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Evolutionary Educational Psychology: The Disparity Between How Children Want to Learn and How They Are Being Taught

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ABSTRACT

The goals of evolutionary educational psychology include revealing the source of children's motivational biases toward learning and using those biases as a sound basis for educational studies and reform. In this paper, two evolutionary based lines of research, folk domain theory and Gray's research on play, are used to explore the difference between how children learned in ancestral hunter-gatherer societies and how they learn in modern societies. By emphasizing how children have learned over evolutionary history, issues that arise with modern educational approaches can be approached in a new and useful way. For example, instead of diagnosing a highly active child with a disorder, one could understand that such behavior is natural. Evolutionary theory brings a new and important perspective to educational and developmental studies.

KEYWORDS

Evolutionary educational psychology; evolutionary developmental psychology; folk domains; educational studies; educational theory; learning from play

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"Children did not evolve to sit quietly at desks in age-segregated classrooms being instructed by unrelated and unfamiliar adults" (Bjorklund, 2007, p.120). Yet, in contemporary[1] society, we expect students to thrive in this environment regardless of its potential disadvantages. Educational theorists frequently devise new strategies for more effective teaching approaches; however, it may just be that children are not meant to learn through explicit teaching methods at all. Through the continuous exploration of ideas and techniques for education, a new realm of theory has developed under the name "evolutionary educational psychology". Researchers in this discipline, such as David Geary and David Bjorklund, focus on ideas that relate evolutionary principles to educational foundations. By analyzing the origins of education, they attempt to understand the function of children's intrinsic motivation for learning. Prior to the invention of formal education, children acquired all of their knowledge through play. However, in modern society, most children attend schools and learn directly from teachers. By examining the transition from free play to formal education, we can see that children may not have responded well to the change. Evolutionary educational psychologists purport that there is a disparity between how children would prefer to learn and how they are currently being taught.

HUMAN FOLK DOMAINS

Geary (2008) explores this educational dilemma in his research, and he uses evolutionary theory to provides an explanation for how the human mind and brain, as they are today, have gradually emerged as a product of evolution. He claims that the advantages the human mind possesses were developed because of our ancestors' ample ability to adapt to their changing environment. From this understanding, Geary developed his main theory of *human folk domains*. He

[1] The "contemporary" or "modern" society referred to in this article is that of mainstream society in developed countries. There are, as previously mentioned, present-day societies which lead foraging lifestyles, and also numerous societies in developing countries that do not have a system of formal educational systems instructing secondary knowledge. Therefore, the formal education systems referred to in this paper are focused on those in today's developed countries such as the United States, China, Canada, France, Japan, and England. Another factor to consider is the cultural differences between Eastern and Western societies. In each respective location, formal education has been created in alignment with their cultural viewpoints, such as individualism or collectivism. While these beliefs are influential to how schools in each location function, the schools are still alike in the focus on direct-teaching strategies. Therefore, the ideas of evolutionary educational psychology can relate to both Eastern and Western education systems without having to differentiate between the two. The only distinction that must be made is the difference between the education systems of developing and developed countries. The learning disparities in this article primarily pertain to formal education in modern developed countries.

proposes that humans have an innate ability to understand certain domains of psychology, biology, and physics that enhance their probability of survival. In the area of *psychology*, Geary includes the ability to recognize one's self as a social being and have an awareness of one's relationships with other people. In addition, he claims that humans have the propensity to break into groups of people and distinguish in-groups and out-groups. The *biological folk domain* serves in a more traditional sense to produce behaviors that would assist with hunting and horticulture. A basic understanding of biology would direct humans' use of ecological resources for survival and/or reproductive purposes. Lastly, the *physics folk domain* explains humans' ability to navigate, and construct and use tools. Folk domains supplied enough essential knowledge to support the survival of ancestral hunter-gatherers. Although these concepts may not be explicitly stated in modern educational curriculums, they provide a framework for formal education to grow upon (Geary, 2008).

Human folk domains can be described as heuristics, or "rules of thumb," for everyday living; they comprise a set of innate motivations for learning. All animals have some sort of built-in survival information, but the degree to which they can change or ignore those predisposed inclinations varies. For instance, chickadees are able to memorize the location of thousands of food items in the winter that they stored in the fall, and some ants are able to navigate using the sun (Wilson, 2007). These are species specific features that benefit each organism's survival and reproduction. Most creatures possess a certain amount of innate abilities or knowledge; ants and chickadees are merely two examples. However, the complexity and flexibility of the human mind is what stands us apart from all other species; it has specialized mechanisms, abilities, and processes that allow humans to function at a more complex level than other animals (Demetriou, 2007). Geary explains that because humans have this advanced thinking ability, we can disable the instinctive folk system and employ critical thinking and problem solving when necessary. This skill, he claims, is what allows humans to create and learn evolutionarily novel, or secondary, information beyond those innate motivations (Geary, 2008).

Geary (2007) makes a clear distinction between primary and secondary knowledge in his research. He explains that primary knowledge is information that we have evolved to naturally acquire; it does not have to be explicitly taught. For example, the ability to speak a native language is primary knowledge. Overall, information that is directly related to survival and reproduction fall under this category. On the other hand, secondary knowledge is something humans have devised, and must be explicitly taught (Sweller, 2007). Therefore, the ability to write or read a language would be considered secondary knowledge. This differentiation is important when analyzing the reasons for the development of formal education.

LEARNING THROUGH PLAY

The way humans lived in ancestral hunter gatherer societies is important to consider because that particular lifestyle comprises more than ninety percent of the time humans have existed on earth (Gosso et al., 2005). Therefore, it is the environment that has influenced the majority of human evolution. Researchers have studied the lives of children in present-day foraging societies to gain insight about how our ancestors lived as hunter-gatherers. Although present-day foragers do not live in the same conditions as our ancestors, their lifestyles are presumed to be comparable in many ways.

Through observation, it has been determined that formal education was not a concept in ancestral hunter-gatherer societies. Children learned through play and, eventually, through work, however, there was no distinction between work and play (Gosso et al., 2005). In hunter-gatherer societies, children learned within their folk domains through self-directed play and exploration. In this environment, primary knowledge is more useful for survival thus reducing the necessity of obtaining evolutionarily novel information. Therefore, children in ancestral hunter-gatherer societies evolved a motivational bias toward play as their preferred learning behavior (Geary, 2008).

Although play and imitation were the only primary means of education, children still learned a great deal. For instance, boys had to learn to identify animals, create tools necessary for hunting, and become skilled at using them; girls had to learn how to identify numerous varieties of fruits, nuts, roots, and seeds, and learn how to prepare them (Gray, 2007). In addition, all children had to learn how to navigate their territory, build huts, make fires, treat illnesses, assist with births, and countless other daily activities that were necessary for survival. However, adults did not force this knowledge upon their children (Gray, 2007). Instead, their studies were conducted by watching others and participating in the activities on their own. Children often mimicked adult work in their play (Bjorklund, 2007). Although some children in modern society may still incorporate aspects of adult activities into their play, it is not the sole method of learning. Altogether, learning takes a very different form in many of today's societies than it did when humans evolved in ancestral hunter-gatherer time.

Defining Play

As previously described, children prior to the invention of formal education acquired most of their knowledge through play. Therefore, play is an important aspect of education. However, before play can be analyzed, it must be defined. Some classify it as any non-serious behavior (Pellegrini et al., 2007), while others tend to be more specific and describe play as a behavior that is based on intrinsic

motivation and free choice, and viewed positively by children (Cooney, 2004). Most importantly, play must be comprised of activities that are freely chosen by the child; the same activities would not be considered play if they were directed by an adult instead (Bergen & Fromberg, 2009). Activities that are facilitated by adults are often structured and disciplined, rather than free. Rules that are implemented in play should be flexible and negotiated by the children themselves, not by a parent or teacher. When children have control over their activities, they are more likely to have fun and further engage themselves. By participating on their own accord, they have more opportunity to develop initiative and other life skills. Instruction from others, since it is not induced by intrinsic motivation, cannot be called play. Children may even reject activities that are facilitated by adults, because they are no longer optional or viewed as desirable (Pellegrini et al., 2007).

However, there are a wide variety of activities that can be considered play, which is the reason why it is difficult to define. In an effort to understand the concept of play, Sponseller (1974) explains a continuum that can be used to understand play from that which has the least amount of adult intervention to the most. In this spectrum, the intervals of play include free play, guided play, directed play, work disguised as play, and work, and each have a corresponding type of learning which is most likely to occur. The type of learning ranges from discovery learning to drill-repetitive practice, and the type of knowledge that is acquired may vary throughout these different forms of learning. The play that was exhibited in ancestral hunter-gatherer societies can be considered free play, where children were completely educated through their own discovery (Sponseller, 1974). This is the type of play that corresponds with the definition in the previous paragraph. On the other hand, direct-teaching strategies, which are commonly utilized in modern education around the world today, would be on the opposite end of the play spectrum. This difference in learning acquisition shows that, for some reason throughout history, humans stopped relying on play and begin implementing systems of formal education instead.

CHANGING SOCIAL DYNAMICS

Some factors that led to the development of formal education included changing social dynamics and the development of complex culture. Perhaps the most crucial was the expansion of agriculture, which had various major effects on human living patterns (Mulhern, 1959). Because people became settled and reliant on the land, their lifestyle changed as a whole. From this point forward, among other things, there became a distinction between work and play, which altered the learning process. Children were now utilized as laborers and had less time to freely explore and play. Instead of choosing their own free time activities, children were required to spend time working to contribute to the family income. This new

responsibility created a clear separation between time for work and time for play, which led to the distinction of time for learning as well. Agriculture, and the ownership of land as a byproduct, also led to social status differences in societies, which eventually had an impact on the amount of education different individuals received as well (Mulhern, 1959). This change in social dynamics led to the creation of advanced civilizations and cultural variations that have molded our world today (Geary, 2008).

The complexity of agricultural and post-agricultural societies led to a divergence between the demands of education and confines of human folk domains. Geary (2008) claims that folk domains give humans enough information to make inferences and assumptions that are appropriate for day-to-day living, but that these explanations are frequently inaccurate from a scientific perspective. In modern society, there are many situations in which human folk domains are not sufficient. Geary defines this disparity as attributional error; relying only on folk domains would produce undesirable results because human life is too complex. However, because the human mind is so sophisticated, we can override our folk domains and use critical thinking to determine better responses and behaviors (Geary, 2008). Through this unique ability, humans also have the capacity to learn evolutionarily novel, or secondary, information. When combined, both of these aspects serve to bridge the gap between folk knowledge and cultural knowledge. The information that children need to obtain in order to be successful in modern society has expanded beyond the information that was necessary in ancestral society. Bjorklund (2007) explains that life is now too complex for children to be able to learn all of their essential skills through the method of free play. Therefore, formal education was designed to help children acquire knowledge that is now necessary.

GOALS OF EDUCATION

As time continued, schooling became a cultural tradition with which society had much to gain. It was, and still is, an economic investment. Education is a business; those who provide education seek profit from their efforts, just like any other industry (Gray, 2008b). Societies as a whole use education as a tool to compete with other societies. In evolution, competition between groups is an important factor (Wilson, 2007). Historically, three main goals of education have been persistently evident: to produce good citizens and soldiers, to promote the values of the church, and to produce good workers (Russell, 1967). The educational philosophy of educating for the advantage of the individual, which is prevalent today, seems to be a fairly new concept. Bertrand Russell, a British philosopher, describes three divergent theories of education that he feels are important to understanding education systems:

> "The first considers that the sole purpose of education is to provide opportunities of growth and to remove hampering influences. The second holds that the purpose of education is to give culture to the individual and to develop his capabilities to the utmost. The third holds that education is to be considered, rather in relation to the community, than in relation to the individual, and that its business is to train useful citizens." (Russell, 1967, p.18).

He claims that these principles are all present to some degree in modern education systems, despite the fact that they have different intentions. According to Russell, the first theory is the newest, while the last is oldest, which is evident when comparing the education systems in different periods.

For national governments, education was a way to produce patriots and future soldiers for their country (Mulhern, 1959). In Sparta, Rome, and Athens, this educational goal was common. In Sparta, males were educated in the household until the age of seven. Afterwards, they were instructed by elder males, and from eighteen to twenty they were classed as Irens. Their education was mainly physical and moral, with only a small portion of intellectual or aesthetic goals. Plutarch explained that "all the rest of their education was calculated to make them subject to command, to endure labor, to fight, and to conquer" (In Cordasco, 1967, p.5). In Athens, a similar system was observed. Education was provided by the state for males between the ages of sixteen and twenty, with almost all emphasis on preparation for military services. In Rome, education was very similar to Sparta and Athens. However, in a later part of the Roman Empire, elementary schools were designed to provide an education for reading and writing. Unfortunately, schooling became limited to the upper class, as a prominent tradition for the future (Cordasco, 1967). It is now clear how distinction of social status in the agricultural era becomes an issue in education. If the state does not have the resources to provide education to everyone, individuals of lower statuses are inevitably left out.

However, the state is not the only investor in education. Historically, the church has been closely linked with education as well. In the Middle Ages, monasteries were the primary location for teaching. In this period, they were the only school for professional training and scholarly studies. Monasteries preserved books and served as libraries. In the late Middle Ages, there is evidence that after the age of seven or eight, a male child was taught at home by his mother until the age of fourteen, and then was educated at court under the supervision of a royal lady (Cordasco, 1967). Continuing in history, the reformation brought about a new theory of education, which focused more on the individual. Reformers were people who thought schools should protect children from negative influences from the outside world. They viewed education as a means to providing students with the foundation to become productive, competent adults (Mulhern, 1959). Throughout

the reformation, Protestant elementary and secondary schools were established. Although they accepted a more humanistic curriculum, they still emphasized religious values as the main objective. In Colonial America, schools developed under the influence of either Puritan, Lutheran, or Catholic churches, depending on their location (Cordasco, 1967). It is clear that churches were heavily involved in the education system.

The third prominent focus of education was to produce good workers**.** Employers in industry viewed school as a way to teach children specific lessons which would help in the workplace; they thought children should learn punctuality, tolerance, and how to follow directions, and there was little emphasis on teaching literacy (Mulhern, 1959). In England in the 18th century, the purpose of education was to prepare children to make money. Girls were taught to sew and knit, while boys were apprenticed to trades (Cordasco, 1967). Even today, the prevalence of trade schools displays the importance of preparing students for work.

From the early 16th century on into the 19th century, ideas about education were gradually shaped into theories of universal, compulsory public education (Gray, 2008b). It is evident that societal needs have changed in many ways since the hunter-gatherer time, and that educational theory has simultaneously changed in many ways as well. Evolutionary educational psychologists are concerned with how these differences have affected children's learning strategies. In contemporary society, the direct relationship between human folk domains and play has instead become a connection between advanced secondary knowledge and formal education. However, research suggests that advanced knowledge can be effectively taught through play, even in modern society (Gray, 2007).

THE DISPARITY

Because there is an emphasis placed on learning more than primary knowledge in contemporary society, there is a contradiction in the way that children learn and the way they innately want to learn. Specifically, this discrepancy is between children's instinct to rely on the folk system, and the necessity of secondary learning (Geary, 2008). Children are inclined to play freely and explore on their own, rather than repeat and memorize lessons. However, modern culture has required that children obtain an education because certain skills, such as reading, writing, and mathematics, are essential for working and survival. This standard has produced high expectations for humans' learning capabilities, and goals that are difficult to attain for many individuals. It is sometimes expected that children will motivate themselves and have a desire to learn. However, in an evolutionary perspective, children are not intrinsically motivated to acquire secondary knowledge in schools. Therefore, children may resist sitting in a classroom and being instructed; the information put forth in schools may seem

abstract and insignificant to students if they do not feel the need to learn it (Geary, 2008). Furthermore, as grade levels increase and lessons become harder, the information being introduced becomes increasingly more evolutionarily novel. Keil (2008) suggests that educators should implement this notion by exploiting all the implicit primary knowledge that humans' effortlessly acquire in order to teach more effectively.

An alternative is to introduce more free play into curriculums because the motivation for children to play is much more prevalent than the motivation to learn from direct-teaching. At the Sudbury Valley School, in Massachusetts, students are taught with this theory in mind. Therefore, instead of forcing students to sit in desks and learn from a teacher, the school encourages students to participate in exploration and play. The Sudbury Valley School illustrates how the sole use of folk domains can be useful in providing an education, even in our complex modern society. The school relies on students' natural instincts for self-education; the student gets to decide what topics to pursue (Gray & Chanoff, 1984). The institution allows students freedom, without interference from adults, to pursue their own interests. Although adults do not facilitate mandatory learning, staff members are available to teach students upon request. For example, if a student wants to learn to play an instrument, they could ask a staff member who specializes in music to teach them. Students follow their own learning agenda at the Sudbury Valley School, and often seek assistance from adults or other students when deeply exploring a subject (Sadofsky, 2000). Children are given time, space, equipment, and protection, which are essential for successful self-guided learning. With the right ingredients, students have the opportunity to positively develop. They can challenge themselves and interact with their peers to obtain friends, develop ideas, learn how to deal with boredom, and cultivate interests (Gray & Chanoff, 1984). This type of school exemplifies the power of play because students who graduated from the Valley School have proven to be just as successful as students who attended conventional schools (Gray & Chanoff, 1986). Therefore, it is clear that children are able to obtain secondary knowledge through free play. However, most schools today do not implement education in this manner.

In America, by 1918, all states had compulsory education laws, demonstrating the importance of education and the emphasis placed on regulating it (Cordasco, 1967). Similar policies regarding education have been created and refined for centuries on the basis of many different theories all over the world. One thing that is certain in contemporary society is that children who are not educated risk losing jobs to those who are (Bjorklund, 2008). Typically, people with high school and college degrees will be more likely to get hired over others who do not possess degrees. Therefore, it is necessary to have some amount of education since obtaining a job and earning money is essential to survival. For these reasons, modern society stresses the importance of school. In addition, Geary (2008)

defends formal education by explaining that as the need to learn secondary information has become more relevant, the length of childhood and adolescence has expanded as well, to allow for more time to acquire the knowledge. Additionally, Keil (2008) explains that one possible reason for schooling may be due to humans being inclined to teach, rather than needing to explicitly learn. Whatever the justification may be, however, it is certain that formal education is an important aspect of modern society.

If secondary knowledge is essential to survival in modern society, why is it a problem that schools focus on it? The answer to this question is that evolutionary educational psychology does not deem the teaching of secondary information itself as a problem. Instead, the approach is more concerned with *how* the information is taught. The goal of evolutionary educational psychology is to enhance the effectiveness of education by understanding its evolutionary foundations. Teaching methods that tap into folk domains, such as free play, as opposed to direct-teaching strategies, may be better received by students and lead to optimal results. Additionally, schools may benefit from allowing students to explore their folk domains. By including lessons about basic emotions, the natural world, and basic logic, etc, and by permitting natural exploration, students may become better prepared to learn secondary knowledge (Keil, 2008).

CONCLUSION

Evolutionary educational psychology is a fresh perspective for educational theorists. The discipline steps back from the current issues to observe how and why the problems have developed in the first place. By understanding the difference and progression from learning in hunter-gatherer societies via folk domains to learning in contemporary societies via direct-instruction, researchers may have a new outlook on children's motivation. Rather than simply delving into behavior modification and diagnoses of learning disabilities, evolutionary educational psychologists are attempting to enhance classroom learning strategies as a whole. It is important to see what children have an evolutionary predisposition for versus what modern society expects of children. For example, many children are now being diagnosed with behavioral disorders, such as attention deficit hyperactivity disorder (ADHD), because they cannot focus in the classroom and get distracted easily. However, evolutionary researchers suggest that children diagnosed with ADHD might actually just be playful children who find it difficult to adjust to the unnatural school setting (Bjorklund & Pellegrini, 2002). When not understood from an evolutionary perspective, ADHD is viewed negatively and treated with medication to reduce hyperactivity. Unfortunately, formal education puts many children in an awkward position; they feel naturally inclined to play, but are being told they must sit still in a

desk. Diagnosing children with behavioral and learning disorders may not be the best solution.

Geary (2007) claims that evolutionary theory will be better able to predict what will be effective in the classroom than non-evolutionary based theories have. Evolutionary educational psychology could make a prominent difference in educational practices, just as evolutionary theory has made a great impact on the social sciences, especially psychology. Evolution has provided new explanations and changed the way researchers study and comprehend human motivation and behavior. It can be beneficial for the field of educational studies as well. Evolutionary educational psychology strives to enhance the perspective and understanding of education, and with further research, could likely lead to very useful results.

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REFERENCES

Bergen, D., & Fromberg, D. P. (2009). Play and social interaction in middle childhood. *Phi Delta Kappan*, *90*(*6*), 426-431.

Bjorklund, D. F. (2007). The most educable of animals. In J.S. Carlson & J.R. Levin (Eds.), *Educating the evolved mind: Conceptual foundations for an evolutionary educational psychology* (pp. 119-129). Greenwich, CT: Information Age Publishing.

Bjorklund, D.F., & Pellegrini, A.D. (2002). *The origins of human nature: Evolutionary developmental psychology*. Washington, DC: American Psychological Association.

Cooney, M. H. (2004). Is play important? Guatemalan kindergartners'' classroom experiences and their parents' and teachers' perceptions of learning through play. *Journal of Research in Childhood Education*, 18(4), 261-277.

Cordasco, F. (1967). *A brief history of education*. Totowa, New Jersey: Littlefield, Adams & Co.

Demetriou, A. (2007). Educating the evolved and the developing mind: Commentary on Geary's "Educating the evolved mind: Conceptual foundations for an evolutionary educational psychology". In J.S. Carlson & J.R. Levin (Eds.), *Educating the evolved mind: Conceptual foundations for an evolutionary educational psychology* (pp. 131-139). Greenwich, CT: Information Age Publishing.

Geary, D.C. (2007). Educating the evolved mind: Reflections and refinements. In J.S. Carlson & J.R. Levin (Eds.), *Educating the evolved mind: Conceptual foundations for an evolutionary educational psychology* (pp. 177-210). Greenwich, CT: Information Age Publishing.

Geary, D. C. (2008). An evolutionarily informed education science. *Educational Psychologist*, *43*(*4*), 179-195.

Gosso, Y., Otta, E., de Lima Salum e Morais, M., Ribeiro, F. J. L, and Bussab, V. S. R. (2005) Play in hunter-gatherer society. In A.D. Pellegrini & P.K. Smith (Eds.), *The nature of play: Great apes and humans* (pp. 213-253). New York: Guilford Press.

Gray, P. (2008b, August 20). *Why schools are what they are II: Forces against fundamental change*. Retrieved February 24, 2009, from http://blogs.psychologytoday.com

Gray, P. (2007). Nature's powerful tutors: The educative functions of free play and exploration. *Eye on Psi Chi,* 12 (1), 18-21.

Gray, P., & Chanoff, D. (1984). When play is learning: A school designed for self-directed education. *Phi Delta Kappan,* 65(9), 608-611.

Gray, P., & Chanoff, D. (1986). Democratic schooling: What happens to young people who have charge of their own education? *American Journal of Education*, 94, 182-213.

Keil, F. C. (2008). Adapted minds and evolved schools. *Educational Psychologist*, *43*(*4*), 196-202.

Mulhern, J. (1959). A history of education: A social interpretation. New York: The Ronald Press Company.

Pellegrini, A. D., Dupuis, D., & Smith, P. K. (2007). Play in evolution and development. *Developmental Review*, *27*, 261-276.

Russell, B. (1967). *Education and the social order*. London: Unwin Books.

Sadofsky, M., & Brezinksy, D. (2000). *Sudbury Valley School: About Us. FAQs*. Retrieved October 3, 2009, from http://www.sudval.org/01_abou_09.html

Sponseller, D. (1974). A schema for play and learning. In D. Sponseller (Ed), *Play as a Learning Medium*, (pp.115-123). Washington D.C.: National Association for the Education of Young Children.

Sweller, J. (2007). Evolutionary biology and educational psychology. In J.S. Carlson & J.R. Levin (Eds.), *Educating the evolved mind: Conceptual foundations for an evolutionary educational psychology* (pp. 165-175). Greenwich, CT: Information Age Publishing.

Wilson, D.S. (2007). *Evolution for everyone: How Darwin's theory can change the way we think about our lives*. New York: Bantam Dell.

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