McCutcheon, 2012; Schepis & Krishnan-Sarin, 2008) found that misusing anxiolytics and sedatives is associated with being White, female, or older (>15 years), and our results coincide with these findings. Although there is a disproportional risk among subgroups (e.g.,

girls), all adolescents prescribed scheduled medications are at some risk and providers have a role in reducing this risk.

For clinical providers in busy practices, it is necessary to devise ways to feasibly educate adolescent patients and their parents about the possible risks of both nonmedical use and medical misuse (using too much of one's own prescription) of anxiolytic and sleep medication (SAMHSA, 2012). One suggestion is to use a brief provider protocol that reminds parents and adolescent patients about the proper dosages (to use as advised), the dangers of sharing (do not give away), the importance of controlling the medication (supervised storage), and the need for proper disposal, especially given the risk of adolescents' misusing leftover medication (Boyd, Anderson, & Rieckmann, 2011; McCabe, West, & Boyd, 2013b; McCabe, West, & Boyd, 2013c). Another suggestion is to carefully consider the number of refills prescribed to adolescents, recognizing that a number of adolescents divert their controlled medication to peers for nonmedical use (McCabe, West, Teter, et al., 2011b). And finally, given the high correlation between nonmedical use of controlled medications and other forms of substance abuse (Boyd et al., 2009; Rigg & Ford, 2014; Schepis & Krishnan-Sarin, 2008), health providers should reexamine the quality of their patient assessments prior to writing a prescription for a controlled medication. It should be standard practice that a brief substance use assessment is conducted before prescribing a controlled medication; if the assessment is positive, the patient should be closely monitored while using the anxiolytic or sleep medication.

### Limitations

This study represents the first longitudinal study to examine the nonmedical use of Schedule IV anxiolytic and sleep medication in an adolescent sample. The response and attrition rates are consistent with those of national studies, and the diverse sample is large enough to examine subgroup differences, although the prevalence and incidence of anxiolytic and sleep medication use was relatively low. The study design also constrains broad interpretations. First, we cannot generalize because the sample was from one region and included only adolescents attending school. Second, the estimates are subject to potential bias introduced when assessing sensitive behaviors through self-report, and in some cases, we had small cell sizes. Finally, our earlier work found important differences between medical users, medical misusers, and nonmedical users (McCabe, Boyd, & Young, 2007b; McCabe et al., 2013c), and thus, we use different definitions than the NSDUH (Boyd & McCabe, 2008).

Despite their relative safety profile when used correctly, this longitudinal, prospective study demonstrates that adolescents prescribed anxiolytic and sleep medication might be at greater risk for engaging in nonmedical use, a behavior that is not only illegal, but also confers substantial risk for overdose, substance abuse disorders, and deviant behaviors (Ford & McCutcheon, 2012; Jann, Kennedy, & Lopez, 2014; Schepis & Krishnan-Sarin, 2008).

Many national studies fail to differentiate between using someone else's prescription and using one's own prescription and these distinctions have implications; thus, this study pro-

vides a new perspective of adolescent prescription drug abusers. Appropriate prevention and clinical interventions will require an understanding of the characteristics of nonmedical users, including whether they use someone else's prescription for self-treating or sensation-seeking motivations. These results might provide some direction for designing such interventions.

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ADOLESCENTS' NONMEDICAL USE OF MEDICATIONS

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# Cannabis Use History and Characteristics of Quit Attempts: A Comparison Study of Treatment-Seeking and Non-Treatment-Seeking Cannabis Users

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Cannabis is the most commonly used illicit substance worldwide, and cannabis use disorders (CUDs) are correspondingly high. Increased demand for treatment and relatively low rates of positive clinical outcomes has led to a large scientific investment in the development of interventions for the treatment of CUD. Much of this research is conducted with cannabis users who are not seeking treatment at the time of study participation, and it is unknown whether these individuals are representative of those who seek treatment. This study contrasted samples of cannabis users participating in screening interviews for treatment and nontreatment research studies. Several differences between groups emerged: Treatment-seekers were more likely to be female (43% vs. 29%), older (33.4 vs. 29.7 years), and have longer cannabis use histories compared with non-treatment-seekers ( $p = .007$ ). Treatment-seekers were more likely to report experiencing guilt after using cannabis and to feel that cannabis use has been a problem for them. Additionally, treatment-seekers reported a greater mean number of reasons for making a quit attempt, experiencing a greater number of withdrawal symptoms, and employing more coping strategies during prior quit attempts. Despite the aforementioned differences, the 2 groups were similar on several key characteristics, particularly with regards to current levels of cannabis use and related problems.

*Keywords:* cannabis, cannabis use disorder, treatment

Cannabis continues to be the most widely used illicit substance in the world (UNODC, 2012; WHO, 2014). Cannabis use disorders (CUD) are relatively prevalent worldwide, and were recently estimated to occur in approximately 9% of cannabis users in the United States (Meier et al., 2012). The number of individuals seeking treatment for CUD has been increasing in the United States, Europe, and Australia (SAMHSA, 2010; EMCDDA, 2008; NCPIC, 2012).

Clinical research has demonstrated that a variety of evidence-based psychosocial therapies are effective treatments for CUD, including motivational interviewing (MI), cognitive-behavioral therapy (CBT), and contingency management (CM; Davis et al., 2014). Despite this, most individuals who enter treatment fail to achieve sustained periods of abstinence despite having a reported desire to quit (Budney, Roffman, Stephens, & Walker, 2007; Davis et al., 2014). An expanding portfolio of research is being conducted to improve understanding of cannabis use, consequences, and cessation with the aim of improving treatment outcomes.

Much of this research is conducted with frequent cannabis users who are not seeking treatment at the time of study participation. Examples include early Phase I/II trials of medications that are potential pharmacotherapies and laboratory studies designed to model craving, withdrawal, drug self-administration and relapse. While essential for cost-effective evaluation and development, little research has been conducted to evaluate whether the non-treatment-seeking cannabis users who volunteer for these studies are representative of the population that presents for treatment.

Research with other substances of abuse has been conducted to explore demographic similarities and differences between samples of treatment-seeking and non-treatment-seeking research participants. Findings indicate that treatment-seeking and non-treatment-seeking samples are largely similar, with some noteworthy differences.

Briefly, Carroll and Rounsaville (1992) and Smith, Dent, Coles, and Falek (1992) found that treatment- and non-treatment-seeking cocaine users were comparable on measures of severity of cocaine use, though non-treatment-seeking cocaine users tended to experience fewer problems and negative consequences as a result of their drug use. Rounsaville and Kleber (1985) explored differences between opiate-dependent individuals seeking treatment versus those not seeking treatment and found that while both treatment-seeking and non-treatment-seeking participants were similar on duration and severity of opiate use, non-treatment-seekers tended to report more adequate social functioning and fewer problems related to their substance use.

Though published reports are available that characterize samples of treatment-seeking cannabis users (Copeland, Swift, & Rees, 2001; Stephens, Babor, Kadden, Miller, & the Marijuana Treatment Project Research Group, 2002; Stephens, Roffman, & Simpson, 1993; Strike, Urbanoski, & Rush, 2003) and non-

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treatment-seeking cannabis users (Buchowski et al., 2011; Copersino et al., 2006a; Copersino et al., 2006b; Levin et al., 2010; Stein, Hagerty, Herman, Phipps, & Anderson, 2011), no studies have provided a direct comparison of these two groups. The present study was conducted to perform such a comparison in order to identify unique characteristics of those who seek treatment, and also evaluate the degree to which research volunteers for laboratory-based clinical research studies are representative of those who seek formal treatment.

## Method

### Participants

Participants represent a cohort of volunteers who were evaluated for laboratory and clinical research studies of cannabis at the Johns Hopkins University Behavioral Pharmacology Research Unit (BPRU) between November 2008 and November 2013. The BPRU is a broad-based substance abuse clinical research program located in Baltimore, Maryland that encompasses both human laboratory research and outpatient treatment research for a variety of legal and illegal substances. The laboratory studies included in this evaluation consisted of residential studies lasting between 20 and 52 days in duration, requiring between 13 and 52 residential nights (Vandrey, Smith, McCann, Budney, & Curran, 2011; Vandrey et al., 2013). The clinical study involved participation in a 12-week outpatient treatment program (currently ongoing). All studies included administration of investigational medications (i.e., dronabinol, zolpidem), and the residential studies involved cannabis self-administration.

All study volunteers were screened over the telephone for initial research eligibility prior to completing clinical interviews and assessments in person.

Participation was limited to current cannabis users (verified via urine toxicology test) between the ages of 18 and 55 who were physically healthy and reported experiencing withdrawal during prior periods of abstinence. In total, 205 volunteers were evaluated for research eligibility. Of those, 74 wanted to quit/reduce their cannabis use and were seeking formal treatment and 131 were volunteering for paid research participation and expressed no desire to stop or reduce cannabis use.

### Assessments

The Marijuana Quit Questionnaire (MJQQ; Boyd et al., 2005; Copersino et al., 2006a) was administered to all participants using pencil and paper during the intake assessment. The MJQQ is a 176-item, individually administered, self-report questionnaire that collects data on demographic information, cannabis use history, and information about prior attempts to quit cannabis use including: reasons for quitting and resuming use; coping strategies used while quitting (Boyd et al., 2005); withdrawal symptoms experienced (yes/no) during quit attempts, and intensity of experienced symptoms (1 = *very little* to 5 = *very high*) (Copersino et al., 2006a); and substance use prior to and during quit attempts.

Within the MJQQ, participants were given a list of 26 potential reasons for quitting cannabis use, and were asked to rate the extent to which each reason matched their personal reasons for initiating their most difficult prior quit attempt using a scale from 0 to 4 (0 =

*not at all*, 1 = *a little*, 2 = *moderately*, 3 = *quite a bit*, 4 = *extremely/very much*). Dichotomous variables were created based on these possible response options (“not at all” vs. “a little or greater”).

Participants also rated the extent to which their most difficult prior quit attempt affected their consumption of other legal and illegal substances. To assess reasons for cannabis relapse, participants were asked “Why did you start smoking cannabis again after your quit attempt?” and asked to select all that applied from a list of 28 potential reasons.

Before answering questions related to the “most difficult” quit attempt, participants were presented with the following: “Now think of the most difficult time you had intentionally stopping all marijuana use (while not in a controlled environment such as jail or hospital). Please answer all the following questions only as related to that quit attempt. If more than one quit attempt was of the same difficulty, please use the longest quit attempt.”

### Statistical Analyses

The sample was restricted to individuals who had made a quit attempt at some point in their lives [83% of non-treatment-seekers (131/158) and 86% of treatment-seekers (74/86)], leaving a total sample of 205 current cannabis users for the present analyses. Statistical significance of differences between treatment-seeking and non-treatment-seeking cannabis users on the basis of sociodemographic and cannabis use history, quit attempt characteristics, reasons for attempting to quit, use of coping strategies, substance use, and reasons for resuming cannabis use was established using *t* tests for comparisons of means and chi-square ( $\chi^2$ ) tests for comparisons of categorical data. Analyses of use of substances other than cannabis were limited to individual substances endorsed by 5% or more of the sample. All analyses were completed using STATA version 13.0 statistical software (StataCorp, 2013).

## Results

### Sociodemographic and Cannabis Use History Characteristics

Participant characteristics are shown in Table 1. Treatment seekers were more likely to be female  $\chi^2(1, n = 205) = 4.26, p = .039$  and were older than non-treatment-seeking participants,  $t(201) = -2.7406, p = .007$ . Despite initiating first cannabis use ( $p = 0.860$ ) and frequent cannabis use ( $p = .712$ ) at similar ages, treatment seekers had longer histories of overall use,  $t(201) = -2.7348, p = .007$  and frequent use,  $t(201) = -2.6145, p = .010$ , likely reflective of the age difference between the two samples.

Additionally, treatment-seeking participants were more likely to report feeling guilt or remorse following cannabis use  $\chi^2(1, n = 205) = 7.11, p = .008$ , as well as to report feeling that cannabis use has been a problem for them at some point during their lives ( $\chi^2(1, n = 205) = 31.20, p < .001$ ). Conversely, non-treatment-seekers reported smoking more blunts (i.e., cannabis cigarettes rolled using cigar paper) during an average 24-hour period prior to their previous “most difficult” quit attempt than did treatment seekers,  $t(197) = 3.3577, p < .001$ . No significant differences were observed between treatment seekers and non-treatment-



COMPARISON OF CANNABIS USERS

Table 1  
*Sociodemographic and Cannabis Use Characteristics*

Characteristic	Non-treatment-seekers (n = 131)	Treatment seekers (n = 74)	p-value
<b>Sociodemographics</b>			
Age (mean, SD)	29.7 (8.5)	33.4 (10.7)	0.007
% Male	71.0	56.8	0.039
% Af. American	82.3	86.5	0.436
% Unemployed	75.4	70.3	0.426
% >High school education	80.9	90.5	0.068
% Never married	83.1	79.7	0.771
<b>Cannabis use</b>			
Age at first use (mean, SD)	14.7 (2.7)	14.6 (4.0)	0.860
Age of frequent use (mean, SD)	16.8 (3.7)	17.0 (4.2)	0.712
Total years of use (mean, SD)	15.0 (8.7)	18.8 (10.9)	0.007
Years of frequent use (mean, SD)	13.0 (8.2)	16.5 (10.5)	0.010
Days used in past 30 (mean, SD)	28.6 (4.3)	27.7 (6.8)	0.249
# of blunts smoked per occasion	2.2 (1.6)	2.0 (1.4)	0.511
# of blunts smoked in 24 hours	6.6 (5.2)	4.4 (2.5)	<0.001
% Meet CUD criteria	93.1	90.5	0.507
% Cannabis abuse criteria	80.1	81.1	0.872
% Cannabis dependence criteria	74.8	81.1	0.305
% Prior formal treatment	7.6	13.5	0.260
% Report guilt after use	22.9	40.5	0.008
% Report problems related to cannabis use	27.5	67.6	<0.001
Age cannabis became a problem (mean, SD)	20.7 (18.66)	22.0 (8.20)	0.420

Note. SD = standard deviation; CUD = cannabis use disorder (cannabis abuse and/or dependence).

seekers on the basis of *DSM-IV-TR* (APA, 2000) criteria for cannabis abuse or dependence ( $p = .507$ ).

**Characteristics of Prior Attempts to Quit**

Characteristics of quit attempts are shown in Table 2. Treatment seekers and non-treatment-seekers reported making a similar number of lifetime quit attempts ( $p = 0.087$ ), and similar proportions from each group reported a past-year quit attempt ( $p = 0.260$ ).

During prior quit attempts, treatment seekers reported having achieved a significantly longer period of complete abstinence compared with non-treatment-seekers,  $t(201) = -5.2724$ ,  $p < .001$ . When reporting about their most difficult prior quit attempt, treatment seekers reported a significantly greater number of withdrawal symptoms,  $t(191) = -5.5454$ ,  $p < .001$  and having engaged in that quit attempt more recently,  $t(201) = 2.1845$ ,  $p = .030$  than non-treatment-seekers.

**Reasons for the Quit Attempt**

Reasons for attempting to quit cannabis use are shown in Table 3. The most commonly endorsed reasons for initiating a quit

attempt were “To save the money that I spent on cannabis” (78.2%), “To prove to myself that I wasn’t addicted” (60.4%), and “So that I could feel in control of my life” (56.3%). Conversely, reasons such as “I knew other people who had health problems caused by cannabis” (12.2%), “I was worried that cannabis use would shorten my life” (17.3%), “To avoid a conviction or jail sentence” (19.3%) and “Someone gave me an ultimatum” (19.8%) were less commonly endorsed. When comparing the two groups, treatment seekers were significantly more likely to endorse a variety of individual reasons for quitting (see Table 3), and, on average, endorsed a significantly greater number of reasons than non-treatment-seekers,  $t(203) = -3.1074$ ,  $p = .002$ . Items with the greatest disparity between individuals seeking treatment compared with non-treatment seekers tended to relate to self-image and positive life change (e.g., would like myself better, want to get control of life, to increase energy, be more productive during the day, be a good example for children).

**Coping Strategies**

Characteristics of the coping strategies reported by cannabis users during their most difficult quit attempt can be found in

Table 2  
*Characteristics of Prior Quit Attempt(s)*

Characteristic	Non-treatment-seeking (Mean + SD)	Treatment seeking (Mean + SD)	p-value
Number of quit attempts	4.3 (10.4)	7.4 (4.3)	0.087
Longest time quit (days)	6.7 (4.2)	292.2 (555.3)	<0.001
% Attempting to quit in past year	76.1	68.9	0.260
Days since most difficult attempt	1329.3 (1032.4)	853.4 (1061.9)	0.030
Days of abstinence achieved	165.3 (412.8)	156.7 (44.2)	0.895
# of withdrawal symptoms	8.8 (4.9)	13.0 (5.1)	<0.001
Average intensity of withdrawal	3.4 (0.8)	3.2 (0.9)	0.057

Table 3  
*Self-Reported Reasons for Making a Quit Attempt*

Reason	Total sample	Non-treatment-seeking	Treatment seeking	p-value
Number of reasons, mean (SD)	9.2 (6.4)	8.2 (6.3)	11.0 (6.3)	0.002
I would like myself better	45.2	36.3	60.3	0.001
So I wouldn't have to leave social events/other people's homes	27.9	25.8	31.5	0.389
To feel in control of my life	56.3	47.6	71.2	0.001
Spouse/children/others would stop nagging me	44.2	38.7	53.4	0.045
To get praise from people I am close to	26.9	22.6	34.2	0.075
Using marijuana didn't fit who I want to be	46.2	35.5	64.4	<0.001
Using marijuana is becoming less socially acceptable	24.9	19.3	34.3	0.020
Someone gave me an ultimatum	19.8	19.3	20.5	0.839
To avoid health problems	41.1	37.9	46.6	0.232
Concern about suffering serious illness	25.4	22.6	30.1	0.239
People would be upset if I didn't quit	28.4	25.0	34.2	0.165
To get more things done during the day	51.3	43.5	64.4	0.005
Marijuana was hurting my health	34.0	30.6	39.7	0.194
To save money	78.2	72.6	87.7	0.013
To prove to myself that I wasn't addicted	60.4	56.4	67.1	0.139
There is drug testing where I work	45.7	41.9	52.0	0.169
I knew other people who had marijuana-related health problems	12.2	8.9	17.8	0.064
Marijuana would shorten my life	17.3	11.3	27.4	0.004
Marijuana-related legal problems	20.7	22.4	17.8	0.442
To avoid a conviction or jail sentence	19.3	20.2	17.8	0.686
To avoid involvement in criminal activities	23.3	19.3	30.1	0.084
I don't want to be a bad example for children	55.3	47.6	68.5	0.004
To have more energy	54.3	42.7	74.0	<0.001
So my hair and clothes wouldn't smell like marijuana	34.0	26.6	46.6	0.004
To avoid burning holes in clothes/furniture	22.4	19.5	27.4	0.201

Table 4. Common coping strategies reportedly used during quit attempts included getting rid of cannabis (58.1%) and getting rid of cannabis paraphernalia (46.0%), while medical or counseling approaches, such as attending self-help groups, counseling/therapy, physician care, prescription and nonprescription medication, herbal medicine, and acupuncture were much less commonly reported (<10%). Treatment seekers reported utilizing significantly more coping strategies during their quit attempt than did non-treatment-seekers,  $t(190) = -3.1154, p = .0021$ . With regard to individual coping strategies, treatment seekers were significantly more likely to report that they “stopped associating with people who smoke cannabis”  $\chi^2(1, n = 198) = 5.37, p = .021$ ; “stopped going places where cannabis was smoked”  $\chi^2(1, n = 199) =$

4.20,  $p = .041$ ; “got rid of my cannabis paraphernalia”  $\chi^2(1, n = 198) = 5.50, p = .019$ ; “attended a self-help group”  $\chi^2(1, n = 198) = 8.24, p = .014$ ; and “got counseling/psychotherapy”  $\chi^2(1, n = 198) = 13.35, p < .001$  compared with non-treatment-seekers.

**Substance Use**

Self-reported substance use can be found in Table 5. During the 6 months prior to participants' most difficult quit attempt, reported use of caffeine, alcohol, tobacco, and non-narcotic pain medications did not differ by treatment-seeking status. However, treatment seekers were more likely to report increasing their use of

Table 4  
*Self-Reported Coping Strategies Utilized During Most Difficult Quit Attempt*

Coping strategy	Non-treatment-seeking	Treatment seeking	p-value
Number of strategies used, mean (SD)	2.7 (0.20)	3.8 (0.29)	0.002
Encouragement from family	33.1 (42)	43.1 (31)	0.160
Encouragement from friends	30.2 (38)	40.3 (29)	0.148
Stopped associating with people who smoke cannabis	27.0 (34)	43.1 (31)	0.021
Stopped going places where cannabis was smoked	33.9 (43)	48.6 (35)	0.041
Got rid of cannabis	53.2 (67)	66.7 (48)	0.064
Got rid of cannabis paraphernalia	39.7 (50)	56.9 (41)	0.019
Attended a self-help group	2.4 (3)	12.5 (9)	0.004
Counseling/psychotherapy	2.4 (3)	16.7 (12)	<0.001
Religious support/prayer	23.0 (29)	23.6 (17)	0.924
Saw a physician	1.6 (2)	1.4 (1)	0.912
Took nonprescription medication	5.6 (7)	11.1 (8)	0.155
Took prescription medication	3.2 (4)	0 (0)	0.127
Took herbal medicine, vitamins, nutritional supplement	11.9 (15)	8.3 (6)	0.432

COMPARISON OF CANNABIS USERS

Table 5  
*Self-Reported Substance Use and Changes in Substance Use During Most Difficult Quit Attempt*

	Non-treatment-seekers	Treatment seekers	<i>p</i> -value
<b>Caffeine</b>			
Using before attempt	78.3 (101)	67.1 (47)	0.085
Increased during attempt	11.6 (15)	7.1 (5)	0.063
Decreased during attempt	20.2 (26)	10.0 (7)	
No change during attempt	48.1 (62)	51.4 (36)	
Not using at time of quit attempt	20.2 (26)	28.6 (20)	
Started using during attempt	0 (0)	2.7 (2)	
<b>Alcohol</b>			
Using before attempt	72.1 (93)	72.1 (49)	0.996
Increased during attempt	20.2 (26)	28.6 (20)	0.016
Decreased during attempt	20.9 (27)	4.3 (3)	
No change during attempt	34.1 (44)	40.0 (28)	
Not using at time of quit attempt	24.8 (32)	27.1 (19)	
Started using during attempt	0 (0)	0 (0)	
<b>Tobacco</b>			
Using before attempt	68.2 (88)	67.1 (47)	0.877
Increased during attempt	27.9 (36)	35.7 (25)	0.509
Decreased during attempt	12.4 (16)	11.4 (8)	
No change during attempt	26.4 (34)	25.7 (18)	
Not using at time of quit attempt	32.6 (42)	24.3 (17)	
Started using during attempt	0.8 (1)	2.9 (2)	
<b>Non-narcotic pain medications</b>			
Using before attempt	26.6 (34)	31.4 (22)	0.467
Increased during attempt	7.9 (10)	10.0 (7)	0.835
Decreased during attempt	3.1 (4)	4.3 (3)	
No change during attempt	20.5 (26)	25.7 (18)	
Not using at time of quit attempt	66.9 (85)	58.6 (41)	
Started using during attempt	1.6 (2)	1.4 (1)	

alcohol during their quit attempt (28.6% vs. 20.2%) while non-treatment-seekers were more likely to report decreasing their alcohol use (20.9% vs. 4.3%;  $\chi^2(1, n = 199) = 10.26, p = .016$ ).

**Reasons for Resuming Use**

All participants were current cannabis users at the time these assessments were conducted, and had thus resumed use of cannabis following their most difficult prior quit attempt. The most commonly endorsed reasons for resuming cannabis use following the most difficult prior quit attempt were “to relax” (78.7%), “to sleep better” (70.0%), “because I was craving cannabis” (69.5%), and “I missed feeling ‘high’” (69.5%). Treatment seekers were more likely to report “to feel less depressed” ( $\chi^2(1, n = 197) = 6.20, p = .013$ ) and “to sleep better” ( $\chi^2(1, n = 197) = 4.34, p = .037$ ) as reasons for relapse compared with non-treatment-seekers.

**Discussion**

The present study compared demographic and substance use characteristics of current cannabis users seeking treatment with those volunteering for non-treatment-based laboratory studies. Treatment seekers tended to be older, a finding that is not surprising given prior research showing associations between older age and treatment-seeking behavior (Mojtabai, Olfson, & Mechanic, 2002). Treatment seekers were also more likely to be female, but were still a minority relative to males in both groups. Prior research indicates that females are less likely to seek substance use treatment due to multiple access-related barriers (Green, 2006), so it is possible that this difference reflects a gender difference in

willingness to participate in residential research studies. Because the reported age of cannabis use initiation and age that frequent cannabis use began were similar across study groups, the outcome that treatment seekers had longer histories of use and frequent use compared with non-treatment-seekers likely reflects the age difference between the two groups.

With regard to experiences during prior quit attempts, treatment seekers were reportedly able to stay quit for a longer period of time than non-treatment-seekers before resuming cannabis use and reported making a quit attempt more recently than non-treatment-seekers. Treatment seekers reported experiencing a greater number of withdrawal symptoms during abstinence on average and endorsed a greater number of reasons for making a quit attempt. The former finding could indicate a greater degree of impairment during abstinence resulting in motivation to quit and entry into treatment-based studies, while the latter further points to an increased motivation to quit using cannabis.

Despite these differences, the two groups were similar in terms of several key characteristics. Treatment- and non-treatment-seekers reported comparably heavy levels of cannabis use, both in terms of the number of days used and daily use prior to their most difficult quit attempt, as well as in terms of the average number of blunts smoked by an individual at one time. Additionally, and perhaps most interestingly, no group differences were observed for endorsement of DSM-IV cannabis abuse and/or dependence, which indicates comparable levels of clinical impairment between the two groups. Utilization of formal treatment programs during prior quit attempts was low among both subgroups, indicating that most had tried to quit on their own. This is consistent with the

general lack of treatment engagement seen among substance users in the United States, but it is unclear whether this reflects a lack of treatment availability, a stigma associated with seeking treatment in general, or specifically for cannabis use, or a beliefs among this group that initially they would be successful quitting on their own.

There are strengths and limitations of this study that warrant acknowledgment. Strengths include: a) the use of identical recruitment strategies and assessments across studies, b) all research volunteers resided and presented for clinical and laboratory cannabis research participation in a single geographic location (greater Baltimore area), c) great degree of overlap with regards to study eligibility criteria, and d) this is the first direct and explicit comparison of cannabis using treatment- versus non-treatment-seeking research volunteers. Limitations of the study include: a) the reliance on retrospective self-report as the primary source of data regarding prior quit attempts, which are subject to recall bias, and b) cross-sectional approach.

Overall, this study provides a better understanding of the comparative characteristics of treatment- and non-treatment-seeking cannabis users than what was previously available. Similar to other examinations of treatment- versus non-treatment-seeking samples of substance users, both similarities and differences were observed. Treatment seekers reported significantly more withdrawal symptoms during abstinence, more reasons for attempting to quit, and utilized a greater number of coping strategies during their most difficult quit attempt, but substance use characteristics between groups were similar. These findings, taken together, potentially characterize treatment-seeking cannabis users as being more motivated to attempt to quit using cannabis than non-treatment-seeking participants, but having more difficulty doing so. Non-treatment-seekers, however, may also benefit from treatment, given that they were found to meet DSM-IV diagnostic criteria for abuse/dependence in comparably high proportions and also reported heavy cannabis use. Group differences based on motivation to quit are particularly noteworthy, given findings from Perkins and Lerman (2014) showing that, among cigarette smokers receiving a nicotine patch, varenicline, or bupropion in Phase 2 studies, treatment for smoking cessation was more effective among smokers who were already high in intrinsic quit motivation, even when given monetary rewards for initiating and maintaining abstinence. In the future, similar research among cannabis users is warranted to assess the importance of intrinsic motivation to quit among participants in research targeting novel treatment development for cannabis use disorders.

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# The Teen Sleep Loss Epidemic: What Can Be Done?

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Making sense of “expert advice” is among the many challenges of parenting. With the media circulating contrasting views on the importance of sleep in adolescence, parents and practitioners would benefit from an accessible synopsis of the scientific literature. We tackled the multifaceted issue of adolescent sleep and daytime functioning, presenting the findings with their methodological limitations. Given what is known about sleep in this population, we offer guidelines that are both realistic and substantiated in empirical findings. Our aim is to put into practice the science behind adolescent sleep.

*Keywords:* adolescents, cognition, parent recommendations, school performance, sleep

There is a great deal of conflicting advice about raising children, and the adolescent years are no exception. Consider these headlines from 2012: “Study or Sleep? For Better Grades, Teens Should Go to Bed Early” (*TIME*, Sifferlin, 2012, August 1); and “How Much Sleep Do Teens Really Need? Maybe Less Than You Think” (*Today*, Rubin, 2012, February 19). Likewise, *U.S.A. Today* claimed there is “No Science, Just Expert Guesses on How Much Sleep Kids Need” (Healy, 2012, February 2), even though “Docs Urge Delayed School Start Times for Teens” (Healy, 2014, August 25).

A growing body of literature has emphasized the consequences of sleep loss in adolescence, defined by the World Health Organization (2014) as 10 and 19 years of age. Adolescence is marked by a tendency toward later bedtimes, a phenomenon known as phase delay (Crowley, Acebo, & Carskadon, 2007). Although this change in sleep timing can continue into the early 20s (Roenneberg et al., 2007), it specifically presents a problem for teenagers, who truncate their sleep for early high school classes. This resulting “sleep debt” is associated with impairments in numerous domains, such as school performance (Preckel et al., 2013; Wolfson & Carskadon, 2003; Wolfson & Carskadon,

1998), driving (Hutchens et al., 2008; Martiniuk et al., 2013; Pizza et al., 2010), and several aspects of cognition (Beebe, Rose, & Amin, 2010; Gais, Lucas, & Born, 2006; Gradisar, Terrill, Johnston, & Douglas, 2008; Telzer, Furlini, Lieberman, & Galván, 2013). Still, other studies have shown no effect of sleep loss on daytime function (Kopasz et al., 2010; Voderholzer et al., 2011), leading some to assert that adolescents compensate for inadequate sleep (Beebe, DiFrancesco, Tlustos, McNally, & Holland, 2009) and even fare better with *less* sleep in certain circumstances (Eide & Showalter, 2012), issues we address in this article.

How does one interpret these findings in a well-informed approach to adolescent sleep? Here we offer a summary of the evidence to guide sleep recommendations for teens, focusing on factors contributing to the variable findings. First, we highlight the crucial characteristics of adolescent sleep, reviewing the established developmental phenomenon of adolescent phase delay. We then unpack the research investigating sleep loss and school performance, driving risk, and cognition and memory, addressing issues to consider when interpreting the research. Finally, we provide evidence-based guidelines to help teens get the most out of their sleep.

## Adolescent Phase Delay

The transition from childhood to young adulthood encompasses many changes, including the penchant to delay bedtime despite having to meet early school obligations. This shift

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in sleep hygiene, or healthy behaviors and attitudes toward sleep, has often been described in terms of biological and sociobehavioral influences, factors we discuss in turn.

### **Biological Contributions**

Understanding adolescent sleep relies in part on conceptualizing developmental changes of two sleep-wake mechanisms: homeostatic sleep drive (Process S) and the circadian rhythm (Process C; Crowley et al., 2007). Simply put, Process S states that the longer one is awake, the more sleep becomes necessary, and that sleeping decreases this need over time. Quantifying homeostatic sleep drive involves measuring the time until sleep onset after a period of sleep deprivation, with shorter latencies indicating a larger accumulation of sleep need. Experiments using this method have demonstrated that mature adolescents take longer to fall asleep than younger children after 36 hr of sleep deprivation, indicating that sleep drive accrues more slowly as a function of pubertal development (Jenni, Achermann, & Carskadon, 2005). Adolescents' protracted accumulation of Process S is hypothesized to contribute to their propensity to stay up later and delay the sleep-wake cycle, even in circumstances of sleep loss (Crowley et al., 2007).

The circadian system, or Process C, encompasses fluctuations of internal mechanisms across the 24-hr day, informally referred to in the literature as the "biological clock." One of the most widely used circadian indicators is the release and offset of melatonin, a light-sensitive hormone secreted in darkness to signal sleep (Crowley et al., 2007). Carskadon and colleagues have made a significant contribution to this topic, noting that melatonin offset occurs later in the 24-hr period for adolescents than younger children and adults (e.g., Carskadon, Acebo, Richardson, Tate, & Seifer, 1997). The result is a longer internal day: Whereas adult melatonin measurements depict a rhythm of about 24.1 hr, this was estimated at 24.3 hr in adolescents (Carskadon, Labyak, Acebo, & Seifer, 1999). The delay and elongation of the melatonin period is understood to account for the "eveningness" phase preference and predisposition for postponed sleep specific to this population (Crowley et al., 2007). This change is driven by age and pubertal stage, as older,

more mature adolescents exhibit more pronounced melatonin delays than those who are younger and less mature (Carskadon et al., 1997). As such, phase delay peaks earlier in females due to the advanced onset of puberty (Roenneberg et al., 2007).

### **Sociobehavioral Contributions**

The biological drive to delay bedtimes combines with social and behavioral factors to influence sleep hygiene in adolescence. The transition to young adulthood brings increased autonomy, which translates into a decline in parental influence over teens' sleeping behavior across the ages of 13 and 18 (Short et al., 2011). When joined with the physiological need to defer sleep, teens' self-selected bedtimes become increasingly later as a function of age, with older adolescents getting less sleep than their younger counterparts (Short et al., 2011). In addition, balancing the increased social and academic commitments specific to this phase of development is likely to come at the expense of sleep. For instance, homework was identified as a primary factor affecting sleep in students ages 12–19, where greater time spent on assignments outside school predicted later bedtimes and shorter sleep (Adam, Snell, & Pendry, 2007). Similarly, Carskadon (1990) reported that 12- to 19-year-olds allocating more than 20 hr per week to after-school employment go to bed later, sleep less, and feel sleepier during the day than those working less than 20 hr. Involvement in extracurricular activities casts a similar trend; however, the problem is magnified as obligations compile, as latest bedtimes and greatest daytime sleepiness were reported in subjects who engage in both (Carskadon, 1990).

Another key factor affecting adolescent sleep is peer interaction, which has become increasingly problematic with the incorporation of technology and social media. According to a study in 2009, up to 44% of U.S. young people between 12 and 18 years of age reported accessing their mobile phones before bed, and up to 55% admitted to using the Internet at that time (Calamaro, Mason, & Ratcliffe, 2009). Hale and Guan (2014) reported that 90% of studies published on the topic of technology use in 5- to 17-year-olds noted disrupted sleep, with shortened sleep and later bedtimes showing the most consistent effects. Evening exposure is of par-

ticular concern, because 12- to 14-year-old boys who engaged in to 60 min of computer gaming before bed exhibited longer times to fall asleep and lighter sleep as a function of the evening screen time (Dworak, Schierl, Bruns, & Strüder, 2007). In adults, “exciting” shooter games increase heart rate and suppress evening sleepiness more than “boring” math games, and the games disproportionately decreased melatonin production if the screen emitted bright light (45 lux) as opposed to dim light (15 lux) (Higuchi, Motohashi, Liu, Ahara, & Kaneko, 2003). These latter results are especially pertinent when taken with findings that adolescents are particularly likely to experience phase delay in response to evening light exposure (Hagenauer, Perryman, Lee, & Carskadon, 2009).

### **Daytime Consequences of Adolescent Sleep Debt**

With the many factors postponing bedtimes, early school start times can trigger an accumulation of sleep loss referred to as “sleep debt” (Wolfson & Carskadon, 1998). Here we elucidate some of the findings surrounding the effect of sleep debt on school achievement and driving, as well as their cognitive underpinnings.

### **Academic Performance**

A substantial amount of attention has been paid to inadequate sleep in the classroom. In one of the most widely cited works on this topic, Wolfson and Carskadon (1998) found that sleep amount declined by 40 min across age in a sample of high school students, with those getting Cs, Ds, and Fs sleeping on average 25 min less on school nights than those getting As and Bs. Inadequate sleep in this sample was also related to increased sleepiness, greater incidence of behavioral problems, and higher scores on a scale of depressive mood (Wolfson & Carskadon, 1998). These findings have since prompted a surge of investigations on sleep and classroom behavior, which generally agree that less total sleep time, later bed- and rise times, irregular sleep schedules, sleep disturbances, and daytime sleepiness correlate negatively with measures of school achievement, teacher behavior ratings, and self-assessed mood (Wolfson & Carskadon, 2003). The sleep-school relationship is largely attributed to the mismatch

between the adolescent biological clock and the early demands of school. In the seminal study by Wolfson and Carskadon (1998), sleep amount declined across age as a function of delayed bedtimes, since wake times remained relatively consistent across older and younger children. Furthermore, a study of high school students by Preckel et al. (2013) found that the predisposition to postpone bedtime predicts lower grade point average even when other factors like conscientiousness, work avoidance, and motivation are controlled.

However, a few analyses have indicated that the connection between school and sleep may not be so robust. A study of Maryland high school students failed to find an effect of sleep on grade point average, an important consideration given the costly effects of reforming school start times (Eliasson, Eliasson, King, Gould, & Eliasson, 2002). Furthermore, one study has suggested that too much sleep may be detrimental to adolescent daytime functioning. Eide and Showalter (2012) compared standardized test scores of 16- to 18-year-olds based on their response to the question: “How many hours of sleep do you usually get a night?” The results indicated that the amount of sleep needed for optimal performance was just under 7 hr, although the authors remarked that using a solitary indicator of “usual” sleep may have been too restrictive to capture the wide variations in sleep habits within a single participant (Eide & Showalter, 2012).

The latter study illustrates the importance of comprehensive sleep and academic performance assessments when interpreting the results of these studies. Although some self-report methods have been validated against objective measures of sleep in children and adolescents (e.g., Sleep Habits Survey; Wolfson & Carskadon, 1998), use of these surveys and methods has varied widely across research groups. Furthermore, Wolfson and Carskadon (2003) commented on the ambiguity of “academic performance,” noting that although some equate it with single measures (e.g., grade point average, standardized assessment), others rely on student reports or lump these with other factors, such as absenteeism and graduation rate. This ill-defined variable is also subject to a number of factors co-occurring with sleep, including but not limited to behavioral problems, socioeconomic status, family structure, and life stress

(Wolfson & Carskadon, 2003). In conclusion, although the connection between sleep and school functioning appears well supported, the nature of these assessments may leave the results open to interpretation.

### **Car Crash Risk**

Young drivers are a national safety concern due to the dangerous cocktail of inexperience and immaturity (Groeger, 2006). This problem is intensified with sleep loss, because more than half of drowsiness-related accidents involve drivers under the age of 25 (National Sleep Foundation, 2000). An analysis of crash risk factors in the United States found that 17- to 22-year-old drivers sleeping fewer than 8 hr per night were 1.28 times more likely to have been involved in a motor vehicle accident than drivers who sleep 8 hr or more (Hutchens et al., 2008). Further, driving drowsy and alone was associated with a 36% greater accident risk in this sample (Hutchens et al., 2008). Data from other cohorts have indicated that threat posed by adolescent sleep debt on the road is widespread. Australian drivers aged 17 to 24 who sleep less than 6 hr per night are 20% more likely to have been involved in a motor vehicle crash (Martiniuk et al., 2013). In a survey of Italian high school students, drivers with a history of at least one motor vehicle crash attributed the accident to sleepiness 15% of the time, and reported poorer sleep and an increased tendency to drive while drowsy than those with no crash history (Pizza et al., 2010). The risk of crashing between 2:00 and 4:00 a.m. is disproportionately high for 15- to 18-year-olds, which has been interpreted as reflecting a combination of the teenager's lack of experience, underdeveloped cognitive control, and deferred sleep-wake patterns (Groeger, 2006).

It is worth noting that most of the work published on this issue have employed methods (e.g., self-report, correlation) that are scrutinized in the sleep and academic performance literature. The lack of tangible support for sleep and teen car safety could be resolved using driving simulations similar to studies assessing drowsy driving in subjects over 18 (see Banks & Dinges, 2007). A caveat about using this method, however, is that it overemphasizes some aspects of performance impairments compared with genuine driving situations, such as

sleepiness and slowed reaction times (Philip et al., 2005).

### **Cognition and Memory**

The consequences of adolescent sleep debt in school and on the road involve real-world tasks that depend on a number of cognitive systems sensitive to sleep loss. Illustrating this point in the classroom, Beebe et al. (2010) found that 13- to 17-year-olds restricted to 6.5 hr of sleep for five nights had more attention lapses and retained less educational content in a school-like context than normally sleeping controls. The mental maintenance of information, a process crucial to academic functioning, was also impaired following sleep loss in adolescents (Gradisar et al., 2008). Furthermore, sleep has been implicated in the stabilization of newly formed memories, because 17- and 18-year-olds who sleep after acquiring new vocabulary remember significantly more words than those who are deprived of sleep after learning (Gais et al., 2006). The acquisition and use of driving skills relies on attention and cognitive control, which are impaired in adolescents getting inadequate levels of sleep (Groeger, 2006; Telzer et al., 2013; Wolfe et al., 2014). For instance, Telzer et al. (2013) demonstrated that poor sleep quality predicts increased impulsivity in 14- to 16-year-olds on computerized tasks of inhibition. Functional magnetic resonance images (fMRI) during the task also revealed reduced activation in the prefrontal cortex in subjects sleeping poorly, an area of the brain associated with executive control processes (Telzer et al., 2013).

Other findings have portrayed adolescents as cognitively resilient in the face of sleep loss. Although Kopasz et al. (2010) found sleepiness increased in 14- to 16-year-olds as a function of a single night of sleep restriction, sleep loss did not significantly predict performance on executive functioning, psychomotor vigilance, attention, and memory retention. Likewise, no post-sleep performance differences were observed in 14- to 16-year-old teenagers for skills and word pairs learned before four nights of sleep restricted to 9, 8, 7, 6, or 5 hr (Voderholzer et al., 2011). Finally, Beebe et al. (2009) demonstrated that five days of sleep restriction in adolescents (13–17 years) elicited working memory performance comparable to normally

sleeping age-matched controls. Although their sample ( $N = 6$ ) may have been too small to capture differences between groups, fMRI obtained during the task revealed more pronounced activation in compensatory areas such as the prefrontal cortex in sleep-restricted subjects, which may have contributed to their performance (Beebe et al., 2009).

Differences in methodology across this literature render these findings difficult to interpret. First, there is a lack of consistency in the tasks used to assess certain types of cognitive functioning. Given that children and young adolescents are most susceptible to sleep loss under high cognitive load (Steenari et al., 2003), differences in task difficulty will yield variations in performance across sleep studies. Second, morning testing periods conflict with the delayed phase preference of these subjects. Evening types function better cognitively in the latter part of the day (Preckel et al., 2013), a crucial consideration when interpreting studies that test in the morning or throughout the day. Finally, during adolescence, neural density declines and the prefrontal cortex becomes more connected with the rest of the brain, leading to faster, more efficient execution of cognitive processes (Feinberg & Campbell, 2010). Given that this brain maturation correlates to both age (Feinberg & Campbell, 2010) and puberty (Peper et al., 2009), studies that differ in the ages and developmental range of their samples are susceptible to individual variability that obscures the effect of sleep.

### Parental Recommendations

So far, we have summarized the behavioral consequences of adolescent sleep loss from the standpoint of academic problems, car crash risk, and cognitive impairment. Next, we outline empirically supported ways to improve teen sleep hygiene (see Table 1).

### Setting Bedtimes

Parents hold a romanticized picture of their children's sleep habits. According to a study of 13- to 17-year-olds, teens sleep on average 35 to 45 min less than their parents estimate, which was largely ascribed to parental misperceptions about when their child goes to bed (Short et al., 2013). In contrast, adolescents whose parents

Table 1  
*Recommendations*

Teen sleep recommendations for parents
<ul style="list-style-type: none"> <li>• Set bedtimes for 10:00 p.m. or earlier</li> <li>• Restrict technology use before bedtime and in the bedroom</li> <li>• Limit caffeine and energy drinks, especially in the evening</li> <li>• Keep sleep schedules consistent</li> <li>• Consider advocating for later school start times</li> </ul>

monitor their bedtimes go to sleep earlier and sleep more at night than those without parent-set bedtimes (Gangwisch et al., 2010; Short et al., 2011), and show increased daytime alertness and fewer complaints of fatigue (Short et al., 2011). Furthermore, bedtimes of 10:00 p.m. or earlier have been associated with a lower risk of depression and suicidal thoughts in adolescents than later or no bedtimes (Gangwisch et al., 2010). Evidence has suggested that early parent involvement in sleep habits can have a persisting effect, even offsetting phase delay in adolescence. Subjects, especially males, whose parents set bedtimes during childhood are less prone to eveningness in adolescence, suggesting that parental influence on bedtimes can calibrate phase preference later in life (Takeuchi et al., 2001).

Yet, parental involvement in their children's sleep raises some concerns about feasibility. First, how likely are youngsters to comply with earlier bedtimes? Interestingly, Gangwisch et al.'s (2010) findings have indicated that all adolescent subjects in their study went to sleep on average within 5 min of their bedtime, and Short et al. (2011) found no significant difference in self-reported sleep latency between teenagers with and without parent-set bedtimes. Another issue is the effect of economic standing and family structure on parent supervision over bedtimes. However, analyses by Short et al. (2011) indicated that teen sleep as a function of bed setting is not affected by socioeconomic status, parent education or employment, or whether the child belongs to a two-parent household. In other words, parental regulation appears to be a practical and effective mediator of sleep hygiene in adolescents, which persists along a diverse demographic spectrum.



## Technology

Adolescents hold misguided attitudes about nighttime media use and their sleep. One study found that nearly a third of seventh and 10th graders use television and computer games to fall asleep (Eggermont & Van den Bulck, 2006); however, evening screen time seems to have the opposite of the desired effect, which has been attributed to dampened melatonin release associated with exposure to bright light displays before bed (Higuchi et al., 2003). Although there is certainly a concern for worsening phase delay, the relationship has also been attributed to a permissive familial climate that affects nighttime media exposure as well as sleep hygiene (Eggermont & Van den Bulck, 2006).

In addition to disturbed sleep, late night screen time has been associated with cognitive deficits the following morning as a function of sleep loss (Dworak et al., 2007; Wolfe et al., 2014). We previously referenced Dworak et al.'s (2007) study, which illustrated that an hour of computer gaming elicits lighter sleep and longer sleep onset latency compared with passive television viewing. Interestingly, the computer group also showed impaired postsleep retention of vocabulary words learned before sleep, whereas the television group did not (Dworak et al., 2007). Similarly, 15- to 20-year-olds allowed up to 5 hr of gaming before sleep exhibited impaired performance on a test of sustained attention the following day, an effect that was wholly mediated by decreased sleep (Wolfe et al., 2014).

## Caffeine

Another barrier to sleep is caffeine: Ninety-five percent of high school students admit to using caffeine in the past week, usually consuming their first beverage in the evening (Ludden & Wolfson, 2010). Heavy caffeine use in adolescence is associated with increased daytime sleepiness (Ludden & Wolfson, 2010), which may reflect a need to combat the lethargy that inevitably follows sleep debt. However, frequent consumption in this age group is also associated with sleep disturbances (Seifert, Schaechter, Hershorin, & Lipshultz, 2011), pointing to a carryover effect that further disrupts sleep and increases dependence on the

substance (Ludden & Wolfson, 2010). In addition, a growing number of energy drinks are now marketed to children and young adults, with a third of adolescents reporting consuming them on a daily basis (Seifert et al., 2011). Although caffeine is typically the primary ingredient in these beverages, energy drinks contain additional plant-based ingredients that are poorly regulated by the U.S. Food and Drug Administration (Seifert et al., 2011). The half-life of caffeine has been estimated at 3–7 hr (Kaplan et al., 1997); however, compounds found in energy drinks can interact with caffeine to extend duration of activity (Seifert et al., 2011).

## Weekend Sleep

Due to the disparity between their biological clock and early weekday obligations, adolescents sometimes use weekends to “catch up” on lost sleep (Crowley et al., 2007; O’Brien & Mindell, 2005; Wolfson & Carskadon, 1998). Although this provides a reprieve from the sleep debt accumulated Monday through Friday, evidence in young adults has suggested that delaying weekend wake time leads to a significant postponement in melatonin the following week (Taylor, Wright, & Lack, 2008). Given that adolescents do not readily adjust to advances in sleep schedule (Carskadon, Wolfson, Acebo, Tzischinsky, & Seifer, 1998), this oversleeping behavior is likely to exacerbate phase delay and further suppress sleep initiation (Taylor et al., 2008). In addition to consistent wake times, bedtime stability from week to weekend contributes to phase alignment: In a study of 10th and 11th graders, postponing bedtime by 1.5 hr on Friday and Saturday resulted in a delayed melatonin phase onset the following Sunday, whether or not sleep duration was extended on the experimental nights (Crowley & Carskadon, 2010).

Evidence has suggested that daytime impairment caused by weekend sleep delay parallels that of insufficient sleep. Wolfson and Carskadon's (1998) survey demonstrated that high school students delaying bedtime by 2 hr or more on weekends were sleepier during the day, got lower marks in school, and reported more behavioral problems than those with more consistent sleep schedules. O'Brien and Mindell (2005) replicated these results, but found that

weekend bedtime delays were the only significant predictor of academic performance compared with school night sleep restriction and weekend oversleep. In addition to poorer grades, weekend sleep-delayed adolescents showed more daytime behavioral impairment and were at higher risk for smoking, alcohol use, marijuana use, and sexual conduct (O'Brien & Mindell, 2005). A mechanism for this relationship was demonstrated by Hasler et al. (2012), who found that variability in weekend to weekday sleep timing predicts altered brain responses during a monetary reward-processing task, even when sleep duration is controlled. Namely, reduced activity in the ventral striatum, a reward-sensitive region, and the prefrontal cortex during anticipation and attainment of reward was observed in larger shifts (Hasler et al., 2012).

### School Start Times

Although there are behavioral changes adolescents can make to improve their sleep, another avenue to reduce the problem of sleep debt is to delay school start times. The American Academy of Pediatrics (Adolescent Sleep Working Group, Committee on Adolescence, & Council on School Health, 2014) recently released a statement encouraging later bell schedules, citing the mounting evidence linking daytime impairments to sleep loss. Meanwhile, students in districts that have already adjusted their start time to 8:35 a.m. or later have reported positive outcomes, such as an average increase of 1 hr of sleep on weeknights, better attendance, and improvements in grades compared with those starting at 7:15 a.m. and 7:30 a.m. (Wahlstrom et al., 2014). Data from schools with varying start times have also projected an average 3-point improvement in standardized test scores if districts institute a 1-hr delay (Edwards, 2012). Even a slight delay of 30 min has been associated with increased alertness, better grades, decreased depressive mood, and fewer health clinic visits in high school students (Owens, Belon, & Moss, 2010). School schedules have also been implicated in driving risk. In Wahlstrom et al.'s (2014) report, two of the delayed schools observed a 65%–70% drop in the crash rate of 16- to 18-year-olds in the corresponding geographical location. Similarly, Danner and Phillips (2008) found a 16.5% re-

duction in adolescent crashes over 2 years following a 1-hr delay, accompanied by student reports of increased sleep and reduced daytime sleepiness (Danner & Phillips, 2008). Furthermore, mass traffic data of two adjacent districts with an hour difference in start times has shown a higher accident rate for drivers aged 16 to 18 years in the region corresponding to the earlier starting school (Vorona et al., 2011).

Despite such findings, there are a number of economic and logistic issues plaguing the decision to restructure school schedules. Kirby, Maggi, and D'Angiulli (2011) outlined the primary concerns associated with policy change, such as rerouting bus schedules, disruption to caregiver schedules, and impact on afterschool activities. Moreover, the associated costs are not trivial: One district projected a yearly loss of \$150 per student in transportation costs alone (Edwards, 2012; Jacob & Rockoff, 2011). Nonetheless, Jacob and Rockoff (2011) have argued that starting school later is an investment in student achievement, estimating an average \$17,500 gain in student earnings due to higher grades and graduation rates.

### Conclusion

Learning to lead a healthy lifestyle is central to the successful transition from childhood to young adulthood, so what can be done within the framework of sleep? First, implementing a set bedtime gives youngsters a longer opportunity to sleep, which can alleviate plaguing sleepiness and fatigue during the school day. Steps can also be taken to avoid worsening the troubling issue of phase delay, such as educating and monitoring adolescents in order to curb media and caffeine use before bed. In addition, encouraging a consistent sleep schedule from week to weekend can lessen the doldrums associated with Monday mornings. Finally, parents and teens can become involved in the initiative to delay school start times. More information is available on the National Sleep Foundation's website (<http://www.sleepfoundation.org>).

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# Resilience in the Study of Minority Stress and Health of Sexual and Gender Minorities

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Research in various populations has shown that, starting early in childhood, individuals often demonstrate resilience in the face of stress and adversity. Against the experience of minority stress, LGBT people mount coping responses and most survive and even thrive despite stress. But research on resilience in LGBT populations has lagged. In this commentary, I address 2 broad issues that I have found wanting of special exploration in LGBT research on resilience: First, I note that resilience, like coping, is inherently related to minority stress in that it is an element of the stress model. Understanding resilience as a partner in the stress to illness causal chain is essential for LGBT health research. Second, I explore individual- versus community-based resilience in the context of minority stress. Although individual and community resilience should be seen as part of a continuum of resilience, it is important to recognize the significance of community resilience in the context of minority stress.

*Keywords:* health, minority stress, resilience

In response to the experience of stress, LGBT people mount coping responses and most survive and even thrive despite stress. Resilience research has shown in various populations that, starting early in childhood, individuals mount significant, sometimes heroic, coping efforts in the face of stress and adversity. But research on resilience and, more generally, salutogenic, or health inducing processes in LGBT populations has lagged (Kwon, 2013). The present issue of *Psychology of Sexual Orientation and Gender Diversity* aims to fill this gap in the literature by offering a group of articles on various aspects of resilience in sexual and gender minority populations. But more than filling a gap, which any one issue can only begin to do, I hope that this special issue encourages researchers to incorporate resilience into their study of LGBT health.

In this commentary, I aim to briefly address two broad issues that, in my reading of the literature, I have found wanting of special exploration: First, I explore how resilience is related to minority stress: Is resilience antithetical to a stress focus? How is resilience different from coping? And, what is the role of resilience in the stress-to-illness causal chain? Second, I explore resilience in view of what I have termed minority coping (Meyer, 2003): How should we think of the differences between individual and community resilience in the context of minority stress and why does it matter?

## Resilience in the Minority Stress Model for LGBT Health

It is important to note that resilience is not in any way antithetical or an alternative approach to stress theory. It is, in fact, a very

essential part of stress theory. According to stress theory, the impact of stress on health is determined by the countervailing effects of pathogenic stress processes and salutogenic coping processes. Similarly, resilience is an essential part of minority stress. Indeed, resilience really has meaning only in the face of stress, and therefore, it is an essential part of understanding minority stress. To state that is not the same as stating that research on resilience (or coping, for that matter) has progressed in lockstep with the study of minority stress processes. It has not, but a growing crop of studies on resilience—with a few published in this issue—is reversing this trend.

Minority stress is based on the premise that (a) prejudice and stigma directed toward LGBT people bring about *unique* stressors and (b) these stressors cause adverse health outcomes including mental and physical disorders (Meyer & Frost, 2013). The minority stress model shows that circumstances in the environment, especially related to stigma and prejudice, may bring about stressors that LGBT people experience their entire lives.

Although I originally developed minority stress in the context of sexual orientation, gender identity is similarly implicated. Recent research has shown how minority stressors impact the health of transgender and gender nonconforming individuals (Bockting, Miner, Swinburne Romine, Hamilton, & Coleman, 2013; Hendricks & Testa, 2012; Testa, Habarth, Peta, Balsam, & Bockting, 2015). These writings suggest that similar minority stressors are applicable to gender minorities as has been described for sexual minorities. A unique source of stress concerns gender affirmation of transgender or gender nonconforming individuals in formal and informal social interactions (Sevelius, 2013; Testa et al., 2015).

I have referred to minority stress processes along a distal to proximal continuum, with distal stressors referring to events and experiences outside the person, and proximal stressors referring to stressors that are transmuted through socialization and experienced by the person through internalizing cognitive processes. Distal stressful experiences are life events, chronic strains, everyday

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discrimination or microaggressions (referred to as *daily hassles* in general stress research) and even nonevents (these are anticipated life course events that have been thwarted; Meyer, Ouellette, Haile, & McFarlane, 2011). Proximal stressors include internalized negative social attitudes, such as internalized homophobia and internalized transphobia, expectations of rejection and discrimination, or felt stigma, and concealment of sexual and gender identity. In turn, the minority stress model states that these stressors can lead to adverse health outcomes such as depression, anxiety, substance use disorders, suicide, and various physical health outcomes that are responsive to stress, such as asthma (Fredriksen-Goldsen, Kim, & Barkan, 2012; King et al., 2008; Marshal et al., 2008).

In addition to describing stressors, the minority stress model, consistent with general stress theory, also shows that coping and social support can buffer the effect of the stressors, so that negative health outcomes can be avoided or reduced. This is where the role of resilience is evident.

Distinguished from general stress theory, minority stress shows the relevance of minority identity in the stress process. Whether or not, and to what extent, one identifies with a sexual or gender minority identity (as opposed to not seeing sexual orientation and gender expression as an important part of one's identity) has impact on both exposure to minority stress and the coping and resilience opportunities one will have. Also relevant, but not discussed here, are the relationships *among* minority identities—gender, sexual orientation, ethnic/racial, and other—that the person has.

There are several important issues that concern identity—many of them are understudied in the LGBT minority stress literature. For example, is having a strong identification with a minority identity a protective or risk factor in terms of how it interacts with exposure to a stressor? On one hand a strong identity can make one vulnerable when a highly salient identity area is injured by a stressful prejudice event; but on the other hand, having a strong sense of identity can be a source of strength that inoculates the person against an assault in that area. Identity is especially important in the area of resilience, as I discuss below, because so much of the community resilience and social support depends on people affiliating with their sexual orientation and gender identity groups.

*Resilience* refers to the quality of being able to survive and thrive in the face of adversity. It includes anything that can lead to more positive adaptation to minority stress and thus, mitigates the negative impact of stress on health. Resilience is, thus, similar to coping in that they both can buffer the negative effect of stress on health. Coping refers to the effort mounted by the individual in response to stress—the effort to adapt to or defend against the stressor. One important difference between coping and resilience is that coping refers to *efforts* the person makes to adapt to stress, but coping does not necessarily indicate successful adaptation. Resilience does indicate success. Thus, resilience is inherently *inferential* because it depends on identifying adaptive functioning in the face of stress (Masten, 2007): We can see that someone is making a coping effort, but we identify resilience only by the impact it makes on health outcomes. Resilience is implied by the fact that the person withstood stress. Masten (2007) described several broad scenarios indicative of resilience: “(a) developing well in the context of high cumulative risk for developmental problems (beating the odds, better than predicted development), (b) functioning

well under currently adverse conditions (stress-resistance, coping), and (c) recovery to normal functioning after catastrophic adversity (bouncing back, self-righting) or severe deprivation (normalization)” (p. 923).

In this context, it is also important to remember that the study of resilience is by definition a study of disease (or, more broadly, negative outcomes) causality. Like the general stress model, the minority stress model is a model of disease causality (Aneshensel & Phelan, 1999; Meyer, Schwartz, & Frost, 2008). Therefore, when investigators study resilience they are implicitly interested in how certain processes buffer the impact of stress on health outcomes—at its core, resilience is a process of stress buffering.

Wheaton (1985) has carefully laid out models of stress buffering and noted two primary causal models: (a) a *suppressor* effect where the stressor “activates” the buffer (e.g., an experience of antigay violence increases the social support the person receives), which, in turn, reduces the impact of the stressor on health outcomes (e.g., feeling depressed) and (b) a *moderator* (interactive) effect, where levels of the buffer, not activated by the stressor (e.g., high vs. low mastery) will alter the impact of stress on health outcomes (e.g., after an event of discriminatory job loss, a person with high levels of mastery will suffer less anxiety than a person with low levels of mastery).

As Wheaton has noted, researchers often confuse other processes with a buffering effect. For example, a direct effect of any factor on health outcomes independent of the presence of stress cannot properly be described as a buffer, or resilience, impact. Thus, noting a positive impact on well-being for the number of good friends one has, regardless of any exposure to stress, demonstrates a direct effect of friends on well-being but not a stress buffering, and therefore, resilience, effect. A different perspective is offered by Fergus and Zimmerman (2005), who included a direct effect model that they called *compensatory*. But I find this more expansive definition less directly related to resilience because, again, resilience can only be inferred in the presence of stress (Masten, 2007) and the direct effect model does not demonstrate that. As Luthar, Cicchetti, and Becker (2000) said, “The term ‘resilience’ should always be used when referring to the process or phenomenon of competence despite adversity” (p. 554).

### Individual Versus Community Resilience

An important distinction, especially in the context of minority stress, is between individual- and community-based resilience. On the individual side are qualities best illustrated by the concept of mastery (Pearlin & Schooler, 1978) that Turner and Roszell (1994) described as indicative of *personal agency*. These are qualities that the person may possess, which can help or hinder her or him in coping with stress, making the person more or less resilient. In addition to mastery, we can include among these qualities such constructs as a sense of powerlessness (Seeman, 1959), effectance motivation (White, 1959), locus of control (Rotter, 1966), helplessness (Seligman, 1975), hopelessness (Abramson, Alloy, & Metalsky, 1989), and fatalism (Wheaton, 1985). Other personal resilience constructs are personality traits (e.g., extroversion) and even what Turner and Roszell (1994) call “world view” constructs, such as sense of coherence (Antonovsky, 1979), hardiness, which includes commitment, control, and challenge (Kobasa, 1979), and potency (Ben-Sira, 1985). All of these constructs represent quali-

ties of the person that have been described as associated with resilience.

But there are some limitations or even hazards when researchers and policymakers focus only on individual-level, or personal resilience. Cultural analysis would suggest that such an individual focus is rooted in western, and even more so, American, ideology that highlights meritocracy and individualism (Hobfoll, 1998). American ideology about meritocracy and individualism exalts personal triumph over adversity—the very essence of resilience. But such ideology can itself lead to negative health impacts on disadvantaged populations. This is because despite our thinking of personal resilience as an attribute of the person, not everyone has the same opportunity for resilience when the underlying social structures are unequal. As Merton (1968) has noted, the *opportunity structure*—the social, economic, and political structures that make success possible in society—are not equally distributed. Racism, homophobia, sexism, socioeconomic inequality, and other social disadvantages limit individual resilience. When individual resilience becomes an ideal, it can lead to adverse health outcomes through both its policy implications and actual increase in stress exposure to disadvantaged social groups (Kwate & Meyer, 2010).

A focus on resilience can lead to a “blame the victim” attitude: By noting that individuals *can* be resilient we risk expecting that individuals *ought to be* resilient. It is easy to slip into assuming that everyone who is exposed to stress can, and therefore should, survive and thrive by virtue of their own resilience—as the idiom goes, pulling themselves up by their bootstraps. Resilience becomes perceived as “ordinary magic,” not something extraordinary and rare (Masten, 2001). I find this attitude creeping in many ways into general discourse, including, for example, our growing distaste of the term “victim,” which critiques say disempowers individuals, but I believe sometimes accurately connotes social realities. If no one is “allowed” to be a victim even when victimized, then we may begin to expect everyone to be heroically resilient.

I say that a focus on individual resilience is hazardous because, from a public policy perspective, it can remove or reduce social responsibility to protect disadvantaged populations as it creates expectation of individual resiliency. Moreover, as we shift our discourse to individual resilience we risk focusing on the individual *response* to stress rather than the stressor itself. This shifts the policy implications that is at the origin of the stress concept generally and minority stress specifically. Minority stress aims to draw our attention to social events and conditions related to stigma and prejudice that harm population health, for example, causing health disparities. As we begin to focus on individual responses and resilience we risk a shift from interventions that attempt to correct the pathogenic social environment to interventions that focus on individuals so that they can become resilient in coping with the environment.

The concept of community resilience realigns these priorities. Community resilience refers to “how communities further the capacities of individuals to develop and sustain well-being” (Hall & Zautra, 2010). We can think of community as providing the resources that can help individuals cope with stress (Fergus & Zimmerman, 2005). This approach to resilience, Fergus and Zimmerman (2005) say, emphasizes social environmental influences on health and helps place resilience theory in a more ecological context, moving away from conceptualizations of resilience as a

static individual trait. This conceptualization of resilience also focuses on social resources as a target of intervention.

Community resilience can be conceptualized at different levels and contexts—we can think of local or national level, the general LGBT community or more specific sexual and gender minority communities, and so forth. In the context of minority stress I have referred to community resilience as *minority coping* (Meyer, 2003). Hobfoll, Jackson, Hobfoll, Pierce, and Young (2002) introduced a similar concept of *community-mastery* as distinct from individual-mastery. They noted that community-mastery is “a sense that individuals can overcome life challenges and obstacles through and because of their being interwoven in a close, social network” (p. 856). This is distinguishable from *individual-mastery*, which refers to the sense that individuals “can overcome obstacles and challenging circumstances based on their own effort” (p. 856). It is also distinct from *social support*, which refers to the receipt of help from others. In communal-mastery there is of course the potential that one will receive support from others but it is not required. The authors (p. 856) explain, “Communal-mastery entails the belief that being part of a closely knit social fabric in itself generates successful confrontation with life problems (i.e., ‘I succeed because I am part of a social group that values me’).”

In the context of minority stress, minority coping and community resilience refer to norms and values, role models, and opportunities for social support. Community-level resilience includes tangible and intangible resources in the community. Tangible resources include, for example, access to an LGBT community center, specialized clinics and support groups, hotlines, information (knowledge), role models, as well as affirmative laws and policies that stem from community mobilization and advocacy (e.g., same-sex marriage, antibullying campaigns). Intangible resources include reframing of social values and norms and applying minority perspectives to them, such as redefining life goals and measures of success (Crocker & Major, 1989).

It is important to note that community resilience, or minority coping, is related to social identity as a sexual or gender minority and affiliation with the LGBT community. Although some community resources—such as a change in law or policy—could reach anyone regardless of their identification, many resources require the individual to access them. To activate such resources, the individual LGBT person must tap into the community to reap the benefits of minority resilience. In that, identification with a community is an essential vehicle to benefiting from community resilience. In the most basic sense, to connect with others like you, you need to see yourself as similar and connected with them. A man who has sex with other men but who does not identify as gay or bisexual could be exposed to some similar stressors as those experienced by a gay- or bisexual-identified man, but he will not be able to benefit from significant sources of strength that the gay or bisexual man could access. Research has shown the importance of belonging to the community, finding strong connections with others, and finding positive role models (Riggle, Whitman, Olson, Rostosky, & Strong, 2008; Riggle, Rostosky, McCants, & Pascale-Hague, 2011; Rostosky, Riggle, Pascale-Hague, & McCants, 2010).

At the same time, however, individuals are limited by the structure of the community. Individual LGBT persons can only benefit from whatever resources are available from the community. (And, again, by access I mean both tangible and intangible

forms of access and identification). This means that to the extent that the community as a whole has not achieved resilience—for example, to the extent that homophobic and stereotypical attitudes prevail—those will be transmitted as well.

Also this means that all segments of the LGBT community will not benefit equally because of structural inequalities within the LGBT community. Even if a person is identified as LGBT, of course, they may face obstacles to connecting to community-based resilience resources. Racism, classism, sexism, biphobia, and transphobia, among other exclusions, will limit many in the LGBT community in identifying and affiliating with the community and, by extension, will deprive them of community resilience.

Still, it is also important to remember that the concept “LGBT community,” which often erroneously connotes White middle class, and urban LGBT people, should not refer to one particular LGBT community. It is a general construct that includes—and historically has always included—many sexual and gender minority communities that achieve resilience on their own terms (Bowleg, Huang, Brooks, Black, & Burkholder, 2003; Moore, 2010). Thus, variation in identification and participation in an LGBT community related to race/ethnicity, social class, age cohort, sexual and gender identities, among others, are important to consider as we study community resilience.

Finally, in the many years of research on minority stress, one of the areas most lagging has been intervention to enhance resilience. The resilience concept offers great promise for intervention research but has been underused in developing interventions (Herrick, Egan, Coulter, Friedman, & Stall, 2014).

My comments here should not suggest that we should abandon individual-based resilience interventions or research. On the contrary, individual resilience is important in determining health outcomes. When we look at the minority stress model, it is important to consider interventions across the entire model (Meyer & Frost, 2013). Rather than think about individual and community interventions as opposites, we ought to think of them along a continuum. This notion is, of course, consistent with social psychological theories that view the person within a social environment (Ungar, 2011). We should look at sites for intervention along the continuum of individual to community resilience. For example, we should look at changing laws and education systems to make them more LGBT affirmative, but also continue to develop effective approaches to increase individual resilience.

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RESILIENCE IN THE STUDY OF MINORITY STRESS

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