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Multibiologism: An anthropological and bioethical framework for moving beyond medicalization

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Abstract

Recent approaches in the medical and social sciences have begun to lay stress on "plasticity" as a key feature of human physiological experiences. Plasticity helps to account for significant differences within and between populations, particularly in relation to variations in basic physiological processes, such as brain development, and, in the context of this article, daily sleep needs. This article proposes a novel basis for the redevelopment of institutions in accordance with growing awareness of human variation in physiological needs, and articulates a theory of multibiologism. This approach seeks to expand the range of "normal" physiological experiences to respond to human plasticity, but also to move beyond critiques of medical practice that see medicine as simply responding to capitalist demands through the medicalization of "natural" processes. Instead, by focusing on how the institutions of U.S. everyday life—work, family, and school—structure the lives of individuals and produce certain forms of sleep as pathological, this article proposes that minor alterations in institutions could result in less pathologization for individuals and communities. Multibiologism provides a foundation for shared priorities in the social sciences, in bioethics, and in medical practice, and may lay the groundwork for emergent collaborations in institutional reform.

KEYWORDS
human variation, institutions, normalcy, plasticity, sleep

1 | INTRODUCTION: PLASTICITY AND ITS ETHICAL OPPORTUNITIES

Bioethics and the social sciences have a long, sometimes vexed history. Sociologists and anthropologists are drawn to bioethics as a system of thought and practice, in no small part due to its engagement with empirical evidence, but find bioethical reliance upon normative claims about human experience and values to be at odds with relativist approaches in the social sciences.[1] Bioethicists, for their part, seem drawn to the social sciences and their engagement with comparative frameworks of medicine, illness, and healing.[2] At times, this has led to scholars on both sides seeing promise in engagements between the disciplines;[3] at other times, it has led to acrimony, as the social sciences critique bioethicists for their implicit support of dominant power structures.[4] Despite these tensions, there continues to exist the possibility for generative engagement, particularly in the shared

[1]Marshall, P. (1992). Anthropology and bioethics. *Medical Anthropology Quarterly*, *6*(1), 49–73; Muller, J. H. (1994). Anthropology, bioethics, and medicine: A provocative trilogy. *Medical Anthropology Quarterly*, *8*(4), 448–467; Callahan, D. (1999). The social sciences and the task of bioethics. *Daedalus*, *128*(4), 275–294; Everett, M. (2006). Doing bioethics: Challenges for anthropology. *Human Organization*, *65*(1), 46–54.

[2]Turner, L. (2005). From the local to the global: Bioethics and the concept of culture. *Journal of Medicine and Philosophy*, *30*(3), 305–320; Andorno, R. (2009). Human dignity and human rights as a common ground for a global bioethics. *Journal of Medicine & Philosophy*, *34*(3), 223–240.

[3]Reddy, D. (2007). Good gifts for the common good: Blood and bioethics in the market of genetic research. *Cultural Anthropology*, *22*(3), 429–472.

[4]Das, V. (1999). Public good, ethics, and everyday life: Beyond the boundaries of bioethics. *Daedalus*, *128*(4), 99–133; Turner, L. (2009). Anthropological and sociological critiques of bioethics. *Journal of Bioethical Inquiry*, *6*(1), 83–98; Turner, L. (2009). Bioethics and social studies of medicine: Overlapping concerns. *Cambridge Quarterly of Healthcare Ethics*, *18*(1), 36–42.

interests in the social sciences and bioethics in developing ways to move beyond dehumanizing or unethical practices in American medicine, scientific research, and institutionalized power structures.[5] Forging this relationship requires developing new conceptual tools for bridging concerns between the social sciences and bioethics that allow for critical, non-normative purchase in critiquing existing practices, institutions, and power structures. My aim here is to provide bioethicists, social scientists, and humanities scholars with a theoretical tool in the form of *multibiologism* for the development of a shared advocacy project. This project, based as it is in an anti-foundationalist ethical approach to nature, builds on critical approaches to bioethical practice as well as on traditions in the social sciences that seek to develop applied approaches to institutional design.

"Medicalization" has long served as a tool for social scientists in their critiques of medical practice, particularly in North America and Europe. As a diagnostic theory, medicalization holds that what was once treated as "natural" is now treated as pathological.[6] This transformation has been aided by medical categorization, which has developed a nosological description of a once-natural state or process that can now be understood as in need of medical intervention.[7] Underlying this transformation is a Marxian view that what motivates the process of medicalization is the generation of profit for medical practitioners, pharmaceutical companies, and shareholders.[8] The process of medicalization has been well accounted for in discussions of childbirth and maternity,[9] menopause,[10] obesity,[11] addiction,[12] erectile dysfunction,[13] and a host of other physiological experiences. Over time, medicalization has been supplemented with a complementary theory of biomedicalization,[14] which posits that the technological infrastructures that facilitate modern medical and laboratory research dovetail with modes of information gathering and distribution that undergird modern life in medicalized societies, leading to the entrenchment of medical rationalities on the part of individuals and institutions in the assessment of risk, surveillance, and understandings of the self. Medicalization is perfectly diagnostic of a set of classificatory and clinical practices that inform modern medical and scientific practice that focus on the assignment of a disease category to a patient's symptoms and experiences, often leading to treatment in the form of pharmaceuticals or surgery. As concepts, medicalization and biomedicalization rely on a naïve view of nature that exists outside of social influences and cultural logics, and they cede the ability to do much more that critique medicine as predicated on a capitalist interest in profit generation and disciplinary subjectivity production. In this article I propose *multibiologism* as the basis for the development of institutional affordances for non-normative physiological experiences, which also seeks to broaden the category of the "normal" to include a wider breadth of human experiences that are non-life-threatening.[15] This moves beyond the diagnostic critiques of medicalization and biomedicalization and their acceptance of human nature and toward a view of human physiological experience as plastic and in need of a diversity of institutional models in order to avoid unnecessary medicalization-based pathologization and pharmaceuticalization.[16] In making this argument, I draw on social scientific, philosophical, and laboratory perspectives on changing conceptions of nature and on my research on human sleep and its variations.

Since the 1990s—drawing on a tradition that stretches back to Karl Marx's earliest writings[17]—anthropologists, sociologists, and philosophers have pointed to the necessary relationship between nature, society, and culture, arguing that what is treated as "nature" is an effect of social norms and cultural expectations. This approach posits that there is no nature outside of culture,[18] and builds on feminist,[19] anti-racist,[20] anti-ableist,[21] and anti-classist[22] scholarship across the social sciences and humanities, each of which was invested in dismantling the normative basis of nature as it developed out of Western traditions that placed heterosexual, able-bodied white men at its center. At its most extreme, such an approach posits that nature is entirely socially constructed and that nature is produced through long-standing cultural practices that shape biases that are institutionalized in expert practices, including scientific knowledge production and medical practice.[23] A less radical position

[5]Elliott, C. (2004). *Better than well: American medicine meets the American dream*. New York, NY: W. W. Norton.

[6]Conrad, P. (2007). *The medicalization of society: On the transformation of human conditions into treatable disorders*. Baltimore, MD: Johns Hopkins University Press.

[7]Arney, W. R., & Bergen, B. J. (1984). *Medicine and the management of living: Taming the last great beast*. Chicago, IL: University of Chicago Press; Foucault, M. (1994). *The birth of the clinic: An archaeology of medical perception*. Translated by A. M. Sheridan Smith. New York, NY: Vintage.

[8]Dumit, J. (2012). *Drugs for life: How pharmaceutical companies define our health*. Durham, NC: Duke University Press.

[9]Martin, E. (1992). *The woman in the body: A cultural analysis of reproduction*. Boston, MA: Beacon Press.

[10]Lock, M. (1993). *Encounters with aging: Mythologies of menopause in Japan and North America*. Berkeley: University of California Press.

[11]Stearns, P. N. (2002). *Fat history: Bodies and beauty in the modern West*. New York, NY: New York University Press; Salant, T., & Santry, H. (2006). Internet marketing of bariatric surgery: Contemporary trends in the medicalization of obesity. *Social Science & Medicine*, *62*(10), 2445–2457.

[12]Roy, K., & Miller, M. (2010). Parity and the medicalization of addiction treatment. *Journal of Psychoactive Drugs*, *42*(2), 115–120.

[13]Wentzell, E. (2013). Aging respectably by rejecting medicalization: Mexican men's reasons for not using erectile dysfunction drugs. *Medical Anthropology Quarterly*, *27*(1), 3–22.

[14]Clarke, A., Mamo, L., Fosket, J., Fishman, J., & Shim, J., eds. (2010). *Biomedicalization: Technoscience, health, and illness in the U.S.* Durham, NC: Duke University Press.

[15]Wolf-Meyer, M. (2012). *The slumbering masses: Sleep, medicine, and modern American life*. Minneapolis, MN: University of Minnesota Press.

[16]Dumit, J. (2012). *Drugs for life: How pharmaceutical companies define our health*. Durham, NC: Duke University Press.

[17]Marx, K. (1992). *Early writings*. Translated by R. Livingstone. New York: Penguin.

[18]Latour, B. (1993). *We have never been modern*. Translated by C. Porter. Cambridge, MA: Harvard University Press.

[19]Haraway, D. (1991). *Simians, cyborgs, and women: The reinvention of nature*. New York, NY: Routledge.

[20]Roberts, D. (2011). *Fatal invention: How science, politics, and big business re-create race in the twenty-first century*. New York, NY: The New Press.

[21]Chen, M. (2012). *Animacies: Biopolitics, racial mattering, and queer affect*. Durham, NC: Duke University Press.

[22]Harvey, D. (1996). *Justice, nature and the politics of difference*. Malden, MA: Blackwell.

[23]Eder, K. (1996). *The social construction of nature: A sociology of ecological enlightenment*. Thousand Oaks, CA: Sage Publications.

recognizes that there is a material experience of the world that precedes its cultural interpretation, but that human interpretive capacities shape the experience—and, over time, the actualization—of nature.[24] Such a view, which I adopt here, sees nature as always influenced by social and cultural influences, and that nature's expression in human physiology is necessarily the product of complex interactions between bodies, their environments, and their histories. This can be seen in discussions of the "need" for sleep, which acknowledges the biological necessity of sleep, but situates this necessity in the cultural contexts in which it is appropriate to desire particular kinds of sleep and in the recognition that some forms of sleep are inappropriate or undesirable based on age, situation, and understandings of pathology.

In this constructivist approach to nature, where discourses of "nature" are employed, "nature" is in the service of those in power ascribing "natural" causes to social relations.[25] This can be seen in discourses about "maternal instinct", that propose that women are naturally predisposed to childcare, ensuring that they are confined to housework and childrearing while men are the public face of the family; anthropologists and historians have demonstrated how "maternal instinct" is a byproduct of a level of modern comfort and discourses about the gendered division of labor.[26] Similarly, racist discourses have been employed to explain race-based differences in athletic and intellectual superiority and inferiority,[27] as well as susceptibility to disease,[28] claiming that innate racial differences explain these physiological phenomena. Each of these "racial" differences can also be explained more convincingly through attention to sociocultural influences concretized in disparities in educational, employment, and health infrastructures. Like with discourses about "maternal instinct," racist recourses to nature help to concretize white superiority, enshrined in dominant institutions in the United States and elsewhere.[29]

Various attempts have been made to reconcile constructivist approaches to nature with approaches to human physiology and health, from the feminist science studies elaboration of "naturecultures"[30] to anthropological "biocultural" syntheses.[31] These approaches accept that there is a body that precedes its cultural interpretation and social emplacement, but that the body is affected in a variety of ways, from how it is thought about and acted upon in everyday situations,[32] to its medical treatment,[33] to the political-economy of diet,[34] disease exposure,[35] and structural inequalities,[36] all of which produce physiological effects that are at once rooted in bodily material and shaped by sociocultural processes. Regardless of their theoretical footing, these approaches destabilize medicalization as something that relies upon a pre-capitalist or pre-medical nature, suggesting that the production of a "natural" past serves the processes of medicalization and biomedicalization by providing a proving ground for the powers of medical intervention to demonstrate their efficacy in making human life more removed from the vagaries of nature.[37] What was once the basis of critique—"nature should be left to run its course"—has become the basis for medical and technoscientific intervention into the life course—"why let nature influence you when it needn't?"[38] To sidestep these processes of medicalization and biomedicalization, bioethicists and social scientists could address the institutional matrix of contemporary life that, for some, justifies medical intervention and pathologization when physiological complaints could be rendered moot through institutional reform.

Multibiologism provides the ground for this discussion. There is a wide range of human physiological states and experience that are largely accepted as lying within a normative range, but the statistical production of normalcy can sometimes produce ideals that are unattainable for many people.[39] This can lead to those states and experiences that fall out of normative ranges being treated as disabilities and pathologies,[40] which is exacerbated when the normative range is defined as relatively narrow. Given human plasticity and how it is acted upon and thought about across societies, in terms of both epigenetics[41] and brain development,[42] the range of normative experience should be recognized to be quite broad

[24] Lien, M., & Law, J. (2011). 'Emergent aliens': On salmon, nature, and their enactment. *Ethnos*, *76*(1), 65–87.

[25] Yanagisako, S., & Delaney, S., eds. (1994). *Naturalizing power: Essays in feminist cultural analysis*. New York, NY: Routledge.

[26] Scheper-Hughes, N. (1985). Culture, scarcity, and maternal thinking: Maternal detachment and infant survival in a Brazilian shantytown. *Ethos*, *13*(4), 291–317.

[27] Gould, S. J. (1996). *The mismeasure of man*. New York, NY: W. W. Norton.

[28] Kaufman, J., & Hall, S. A. (2003). The slavery hypertension hypothesis: Dissemination and appeal of a modern race theory. *Epidemiology*, *14*(1), 111–118.

[29] Roberts, D. (2011). Fatal Invention: How Science, Politics, and Big Business Re-Create Race in the Twenty-First Century. New York: The New Press.

[30] Haraway, D. (1997). *Modest_Witness@Second_Millennium.FemaleMan©_Meets_OncoMouseTM*. New York, NY: Routledge.

[31] Goodman, A., & Leatherman, T., eds. (1998). *Building a new biocultural synthesis: Political-economic perspectives on human biology*. Ann Arbor, MI: University of Michigan Press.

[32] Lock, M., & Kaufert, P. (2001). Menopause, local biologies, and cultures of aging. *American Journal of Human Biology*, *13*(4), 494–504.

[33] Roberts, E. F. S. (2012). *God's laboratory: Assisted reproduction in the Andes*. Berkeley, CA: University of California Press.

[34] Leatherman, T. (1996). A biocultural perspective on health and household economy in southern Peru. *Medical Anthropology Quarterly*, *10*(4), 476–495.

[35] Schwirian, K. P. (2006). The political ecology of plague in the global network of cities: The SARS epidemic of 2002–2003. *Research in Urban Policy*, *10*, 241–268.

[36] Metzl, J. (2011). *The protest psychosis: How schizophrenia became a black disease*. Boston, MA: Beacon Press.

[37] Wolf-Meyer, M. (2015). Myths of modern American sleep: Naturalizing primordial sleep, blaming technological distractions, and pathologizing children. *Science as Culture*, *24*(2), 205–226.

[38] Romain, T. (2010). Extreme life extension: Investing in cryonics for the long, long term. *Medical Anthropology*, *29*(2), 194–215.

[39] Davis, L. (1995). *Enforcing normalcy: Disability, deafness, and the body*. New York, NY: Verso.

[40] Canguilhem, G. (1991). *The normal and the pathological*. Translated by C. R. Fawcett. New York, NY: Zone Books.

[41] For two very different discussions of epigenetics, see Goldberg, A., Allis, C. D., & Bernstein, E. (2007). Epigenetics: A landscape takes shape. *Cell*, *128*(4), 635–638 and Lock, M. (2015). Comprehending the body in the era of the epigenome. *Current Anthropology*, *56*(2) 151–177.

[42] Again, for two very different perspectives on plasticity, see Burke, S. N., & Barnes, C. A. (2006). Neural plasticity in the ageing brain. *Nature Reviews: Neuroscience*, *7*, 30–40 and Malabou, C. (2008). *What should we do with our brain?* Translated by S. Rand. New York, NY: Fordham University Press.

and fungible as a result of social and environmental influences. For example, when it comes to sleep needs for adults, the average for the human population is approximately 8 hours in a 24-hour period,[43] but at the individual level, sleep needs can vary between 6 and 11 hours without being clinically treated as pathological. Similarly, although consolidated sleep is the norm in the United States, cross-culturally and historically, many humans have been biphasic or polyphasic sleepers, meaning that they slept in 2- to 4-hour blocks throughout a 24-hour period rather than in one, 8-hour period of nocturnal rest.[44] Taken together, this evidence points to human sleep being highly variable in its patterns at the community and individual levels. But in the United States, school and work times are concretized in daily, consolidated patterns that depend upon nocturnal, consolidated sleep. The result of this mismatch between individual desires for sleep and institutional organization is that a wide swath of human sleep is treated as pathological and in need of either pharmaceuticals to ensure that it happens at night and in a consolidated fashion, or stimulants to support alertness during the day.[45] This has been supported by the expansion of sleep-related medical categories, including "excessive daytime sleepiness" and "advanced sleep phase disorder," both of which indicate pharmaceutical treatments for their symptoms, but also might be addressed through institutional rearrangements such as allowances for napping or flexible scheduling. Such categories are medicalizations of "natural" human phenomena, but they rely upon institutions that uphold normative expectations of human sleep, wakefulness, and diurnal behavior that construct nocturnal, consolidated sleep as "natural" and any variation from this human nature as pathological and in need of medical intervention.

A multibiological approach helps to bring the variety of human sleep into conversation with institutional norms in an effort to reduce the overall burden on individuals to meet inflexible institutional standards and instead forge new models to address variations in human sleep. Such an approach recognizes that human physiology is innately plastic—between individuals and over the life course—and that institutional redress can alleviate individual challenges that now result in widespread pharmaceuticalization. This is not to argue for a total atomization of institutional redress based on individual desires, but it is to suggest that aggregate preferences for institutional timing should provide a framework to establish a broader array of institutionalized times for work, school, family, and recreation that serve as compromises between individual desires and institutional demands. In the following, drawing on ethnographic fieldwork with clinicians and patients as well as on archival and policy research,[46] I demonstrate the burdens on individuals and whole age groups as they interface with normative ideals of human sleep as concretized in daily schedules that favor some models of sleep over others. In both cases, I point to institutional changes that bioethicists and social scientists could advocate for to alleviate individual and societal burdens.

2 | CONSOLIDATED WORK AND ITS CONSEQUENCES

The workday in the United States generally ranges between 8 a.m. and 5 p.m., with second and third shifts beginning in the late afternoon and ending in the late evening, and beginning late in the evening and running through to the early morning, respectively. For most adults, this means that to ensure the ideal of an 8-hour night's rest, they must be asleep by 11 p.m. so as to wake by 7 a.m. For many Americans, this schedule can result in sleep deprivation on a nightly or chronic basis. This sleep deprivation drives the consumption of stimulants such as caffeine, but also the use of pharmaceuticals such as monafodil. For some workers, however, there are flexible schedules that allow them to come into work late and labor past the day's close of work or to labor on the weekend. These "flextime" schedules tend to disproportionately favor white-collar workers, who tend to not use them to the degree that they are allowed to, generally citing social shame as a deterrent.[47] In other work contexts, particularly in Silicon Valley, experiments have been undertaken with workplace napping facilities, usually a room set aside with one or more cots for employees to sleep in.[48] Again, these facilities are often rarely used, and in some cases, after disuse, are abandoned by the employer and used as a justification for the revocation of policies regarding workplace napping. Employees cite social shame as a deterrent for using these facilities, as well as for sleeping at their desks, even when it is permitted in a workplace. Instead, many employees develop habits to

[43] Murillo-Rodriguez, E., Arias-Carrion, O., Zavala-Garcia, A., Sarro-Ramirez, A., Huitron-Resendiz, S., & Arankowsky-Sandoval, G. (2012). Basic sleep mechanisms: An integrative review. *Central Nervous System Agents in Medicinal Chemistry, 12*(1), 38–54.

[44] Ekirch, A. R. (2001). Sleep we have lost: Pre-industrial slumber in the British Isles, *106*(2). *American Historical Review*, 343–386; Worthman, C. M., & Melby, M. K. (2002). Toward a comparative developmental ecology of human sleep. In M. A. Carskadon (Ed.), *Adolescent sleep patterns: Biological, social, and psychological influences* (pp. 69–117). New York, NY: Cambridge University Press.

[45] Wolf-Meyer, M. (2012). *The slumbering masses: Sleep, medicine, and modern American Life*. Minneapolis, MN: University of Minnesota Press.

[46] From January 2003 through April 2007, I conducted archival and ethnographic research, first in the Twin Cities in Minnesota, and then in Chicago, Illinois. The research began at the pseudonymously named Midwest Sleep Disorder Center (MSDC), where I would attend weekly case discussion meetings and departmental lunches, as well as visit the overnight sleep clinic. I conducted formal and informal interviews with clinicians, researchers, patients and their families at the clinic and throughout the Twin Cities. I also attended local support groups for individuals diagnosed with obstructive sleep apnea and restless legs syndrome, and conducted archival research at the Wagensteen Historical Library of Biology and Medicine, housed at the University of Minnesota, containing medical monographs from the 19th and 20th centuries. In February 2006, I relocated to Chicago to conduct further research, including archival research at the Special Collections Research Center at the University of Chicago's Regenstein Library, and ethnographic research with patient support groups throughout the Chicago Metro region. Over these three and a half years of research, I informally interviewed over 80 disordered sleepers, and conducted life-history interviews with an additional 40. In addition, I conducted a dozen interviews with sleep clinicians, and additional interviews with sleep technicians and other clinic staff.

[47] Golden, L. (2001). Flexible work schedules: What are we trading off to get them? *Monthly Labor Review*, *124*(3) 50–67; Golden, L. (2001) Flexible work schedules: Which workers get them? *American Behavioral Scientist*, *44*(7), 1157–1178.

[48] Brown, M. (2004). Taking care of business: Self-help and sleep medicine in American corporate culture. *Journal of Medical Humanities*, *25*(3), 173–187.

support their alertness, including the use of stimulants, and, in some cases, clandestine naps in their car.

This was the case with many of the patients that I interviewed as part of my ethnographic research. Over a decaffeinated latte, Susan told me about her history of disordered sleep, medical treatment, work–life difficulties, and eventual retirement. Susan described herself as "high-achieving" and had earned a doctorate in education in the early 1980s, after just a few years of teaching elementary school. She decided to move into public school administration, and spent the rest of her career working for her local school district in a variety of capacities, eventually ending with an eight-year period of being superintendent of schools in her suburban district. She was "passionate" about her career, and "loved all of the kids and their families," but had a "crippling addiction to coffee" as a result of a mismatch between her working hours, sleeping needs, and family time. Years before, she had seen a sleep physician and been diagnosed with persistent insomnia. She explained that her symptoms came in two expressions: either she would stay up late and fall asleep around 12 or 1 a.m. and then sleep until 4 or 5 a.m. and be unable to return to sleep, or she would fall asleep around 8 or 9 p.m. and sleep until 6 a.m. Two or three nights of the first pattern would give way to one or two nights of the second pattern, each of which caused its own difficulties. On nights when Susan would fall asleep early, she was unavailable to help with her children's bedtime routines. When Susan would wake up early, she was often irritable and sleepy and "no fun to be around." After her diagnosis, she was prescribed Ambien. Susan experienced "scary side effects" from the drug, including sleepwalking and sleep eating. She stopped using Ambien after only a week, complaining to her physician that "it didn't fix the problem." He proceeded to prescribe a series of other drugs, but they either had negative side-effects or failed to help her sleep in a way that worked for her and her family. After months of this, she decided to go "drug free," but still relied on coffee to get her through her workday and family life. At that point, in conversation with her spouse, she decided to retire early, "although not what [she] wanted to do." Retiring at 52, Susan dedicated herself to her children's teenage years, and accepted her non-normative sleep pattern. This allowed her to live "drug free," including cutting caffeine out of her life.

A flextime schedule may have eased Susan's experiences, as she would have been able to sleep in when needed or go home for the occasional nap. Policies—and spaces—permitting onsite napping may have also helped. But in both cases, she would have needed to overcome the potential shame associated with not working during normal working hours. In both cases, institutional models exist that could be implemented. Flextime and workplace napping might help to move beyond the pharmaceutical treatment of some sleep disorders, but may not overcome the use of caffeine and other stimulants, imbricated as they are in American consumer behavior, both culturally and scientifically.[49] Flexible institutional arrangements help to displace the burdens placed on individuals, and the pathologization of experiences that could otherwise fall within the breadth of an expanded view of normalcy. Such flexible institutions implicitly acknowledge that physiological needs are plastic—including but not limited to sleep—and that through the modular arrangement of institutional demands, including time use and attendance, diverse physiological needs can be met without the need for medical intervention, its costs, and potential side-effects. Such modularity may not be available to all workers in all contexts of employment, and in those cases, there have been longstanding experiments with shortening the work day and work week, in both cases showing that workplace efficiency improves, health complaints decrease, and employee morale improves alongside their feelings of connection to family, friends, and employers.[50] Such shortened days and weeks—which generally come in the form of 6-hour work days and 4-day work weeks—may not allow for the daily meeting of physiological needs, but would provide workers with the regular, predictable opportunity to sleep late, nap, and otherwise rest. With the increasing automation of the American workforce,[51] employing more people for shorter work days may also help to ease the transition to decreased work opportunities for a wide swath of American workers.

3 | THE BIASES OF SCHOOL START TIMES

Since the 1980s, there has been a steady stream of research on adolescent sleep timing and duration. This research has shown that at puberty, sleep needs increase and sleep onset shifts to later in the circadian cycle.[52] In the United States, rather than adjust school start times to later in the morning for older students in response to this scientific research, the opposite happens, and middle and high school students are expected to attend school earlier than they did when they were elementary-aged. For example, where elementary-aged students might report to school at 8 a.m., middle and high school students are routinely asked to begin school at 7 a.m. This configuration of institutional time is based on the assumption that young children need parental support in getting ready for school in the morning, but also that older children can ready themselves without parental support. It is also supported by shared busing systems that must pick up and deliver one cohort of students to school before beginning with the other population. This is buttressed by early school days beginning in the dark of winter mornings, especially in the northern parts of the United States, where some parents express concerns about small

[49] Rasmussen, N. (2009). *On speed: The many lives of amphetamine*. New York, NY: New York University Press. See also the media coverage of Loftfield, E., Cornelis, M., & Caporaso, N. (2018) Association of coffee drinking with mortality by genetic variation in caffeine metabolism. *JAMA Internal Medicine*, *178*(8), 1086–1097.

[50] Hunnicutt, B. K. (1996). *Kellogg's six-hour day*. Philadelphia, PN: Temple University Press; Bird, R. (2010). Four-day work week: Old lessons, new questions. *Connecticut Law Review*, *42*(4), 1059–1080.

[51] Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. New York, NY: W. W. Norton.

[52] Carskadon, M. A., Harvey, K., Duke, P., Anders, T. F., Litt, I. F., & Dement, W. C. (1980). Pubertal changes in daytime sleepiness. *Sleep*, *2*(4), 453–460; Carskadon, M.A., Harvey, K., & Dement, W. C. (1981). Sleep loss in young adolescents. *Sleep*, *4*(3), 299–312; Carskadon, M. A. (1999). When worlds collide: Adolescent need for sleep versus societal demands. *Phi Delta Kappan*, *80*(5), 348–353.

children walking to school or waiting for the bus in the dark. Moreover, the need for school sports teams to practice and other extracurricular activities to occur relies on time after school and before dinner. The result of this configuration is that many students in middle and high school are chronically sleep-deprived, which, as epidemiological studies have shown, results in behaviors associated with attention deficit disorder (ADD), attention deficit hyperactivity disorder (ADHD), depression, anxiety, and a host of other medicalized conditions.[53] Despite efforts to demonstrate these effects—and the positive test-score and grade results of a later start time—very few school systems in the United States have altered their school start times to address these concerns.[54] The change can be simple: trading elementary start times with middle and high school start times provides those who need an extra hour of sleep with that time, and extracurricular activities can either be moved to the early morning or later in the day with minor adjustments. There is also the possibility to develop more modular approaches to meet the needs of students, teachers, administrators, and families.

The stakes of this policy debate became apparent to me during a staff meeting at the sleep clinic where I conducted my ethnographic fieldwork. The head neurologist presented the case of a young man, 15, who had a history of difficulties in school, including "behavioral issues" such as fighting with other students, refusing teacher requests, and poor grades. The young man had been referred to a pediatric psychiatrist who had initially diagnosed him with ADHD and opposition defiant disorder. After being treated with Ritalin for a month, the patient and his parents both complained to the psychiatrist that his symptoms had only become worse. The pediatric psychiatrist then consulted with the head neurologist in the sleep clinic, who suggested that the patient be admitted for a sleep study. It is typical that patients quickly fall asleep in the clinic after being prepared for the study and their nightly bedtime routine, and this patient was no different. Unlike many patients, he slept through the night and deep into the next morning, waking up around 11 a.m. The patient was sent home with the recommendation to "free run," going to bed when he was tired and waking up without prompting by a parent or alarm clock, and to keep track of sleep onset and waking in a sleep diary. This 2-week experiment was intended to reveal his base sleep need and whether it was being met. To the surprise of none of the clinicians at the staff meeting, the patient's average nightly sleep over the 2-week period was 11 hours, and tended to begin around 11 p.m. and end around 10 a.m. The patient and his parents were interested in finding non-pharmaceutical options to his situation, so the head neurologist presented the idea of the student enrolling in one of the local Catholic schools. The Catholic school started at 9 a.m. rather than at 7:15 a.m. like the public school the patient regularly attended. Moreover, the principal and teachers at the Catholic school were willing to let the patient regularly come to school late and make up his work during a supervised period after school each day when the teachers would otherwise be completing their paperwork and grading. While the family was reticent about the move to a religious school, they accepted it as a non-medicalized option and made the transition. The head neurologist presented the case as an example of the need to know the institutional options available to students so as to be able to direct them and their families to schools that might be able to meet sleep needs without recourse to pharmaceuticals.

Not all school districts have a diversity of schools that have different start times, nor are all institutions willing to adjust their schedules for supervision to allow for individuated attendance. But one option that schools might adopt is a modular schedule. The process requires polling the staff, faculty, and students about their desired work and attendance times. A poll of the population of the school means that teachers, administrators, and students can be sorted into subpopulations based on preferred attendance and work times. For example, a cohort of students, faculty, and staff might begin at 7 a.m. (including those with extracurricular activities), with other cohorts beginning at 8 a.m., 9 a.m., and 10 a.m. They would respectively end their school days at 3 p.m., 4 p.m., 5 p.m., and 6 p.m. Such an organization would provide an overlapping period between 10 a.m. and 3 p.m. for the majority of instruction and administration, with elective courses being offered during each end of the school day. This model is largely how universities in the United States operate. Such a modular schedule addresses the breadth of human sleep and its variations. It would even allow some students and employees to attend early, leave midday for a nap, and then return for the later part of the school day. Implementing this kind of institutional arrangement can alleviate the burdens placed on individuals and families that stem from sleep and the related physiological consequences of not meeting sleep needs.

4 | MULTIBIOLOGISM AS THE BASIS FOR INSTITUTIONAL REFORMS

It was cases like these—in the clinic and out—that started my thinking about multibiologism as an ethical principle for the organization of institutions and the medical care of individuals. Physicians and patients and their families were all invested in finding ways to work beyond the medicalization of human experiences, particularly those that they accepted as being "normal" without meeting the expectations of an ideal, such as nocturnal, consolidated sleep that meets the temporal demands of the American school and work days. Implicitly, they were working to expand the range of normalcy that American institutions had built themselves upon during the 19th and 20th centuries, but they were unable to make more than individual changes. Social transformation has not yet occurred; rather, only affordances at the individual level were able to be made, and often only through

[53]Center for Applied Research and Educational Improvement. (1998). *School start time study: Final report summary*. Minneapolis, MN: Center for Applied Research and Educational Improvement.

[54]Wahlstrom, K., Dretzke, B., Gordon, M., Peterson, K., Edwards, K., & Gdula, J. (2014). *Examining the impact of later high school start times on the health and academic performance of high school students: A multi-site study*. Minneapolis, MN: Center for Applied Research and Educational Improvement.

negotiations with authorities in the institution, and, at times, at the cost of private school tuition or lost wages.

The cases presented here were not uncommon, and over the nearly 3 years that I attended staff meetings, similar cases were presented almost weekly. In each case, a school-aged young adult found him- or herself in distress because of the demands of school achievement, parental expectations, and the daily school schedule. For adults, the adoption of non-pharmaceutical treatments for their sleep disorders often meant missed promotions, the reduction of work hours, or being supported through state programs. For many of these adults, the loss of work impacted them, largely because of the emphasis that Americans place on vocations as a meaningful part of adulthood. The acceptance of state support for disability was even harder for some, and many refused to accept the fact that they were disabled, preferring, instead, to work at jobs that were beneath their level of education and experience. If "dignity" and "suffering" play a role in the social sciences and bioethics,[55] however they are defined by local societies and individuals, addressing the institutional composition of everyday life is necessary to achieve greater experiences of dignity and the diminishment of suffering, both of which are predicated on normative ideals in the structuring of everyday institutions that lead to some physiological experiences being unnecessarily recognized as in need of medical intervention and its concomitant costs, economic and otherwise.

The tensions that have existed between the social sciences and bioethics in the past may stem from a shared concern about the perceived excesses in the practice of medicine in the United States and elsewhere, as well as about the abuses in scientific knowledge production. Because of these shared interests, there has long been an impasse on how to approach the shared concerns that motivate many social scientists and bioethicists in and beyond the clinic and hospital. Multibiologism offers a principle for the ethical reform of institutions to meet the needs of individuals and communities. Multibiologism serves as a means to accept the changing scientific and medical conceptions of human physiological needs, whether they are based in sleep, diet, ageing, or any other physiological process or need. Cultural conceptions of "biology" and its inevitable needs change over time,[56] but the physiological serves as a foundation for the articulation of sensible institutional organization that meets socially recognized needs. These needs may change over time as scientific and medical understandings of basic physiologically processes change, but it is the bioethical role of social scientists—in concert with bioethicists invested in social reforms—to develop and propagate models of humane institutions. Doing so will minimally reduce the pharmaceuticalization of a host of "natural" and "biological" processes while also reducing perceived stigmas associated with non-normative physiological experiences and capacities.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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