

Evolutionarily Informed Research: The Future of Health & Fitness

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ABSTRACT

Looking at our evolutionary past has the potential to inform and improve various facets of human life including areas in health, physical fitness, and nutrition from an evolutionary perspective. We argue that doing so would logically aid the fields of anthropology, biology, kinesiology, holistic sciences, nutrition, psychology, and exercise science, just to name a few. Specifically, we focus on the implications of shifting our paradigm from quantity of food and exercise to quality of such things. Implementing an evolutionarily informed approach, thus reducing the mismatch between our biology and technology, can do this.

KEYWORDS

Mismatch Theory, Evolutionarily Informed, Health, Fitness

INTRODUCTION

Human health, wellness, fitness, and nutrition are popular topics in science and medicine. Although science has devoted a considerable amount of time and resources to these areas of research, there are still widely varying opinions, "facts" and trends that circulate among the academic community, as well as the general lay public. In many ways, just like in other facets of life, history also has a way of repeating itself. A good example of this is the parallel between the physical culture movement of the late 19th/early 20th century and the ancestral health movement currently upon us (Stapell, 2013). During the physical culture movement, the focus turned to healthy eating as fuel for the body, as well as the benefits of plenty of regular physical activity. The physical culture movement also specifically addressed the place that regular weight-bearing exercise had within a well-rounded physical fitness regimen. Since that time, several fitness and diet fads have come and gone.

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Similar trends and parallels to previous eras may be seen among these areas of the academic and scientific community. For example, the ancestral health movement, which takes a holistic approach, encompasses diet as well as concern for modern stressors on hormones, circadian rhythms, and interpersonal relationships. Taken as a complete package, the ancestral health movement attempts to rectify modern ailments of the body and mind by looking to our primal ancestors as a model. Support for some of the claims that are central to this movement can be found by looking at cultures that have been sheltered from many of the modern conveniences that those of us in developed societies enjoy, such as electronic technology and processed foods. We argue that in order to make progress and avoid the constant regurgitation of information among the scientific and academic community, we actually need to look to the past, and incorporate a broader, multi-disciplinary approach to the study of human health and physical fitness. Specifically by incorporating evolutionary theory, may be the answer.

MISMATCH THEORY

Biological evolution happens at a much slower rate than does our agricultural or industrial evolution. As a result, human genes and human lifestyles become incongruent from one another (Eaton & Eaton, 2003). Rapid technological and cultural changes over the past several hundred years have outpaced human genetic adaptations, and thus created a mismatch between our genome and our environment (Platek et al., 2011). This idea is the basis of mismatch theory, which asserts that our external environment has advanced at a much quicker pace than our biological makeup, thus creating a gap (mismatch) between what our bodies are adapted for and how we currently live. In other words, all of these highly convenient, but evolutionarily disruptive, conveniences create a mismatch between the traits that were preserved throughout evolution due to adaptive purposes in the Environment of Evolutionary Adaptedness (EEA), but are no longer matched with how we utilize them in our current environment (O’Keefe & Cordain, 2004).

Oftentimes mismatch theory is applied to reproductive success or genetic fitness, such as in the case of hormonal contraception. However, other mismatches are also important. For example, lack of functional physical movement and a diet rich in whole foods has perhaps had less impact on reproductive maladaptation, as it has on overall human physical and mental health. In response to increased awareness of the mismatch between ancestral living and physical activity as opposed to our modern day health and exercise choices, greater attention has been recently given to factors influencing a healthy lifestyle. Results of this include the emergence of evolutionarily informed dietary plans (such as the “paleo diet” and “primal eating”) and fitness training programs (such as CrossFit and MoveNat) that emphasize a holistic approach to eating “clean” and performing functional, whole-body activities that more closely mimic the movement patterns of our ancestors.

In the Pleistocene, it was necessary for our ancestors to be physically active, in order to obtain food, shelter, and safety, as well as protect mates and offspring. Comparatively, the industrial and agricultural revolution have provided modern, westernized societies with an abundance of processed food choices that don’t need to be hunted down, manually butchered, and protected from predators. Rather than

trekking long distances over varied terrain, lifting, digging, pulling, and pushing as was necessitated by these ancestral times, we now use treadmills, recumbent bikes, and muscle isolation machines if we want to exercise our heart, lungs, and muscles. Many of our modern physical fitness regimens include this machine-based, muscle isolation work and long steady state cardio. This does not parallel those activities of our ancestors, who performed a combination of high-intensity activity (sprinting, throwing) and longer, lower-intensity movements (hiking, carrying). In the EEA, physical effort was necessary, but unwise or inefficient energy expenditure would have compromised the likelihood of survival and reproduction (Platek et al., 2011). Likewise, food was consumed for energy and survival. The myriad of processed convenience foods industrialized societies now enjoy are far removed from the sources of fuel our bodies were made to rely on.

ANCESTRAL ACTIVITY VS. MODERN ACTIVITY

Physical fitness of our ancestors was comprised of a large amount of daily light to moderate activity such as walking and some periods of interval-style, high intensity work, all of which were conducted outside in nature, recruited both the musculature and cardiovascular system, and included weight-bearing, strength and flexibility building movements with plenty of rest periods built in (O’Keefe et al., 2010). A classic example is short bouts of running after prey (cardiovascular endurance), explosively throwing a spear into it (strength, power, accuracy), not getting killed in the process (reaction time), gathering wood/supplies and deep squatting whilst lighting a fire and cooking the meat. These movements are still basic, fundamental parts of our movement pattern and are beneficial for the health of our muscles, joints and ligaments.

Currently, the majority of individuals in industrialized societies sit for large portions of the day, but not in the deep squat position, our ancestors sat in. We have toilets, chairs, recliners and ergonomic workstations. All of these highly convenient but evolutionarily disruptive characteristics create a mismatch between the traits that were preserved throughout evolution due to adaptive purposes in the EEA, such as eating solely as a fuel for physical activity, but are no longer matched with how they are utilized in our current environment (O’Keefe & Cordain, 2004). Today, we see a much greater prevalence of diseases of modernity, many related to obesity and sedentary lifestyles (O’Keefe et al., 2010). However, the innate physical capabilities and requirements of our ancestors are essentially the same for us in modern times.

Forencich (2012) provides physical evidence to support the assertion that our embodied cognition and kinetic intelligence are slowly being diminished by technology, stress, modern disease, convenience, and general laziness. In fact, our bodies are not well adapted to physical inactivity, which reduces the natural functioning that regular physical activity-induced stress provides. Anthropological data suggest that our male and female ancestors had greater bone density and muscle mass than modern humans. Our ancestors were likely more robust in both muscularity and stamina than modern humans; this pattern holds constant whether the population studied underwent agricultural revolution 10,000 or 1,000 years ago (Eaton, Konner & Shostak, 1988; Forencich, 2012). This suggests that despite the longer hours of labor agriculturist societies have endured, the intermittent intense

physical activity of our primal ancestors actually produced better muscularity and endurance capacity. Although we have gyms and fitness facilities that promote a healthy lifestyle through developing cardiovascular and muscle training activities, our current society is plagued with diseases of modernity such as heart disease, diabetes and obesity (O'Keefe, Vogel, Lavie & Cordain, 2010). Recently, ancestral-inspired fitness programs like CrossFit have begun to bring natural, functional movements to modern humans. These types of workouts, and CrossFit specifically, provide the constantly varied movement patterns and a combination of short, high-intensity and longer, low-intensity training that more closely resembles the types of physical activity of our ancestors. We argue that the quality rather than quantity, of exercise is the important factor when combating modern diseases.

EVOLUTIONARILY INFORMED HEALTH AND REPRODUCTIVE FITNESS

Literature suggests physical wellness and evolutionary fitness go hand in hand (Platek et al., 2011). Evolutionary fitness, or the ability to survive and reproduce with traits recurring into future generations, is thus logically aided by superior physical fitness. Modern medicine has provided advancements that allow almost anyone to have a child, and for the majority of these children, even those with congenital diseases, to make it to reproductive age. However, attracting and selecting mates continues to have some traditional roots, including a preference for physical features that more closely resemble those of the ancestral male/female. Selection favors indicators of reproductive fitness in order to have the best chance of reproduction and gene perpetuation. According to Platek (2010), the movements that were necessary for our ancestors and were adaptive throughout our evolutionary history may also be the ones that help us achieve the physical attributes that attract mates (e.g. optimal waist to hip ratio/shoulder to waist ratio). General Physical Preparedness (GPP) refers to broad programming that increases work capacity and produces the ability to be prepared for any physical task. This is opposed to specific physical preparedness (SPP), which focuses on becoming excellent in one domain. GPP does not focus on becoming excellent at any one aspect/sport/movement but instead being overall conditioned, strong, fast, and flexible. Ancestral-style exercise programming utilizes the motor recruitment patterns to produce both GPP and, possibly optimal mate-worthy bodies (Platek, 2010). Although outside the scope of this paper, we suggest that adopting an ancestral-inspired fitness regimen may not only help produce choice mates but promote healthy pregnancies and offspring as well.

ANCESTRAL HEALTH AND DIET

In terms of food, paleo-style eating is, at its heart, less about emulating the exact foods of our ancestors (saber tooth tiger is hard to come by) and more about emulating the metabolic state and physiological reactions to the food that we consume. Although much of the modern movement toward a paleo-style diet has become simplified as a prescription to eat copious amounts of meat and vegetables, little dairy, sugar, alcohol, and grains, the dietary choices of our Paleolithic ancestors varied greatly by physical location and season. The greatest premise of a

modern primal eating plan should, then, reflect local, seasonal whole foods over those that are mass-produced, processed, or genetically modified. Further, research suggests that ancestral diets consisted of approximately 33% protein, 46% carbohydrates, and 21% fat (Eaton, Konner & Shostak, 1988). Current Western diets typically display higher fat and carbohydrate levels, with much lower protein consumption. Anthropological data leads us to believe that consumption of whole, unprocessed foods also allowed for appropriate and adequate vitamin and mineral consumption/absorption, clearly without the engineered pseudo-vitamins and additives of modern times. In fact, Paleolithic hunter-gatherers typically consumed 1,500-2,000 mg of calcium per day (as compared to the estimated 740 mg consumed by industrialized nations) without having dairy sources as we do today (Eaton et al., 1988). Based on this data, we could deduce that consuming unprocessed, seasonally available foods could also assist in supporting the reduction of modern health complications. Finally, we once again suggest that shifting our focus from quantity to quality will greatly improve the results of dietary choices.

ANCESTRAL HEALTH AND SOCIETAL IMPLICATIONS

Human longevity and survival rate has increased dramatically since Paleolithic times, leading some to believe that we have adapted to this lifestyle. While modern medicine allows for the treatment of injury and disease, this should not be confused with a genetic adaptation to modern times. Improved sanitation, housing, and medical care have provided protection from infection, trauma, and predation, all chief causes of death in the Paleolithic era. While life expectancy is now more than double that of our ancestors, modern humans have plenty to be concerned about. Chronic degenerative and modern diseases such as diabetes/insulin resistance, bone density loss, chronic stress, some cancers, and hypertension appear to be a product of our modern environment (Eaton, et al., 1988). To this end, some researchers may argue that examining ancestral health and wellness is of the utmost importance. To some in this field, "fitness," in the traditional sense of the word, may have little to do with our activity levels or diet and more about reproductive success. However, to others, it is equally relevant as the study of reproductive fitness, which has been possibly the most commonly known evolutionary topic in academia. We argue that these two topics may go hand in hand.

EVOLUTIONARY INFORMED HEALTH ACROSS DISCIPLINES

Overall, health and wellness research may be better supported through incorporating evolutionary theory and practice. In order to reduce the mismatch between our modern lifestyle and ancestral history, we believe that individuals would be better able to tailor exercise programs and dietary choices to decrease the incidence of injury and illness. A general set of guidelines providing a framework by which to evaluate one's own program, or that of clients/patients for those in sports, exercise and medical related fields, can help to reduce this mismatch. For example,

the information gained through evolutionary research may help a long-distance runner evaluate his or her training program by comparing it to a basic set of “primal” criteria, such as incorporating short bursts of high-intensity sprints more often, longer, slow activity more often such as hiking, or functional strength such as pushing, pulling, throwing, and squatting. This is but one example. However, not only physical benefits abound. Aspects of human emotion, cognitive functioning, and overall mental health have been associated with and may benefit from following ancestral principles.

Despite the growing abundance of scholarly information available regarding the benefits of incorporating an evolutionary approach into our daily lives, we have yet to see extensive collaboration between evolutionary scientists and other traditional fields of study. However, this is growing through the work of some cross-discipline researchers such as Robb Wolf, as well as work presented at the Ancestral Health Symposium, Evolutionary Studies (EvoS) Summit, the NorthEastern Evolutionary Psychology Society (NEEPS) and the EvoS Consortium. We argue that by also considering ancestral health and nutrition into the bigger picture of medicine, exercise science, mental health counseling, etc., academia is better able to account and control for modern diseases; ones which also may not only affect individual health, but also extend to public health. Doing so also supports a traditional evolutionary focus of attracting and/or selecting a mate, and successfully (healthfully) reproducing. By approaching this from a multi-disciplinary perspective, rather than simply a medical perspective, reliance on one’s natural awareness may be restored. We argue that studying human health, physical fitness, and nutrition from an evolutionary perspective would logically aid the fields of anthropology, biology, kinesiology, holistic sciences, nutrition, psychology, and exercise science. Collaboration among academics in these fields, allow for a greater breadth and depth of research, knowledge procurement and proliferation. By combining the insight that we gain in the EvoS program, a well-rounded examination of these topics results in, and provides support for healthier ways of living. We believe that a comprehensive approach to health and wellness should be multi-disciplinary, and broad in scope, including science and humanities with range and complexity that supports and promotes the greatest amount of knowledge and collaboration. This may be achieved through channels such as the EvoS Consortium, Ancestral Health Symposium, and EvoS publications such as this.

REFERENCES

- Eaton, S. B., & Eaton, S. (2003). An evolutionary perspective on human physical activity: implications for health. *Comparative Biochemistry and Physiology*, 136 Part A, 153-159.
- Eaton, S. B., Konner, M., & Shostak, M. (1988). Stone agers in the fast lane: chronic degenerative diseases in evolutionary perspective. *The American Journal of Medicine*, 84, 739-748.
- Forencich, F. (2012). A whole life approach to health and performance. *The Exuberant Animal*.

- O'Keefe Jr, J., & Cordain, L. (2004). Cardiovascular disease resulting from a diet and lifestyle at odds with our paleolithic genome: how to become a 21st-century hunter-gatherer. *Mayo Clin Proc*, 79, 101-108.
- O'Keefe, J., Vogel, R., Lavie, C., & Cordain, L. (2010). Achieving hunter-gatherer fitness in the 21st century: Back to the future. *The American Journal of Medicine*, 123(10), 1082-1086.
- Platek, S. (2010). Moved to mate?. *CrossFit Journal*. 1-6.
- Platek, S., Geher, G., Heywood, L., Stapell, H., Porter, J. R., & Walters, T. (2011). Walking the walk to teach the talk: implementing ancestral lifestyle strategies as the newest tool in evolutionary studies. *Evolution Education & Outreach*, 4, 41-51.
- Stapell, H (2013). Back to the past: the industrial revolution, the digital revolution, and “new” paradigms for living in a rapidly changing world. Powerpoint Presentation.

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