

## **Education and the New Sciences of Human Nature: How Evolutionary Psychology Can Inform the Education of Young People**

Charles Smith and Kevin Goff

The driving purpose of the entire educational enterprise is to cultivate changes in the cognitive capacities, conceptual schemata, character, and conduct of young people. Underlying this mission is a deep optimism that educational environments and experiences can shape and reshape a student's developmental trajectory. Of course, every student, no matter how young, comes to school already molded in important ways by parents, peers, and prevailing cultural norms. Thus each student's developmental trajectory always bears a certain inertia, a socially-conditioned momentum, that educators must not only seize upon, but also redirect and sometimes even counteract. Just as engineers develop technologies that both utilize and contend with the physical forces of inertia and momentum, so do educational researchers strive to engineer potent practices that both employ and combat social forces, with the goal of sculpting the thought and behavior of young people.

Something important is missing from this model, however. There is another kind of inertia and momentum at work in the thought and behavior of students. All people, regardless of cultural context and social setting, approach the world with certain cognitive, affective, and behavioral predispositions that are universal. Many (probably most) of these represent extant traces of our biological and psychological evolution as a species. The study of these universal affinities, or what most of us simply call "human nature," is the province of the burgeoning field of evolutionary psychology. Educational theory that focuses solely on the social and cultural momentum born of recent history, while ignoring the more ancient momentum of natural history, will be incomplete at best and misguided at worst. In this paper, through a series of practical examples, we argue that evolutionary psychology can constructively inform educational practice at every level, from the single classroom to whole school districts to the enterprise at large.

### **Social Constructionism versus an Integrated Causal Model**

In a seminal 1992 paper, anthropologist John Tooby and psychologist Leda Cosmides – vanguard proponents of the emerging field of evolutionary psychology – heralded the approaching "twilight of learning as a social science explanation":

Advocates of the Standard Social Science Model have believed for nearly a century that they have a solid explanation for how the social world inserts organization into the psychology of the developing individual....Individuals "learn" their language, they "learn" their culture, they "learn" to walk, and so on. All problems – whether they are long-enduring adaptive problems or evolutionarily unprecedented problems – are solved by "learning"....Of course, as most cognitive scientists know (and all should), "learning" ... is not an explanation for anything, but is rather a phenomenon that itself requires explanation....We expect that the concept of learning will eventually disappear as cognitive psychologists and other researchers make progress in determining the actual causal sequences by which the functional business of the mind is transacted. (pp. 122-123)

Learning, of course, is a central metaphor in the field of education, so if its demise is imminent, then educational researchers will want to take heed. What Tooby and Cosmides are really challenging, however, is not the nature of learning algebra and such in the classroom, but rather the social constructionist dogma that a person's entire worldview and behavioral repertoire – one's concepts, one's meanings, one's ways of categorizing and interpreting reality, one's reactions and responses, one's morals and values, even one's emotions, desires, and personality traits – are *learned* from one's native culture and language (Crotty, 1998). The central tenet of social

constructionism (or what Tooby and Cosmides call the Standard Social Science Model) is that the human psyche is exceptionally malleable; the mind itself is profoundly molded by whatever symbol system prevails within the local social setting (Crotty, 1998; Pinker 2002). Pinker (2002), an evolutionary psychologist, likens this model of the mind to “silly putty,” pliable into any shape and (when pressed against a newspaper) readily imprinted with language. Culture and language *precede, imprint* themselves upon, and indeed *construct* human nature itself. “Culture,” in this paradigm, “is best seen as the source rather than the result of human thought and behavior....All reality, as meaningful reality, is socially constructed. There are no exceptions” (Crotty, 1998, p. 54).

According to Tooby and Cosmides (1992), this framework largely gets things backwards and upside-down. Social constructionism, and its concomitant denial of human nature, held sway as the 20<sup>th</sup> century’s dominant theoretical framework in the human sciences. It is the foundational doctrine of anthropology (e.g., Geertz), sociology (e.g., Durkheim), social psychology (e.g., Mead), and critical theory (Marx and all his successors) – and by extension, all the educational theories rooted therein (Crotty 1998; Pinker 2002). One of its primary effects (and goals) was to wall off the social sciences from the natural sciences.

Over against this trend, Tooby and Cosmides (1992) propose to replace the “Standard Social Science Model” with an “Integrated Causal Model.” The natural sciences are already “vertically integrated”: the principles of chemistry are consistent with the laws of physics, the principles of biology are consistent with those of chemistry, the principles of ecology are consistent with those of biology, etc. Likewise, they argue, the social and behavioral sciences must be continuous with the natural sciences. Anthropology, sociology, and social psychology should be consistent with cognitive and behavioral psychology, which should in turn be consistent with neuroscience and biology. And it is the emerging new metatheory of evolutionary psychology, they contend, that will bridge these heretofore segregated disciplines. The “vertical integration” of all the sciences – from hard

to soft – will reveal that although the relationship between “human nature” and “culture” is complex indeed, it is emphatically *not* the case that the latter precedes the former.

Evolutionary psychology adopts a Darwinian approach to human behavior, cognition, emotion, and reasoning. According to this model, the mind comprises a suite of *adaptations*, fashioned by natural selection (yet now conditioned by culture), that fostered the survival and reproductive success of our highly social, foraging hominid ancestors. These psychological adaptations evolved for millions of years before the comparatively recent advent of agriculture, civilization, or anything like modern culture. Each psychological adaptation is *functionally specialized, context-sensitive*, and specifically targeted at a *particular* problem or pattern that was recurrent in the environment of our evolutionary past, including the social environment (Tooby & Cosmides, 1992). By contrast, social constructionism holds to a model of the human brain as a *general-purpose* learning and reasoning machine, and it is this that makes the human mind so malleable by culture. Symons (1992), an evolutionary psychologist, retorts:

It is no more probable that some sort of general-purpose brain/mind mechanism could solve all the behavioral problems an organism faces (find food, choose a mate, select a habitat, etc.) than it is that some sort of general-purpose organ could perform all physiological functions (pump blood, digest food, nourish an embryo, etc.) or that some sort of general-purpose kitchen device could perform all food processing tasks (broil, freeze, chop, etc.). There is no such thing as a “general problem solver” because there is no such thing as a general problem. (p. 142)

What we have inherited from our ancient ancestors, then, is a toolkit of psychological mechanisms, each well engineered for a specific function, from facial recognition to food selection, from navigating open terrain to negotiating social hierarchies, from language acquisition to loving one’s kin, from making alliances to mistrusting cheats, from wielding tools to wooing mates (Buss, 2004; Pinker, 1997). Although all of these mechanisms must be *calibrated* to the local social,

cultural, and ecological setting (Geary 2007; Tooby & Cosmides 1992), they no more need to be “learned” than an infant needs to learn to suckle. This is what inspired Tooby and Cosmides to proclaim the “twilight of learning as a social science explanation.”

It is important to note that the emphasis in evolutionary psychology (despite accusations to the contrary) is *not* on the biological *differences* between people, but almost always on what humans share in common. It investigates the universal, species-specific “human nature” that cuts across cultures, languages, and individuals (Buss, 2004; Pinker, 2002), the “psychic unity of humankind” (Tooby & Cosmides, 1992, p. 25) that enables *any* newborn to calibrate her innate linguistic and cultural capacities to *any* local setting. It is equally important to point out that evolutionary psychology does not embrace some sort of rigid genetic reductionism. The “nature vs. nurture” distinction and debate are deeply flawed, for behavior *always* arises through an interaction of genetic adaptations and environmental context:

*Everything*, from the most delicate nuance of Richard Strauss’s last performance of Beethoven’s Fifth Symphony to the presence of calcium salts in his bones at birth, is totally and to the same extent genetically and environmentally codetermined. “Biology” cannot be segregated off into some traits and not others. (Tooby & Cosmides, 1992, p. 84)

Nor are we genetically programmed robots; rather, we are an exceptionally flexible, adaptive, knowledge-gathering, knowledge-using, knowledge-sharing, problem-solving, decision-making species (Pinker, 1997, 2002). We have an ability, unparalleled in the animal kingdom, to negotiate and manipulate a great diversity of environments, including our exceptionally dynamic social settings. It is not a singular, malleable, general-purpose mind that makes this possible; rather, it is the plurality of tools in our mental toolkit that gives us our behavioral plasticity, just as a chef’s assortment of utensils makes many recipes possible (Tooby & Cosmides, 1992). Only natural selection could have engineered a suite of functional-yet-flexible adaptations as extraordinary

as those comprised by the human brain (Dawkins, 1986), and there can be little doubt that our evolutionary past continues to influence our cognitive and affective lives.

Surely this has implications for educational theory and practice. In what follows, we stage three brief discussions on three different educational issues, each at a different organizational level and each of which might profitably be informed by evolutionary psychology: a classroom instruction issue, a school policy issue, and a societal welfare issue. We tackle each in a dialectical spirit, moving from a “thesis” rooted in evolutionary psychology, to an “antithesis” rooted in social constructionism, and finally, in accord with the goal of “vertically” integrating the natural and social sciences, to a “synthesis” of thesis and antithesis that compatibly encompasses both.

### **Three Educational Issues: Examples of Vertical Integration**

#### **Classroom Issue: Which is a Better Pedagogy – Direct Instruction or Discovery Learning?**

**Thesis: direct instruction is the best pedagogy.** Much of our psychological architecture is *context-sensitive* and *content-specific*, specially adapted to “learn” – or better, to *calibrate* itself to – those features of the local social and ecological environment that potentially would have affected the survival and reproductive success of our small-society, hunter-gatherer ancestors. An obvious example is spoken language. Children need no instruction whatsoever to “learn” the local language, and in fact, the adults of most contemporary foraging societies rarely even speak with children (Pinker, 1994). The child is born with a “language instinct” – an evolved “universal grammar” that underlies all languages and dialects – which must be calibrated to the local tongue; this happens quite “naturally” so long as the child is within earshot of others (Pinker, 1994). One might say that the child “discovers” spoken language quite easily.

Written language, however, is another matter altogether. Reading and writing are extremely recent products of *cultural* evolution; there simply has not been enough time for humans to evolve a

capacity for written language through *biological* evolution (Geary, 2007). Consequently, a child is unlikely to “discover” how to read and write on his or her own. These skills must be acquired through conscious, effortful, protracted struggle and practice under the guidance and direction of an experienced adult (Geary, 2007). This, of course, is what schools are for. As Pinker (2002) says, “Education is a technology that tries to make up for what the human mind is innately bad at” (p. 222). As academic fields grow ever more sophisticated, what we ask students to learn becomes ever more “remote” from the ecological and social settings in which their minds evolved (Geary, 2007). Bridging the gap therefore requires direct instruction by an experienced adult (Geary, 2007). “Discovery” will not work.

Motivation is problematic, too. Humans have an extended juvenile period (common in social mammals), which presumably functions as an active learning period, comprising play, exploration, and practicing of social interactions – “environmental experiences” that calibrate the child’s native psychology to the local ecology and society (Geary & Bjorklund, 2000). Thus students will have a natural curiosity about things social and ecological, but this curiosity will not necessarily be conducive to modern academic learning. “A burning desire to master algebra or Newtonian physics will not be universal, or even common” (Geary, 2002, p. 333). To the extent that modern schooling asks students (as it must) to engage in activities that fail to tap, or even run counter to, their natural motivations, there will be conflict and resistance. In short, “discovery learning” is bound to fail; the correct pedagogy is direct instruction coupled with external rewards and extrinsic motivations.

**Antithesis: discovery learning is the best pedagogy.** Theorists on both sides of this argument agree that children possess a natural curiosity to learn about their natural and social environment. The divergence becomes apparent when discussing what is the appropriate pedagogical strategy that should be employed to facilitate the acquisition of skills and knowledge that may be classified as academic learning. A competing theory to the direct instruction model is a discovery learning model

which promotes the idea that children learn best by free exploration and investigation, and that teaching strategies that incorporate this “natural curiosity” into the classroom are more effective in helping children obtain knowledge in all areas.

One example of the successful implementation of the discovery learning model can be seen in the longstanding tradition of Montessori schools. Established in the early twentieth century, based on the theoretical framework established by Dr. Maria Montessori, these schools are set up to encourage children’s natural development and instinct to learn, and incorporate a teaching philosophy based on several guiding principles. The main tenet of this teaching philosophy is that children should be encouraged embrace exploration, and that they should be given the tools that are necessary to learn independently. Montessori schools provide an environment that advances learning by promoting children’s innate curiosity and creativity, so that they may develop skills that will allow them to contribute to society.

This approach produces results because it provides the appropriate tools and framework to facilitate the learning process, but also provides the flexibility necessary to cater to the individual needs of each child. The children are placed in a stimulating environment that encourages their natural inquisitiveness, while providing meaningful activities and guidance from instructors. These activities are structured, but still allow the children to develop self-discipline and progress at their own pace. The discovery learning model has been successfully implemented to help children acquire all types of skills in both formal and informal learning environments.

**Synthesis: a hybrid pedagogy.** In order to have the greatest impact on the education of children, the adoption of a pedagogical hybrid of the direct instruction and discovery models should be considered. Educators should take the best aspects of each strategy and form a new teaching approach that creates a blended model. While children do respond to formalized learning within a structured environment, this does not mean that they derive no benefits from elements of the discovery model which encourages natural curiosity and exploration.

Young people need to be involved in directed activities, but also need the opportunity to explore their surroundings and figure things out on their own. In fact, evolutionary psychologists Stephen and Rachel Kaplan (1989), in their book *The experience of nature: A psychological perspective*, put forth the idea that situations that are too structured and focused result in mental fatigue, and that providing access to natural elements is meaningful to human development and the recovery of mental energy. As a “knowledge-seeking, knowledge-using species,” humans have a strong motivation to seek and discover new information and to share it, and they experience joy in using knowledge successfully and in making successful predictions – all of which would have been adaptive for a mobile, opportunistic, highly social, hunter-gatherer niche (Kaplan, 1992). In the classroom, then, “discovery” can lay foundations and provide raw material, plus an ounce of natural motivation, while “direct instruction” can assemble the final cognitive edifice. A powerful pedagogy may be one in which discovery experiences always *precede* direct instruction, and direct instruction both builds upon and transcends raw discovery experiences.

### **School Policy Issue – Can mandatory school uniforms diminish school violence?**

**Thesis: uniforms can reduce violence.** The roots of violence are evolutionary. Violence is evoked by circumstances that were relevant to a person’s reproductive success in the small foraging societies in which our brains evolved (Buss, 2004). To have hope of eliminating violence in our schools, we must understand both what triggers it and why. All evolved adaptations – both bodily and behavioral – encompass some sort of tradeoff between risks and rewards, between costs and benefits. Because aggression presents real risk to the aggressor himself, it will manifest itself only in response to contextual cues resembling those *archaic* ones in which the ultimate reproductive reward might have made the risk worthwhile. “In principle, the mechanisms producing aggression could remain dormant for the entire life of an individual if the relevant contexts are not encountered” (Buss, 2004, p. 285). Requiring all students to wear identical school uniforms might

alter the social environment in a way that renders incidences of violence less likely and less frequent.

What is striking about so many altercations, as revealed in extensive data collected by evolutionary psychologists Daly and Wilson (1988), is that they seem to escalate out of proportion to the original offense, even to the point of homicide. A Darwinian perspective helps to explain why. In the foraging, subsistence-level niche of our ancestors, individuals who could accumulate more resources (especially food) would have had a statistically better chance of successfully raising offspring than others. Thus a *visible* ability to accumulate resources would have helped one in the competition to attract a mate (Buss 2004). Worldwide, the vast majority of non-domestic altercations, assaults, and homicides take place *not* in private, but before an audience of shared acquaintances, often as retaliation for some sort of *public* humiliation (Daly & Wilson, 1988). Public status-seeking and reputation-defending – hence the irrational escalation of public altercations – have their evolutionary roots in our reproductive nature: among our ancestors, individuals could “gain reproductive success by commanding and *displaying* resources that exceed their own subsistence needs” (Daly & Wilson, 1988, p. 179; italics added). There can be little doubt that this dynamic lies (unconsciously, at least) at the heart of the “fashion wars” in today’s schools. This in turn deeply affects an individual’s *perceived* socioeconomic status relative to his peers. Since the invocation of violence brings serious risk to the aggressor himself, the individuals most likely to assume that risk would be those who *perceive* themselves (unconsciously) to be in danger of reproductive failure (Daly & Wilson, 1988). One key to curbing violence, then, might be to diminish economic inequality, or at least the *perception* thereof (Harris, 1998; Pinker, 1997).

Schools, of course, cannot undo the socioeconomic disparities among its enrollees, but they can work to extinguish the *public signs* of those disparities. Uniforms will not eradicate the status-seeking, reputation-protecting instinct, but they may help to prevent its evocation. Again, evolved behavior is *context-sensitive*. Expensive clothing and other visible status symbols may

unconsciously activate the status-seeking modules of the mind, putting them on “high alert.” To the extent that uniforms tone down the air of status competition, they may have the potential to avert violent altercations.

**Antithesis: uniforms will not reduce violence.**

The issue of school uniforms and their effect on the learning environment has been a hotly contested subject in recent years. The impact of these programs has been studied in many school systems and many different theories concerning the effectiveness of this program have been advanced. Proponents of this issue state that uniforms promote school unity and discipline, and lower distractions to academic success. One of the most controversial claims is that the introduction of school uniforms is responsible for a decrease in violent incidents within the school system.

Opponents of the school uniform plan argue that in fact there is no correlation between the implementation of these programs and an increase in the academic success rates of students, and that these types of programs have are detrimental to students by suppressing their individuality (Brunsma & Rockquemore, 1998). They also contend that these programs can in fact encourage discipline problems instead of reducing them. While the use of uniforms is supposed to quell aggressive behavior that leads to violence, the implementation of the policy itself can serve as an aggravating factor that incites a rebellious spirit in young adults. If students are not allowed to express their individuality by choosing their own clothing, many will express themselves by altering the school uniforms to create their own identity. If they do not alter their clothing as a mark of self-expression, they will inevitably find other ways to differentiate themselves. Aggression and the predisposition for violence are environmental in origin, and if not clothing, other factors will precipitate violent altercations in the educational environment.

While several school systems have lauded the benefits of school uniforms in increasing academic success and decreasing violence, there has been academic research that calls into question these assumptions. In their groundbreaking study, “The Effects of Student Uniforms on Attendance,

Behavior Problems, Substance Use, and Academic Achievement,” David L. Brunsma and Kerry A. Rockquemore (1998) argue that because of the success of school uniform platforms in the private school setting, public educators have adopted similar programs in order to lower gang activity and the incidence of student victimization. However, the results of their study show that there is no correlation between the existence of a school uniform program and a decrease in behavioral problems in the educational environment (Brunsma & Rockquemore, 1998). Ultimately school uniform programs are just band-aids that do not address the real sources of school violence which are rooted in complex social, cultural, and environmental issues.

**Synthesis: a plural of strategy for reducing school violence.**

Uniforms are not a panacea or cure-all, but may be worth trying as one element in a much broader anti-violence strategy. Schools need to develop a comprehensive program to reduce violence, including education and prevention programs. These programs focus on developing self-esteem, social skills, teamwork, and tools to help with conflict resolution between students. Schools should provide these tools to all children within the educational system and implement a plan of discipline that is fair and consistent. Teachers and administrators should be trained in proper policies and procedures, and shown how to identify students who may require additional help. Further actions should be taken to provide additional resources to students who are identified as being at-risk, including interventions to modify emotional and behavior problems. The schools may also need to collaborate with other agencies including social services and mental and behavioral health agencies. Although school uniforms might contribute to the cause, they must be part of a much more comprehensive campaign.

**Societal Issue – Should schools emphasize competition or cooperation?**

**Thesis: schools should emphasize competition.** Some have argued that competition and rewards in school *teach* students to develop competitive habits, and thus blame school-sanctioned competitions for cultivating an unhealthy and undesirable competitiveness among

adolescents and adults. Some go so far as to claim, for example, “that teenagers get the idea to compete in looks and fashion from spelling bees and academic prizes” (Pinker, 2002, p. x). In fact, this gets the causal relationship (mostly) backwards. In all animal species, intraspecific competition – that is, competition between members of the same species – is natural, normal, and innate, and humans are no exception. This is a straightforward manifestation of natural selection: those individuals that can outcompete their rivals for finite resources are more likely to spread their genes, including the very genes that made them competitive. A genetic mutation that divests an animal of its competitive drive will not persist.

Humans, however, are unusual in the animal kingdom in several respects. First, unlike most species, humans compete for *status* in the social domain. Among our ancestors, status translated into reproductive success, so social competition was an important selective force in hominid evolution (Buss, 2004; Geary, 2002). Second, in most animal species, males compete with each other for mates, but females do not. Humans, on the other hand, are that rare “high male parental investment species” in which fathers actually contribute significant resources and energy to the rearing of offspring (in most species, mothers do all the work). Consequently, female hominids also competed with each other to attract mates who could and would invest in child-rearing (Buss, 2004). As a result, modern men and women have both inherited a competitive spirit, one that not only targets resources, but also *social* rewards such as status and public recognition.

Finally, humans are also unusual in having a protracted juvenile period. This is a life cycle adaptation that allows individuals to rehearse their social skills for adulthood, including their competitive skills – from the “rough and tumble” play-fighting of young boys to the social jockeying of teenagers (Boulton & Smith, 1992; Geary & Bjorklund, 2000).

Schools, then, do not *cultivate* competitiveness; rather, they respond to it. If we wish to diminish the ill social effects of competitiveness, we should create opportunities for young people to compete,

gain status, and win social recognition in healthy, socially desirable ways, and we should strive to channel each child’s natural competitiveness in ways that promote academic learning and character building. This is the aim of academic and athletic contests.

**Antithesis: schools should emphasize cooperation.** The cooperative learning model in the school environment is an alternative to the competitive learning model. Cooperative learning employs a teaching strategy that uses the creation of small groups within the classroom as the basis for facilitating the understanding of a particular subject (Johnson & Johnson, 2001). This often includes students of various ability levels who are not only tasked with learning the assigned material themselves, but also aiding their classmates in acquiring knowledge.

The cooperative learning model incorporates several elements including positive interdependence, which essentially means that the contributions of each member of the group are necessary and integral to the success of the group. This strategy also promotes face-to-face interaction that promotes communication and understanding between group members (Kagan, 1994). Successful cooperative learning also encourages individual and group accountability. Each student is given responsibilities, and is held accountable for the final outcome. Cooperative learning also aids in the development of interpersonal skills including leadership, decision-making, and conflict management skills.

The implementation of cooperative learning techniques in the classroom has been shown to promote academic achievement and student learning. Students have shown an increase in the retention of information and an increase in their satisfaction with the learning experience. Students are also able to develop skills that increase their ability to communicate effectively with their classmates and interact socially with their peers. Equally important is the increase that can be seen in the self-esteem of students who engage in this learning style. These benefits in addition to the acquisition of needed skills are evidence that schools should emphasize group goals and

collaboration while working to extinguish the cultural conditioning that makes us competitive.

**Synthesis: competition and cooperation are both important.** Cooperation with non-kin is exceptionally rare in the animal kingdom. Among the exceptions – along with wolves, dolphins, chimpanzees, and vampire bats – are *Homo sapiens*. The evolutionary origins of altruistic and cooperative behavior in our species are beyond the scope of this paper; in brief, our hominid ancestors were able, through cooperation, to secure resources and win reproductive rewards whose value more than compensated for the inevitable costs of cheating and free-riding (Cosmides and Tooby, 1992). To a unique degree, humans are *both* cooperative and competitive, both selfish and altruistic, *by nature*. It is reasonable, therefore, for schools to take advantage of both propensities, amplifying and developing the expression of students' "cooperative side" while simultaneously channeling their "competitive side" into healthy, motivational directions. Many sports and academic contests do, in fact, foster teamwork and collaboration. Cooperative learning – properly executed so as not to arouse resistance and resentment born of an individual's native competitiveness – can powerfully motivate learning while cultivating valuable social skills and dispositions.

The shootings at Columbine High painfully revealed the dangers of social isolation in young people (Kirkpatrick et al., 2002). It is crucial for schools to occasion *belongingness* – that is, social inclusion – through cooperative learning, athletics, academic contests, and other collective activities. Perhaps for males especially, we should recognize the importance of group endeavors for our ancestors, such as hunting, social alliances, and yes,

warfare (Kirkpatrick & Ellis, 2001). Accordingly, we should offer team competitions as an alternative to gangs, cliques, and such. Competition and cooperation are not opposites; they are two sides of a single nature, and both should inhabit the educational process.

### **Conclusion**

According to Labaree (1998), the nature of educational research consigns it to "a lesser form of knowledge" – soft science rather than hard, applied science rather than pure. The "Integrated Causal Model" proposed by Tooby and Cosmides (1992) suggests a way that educational research might anchor itself in (without reducing itself to) the hard and pure sciences. The educational enterprise deals at every level with human cognition, motivation, and behavior. The young science of evolutionary psychology attempts to understand human cognition, motivation, and behavior from an empirically grounded Darwinian framework. The educational enterprise also deals at every level with the interaction between the individual and her surrounding culture, including the school culture itself. Evolutionary psychology attempts to understand how evolved human nature expresses, responds to, and shapes culture.

Evolutionary psychology cannot, of course, dictate educational policy, but it can at least *inform* educational theories, practices, and policies, and it should. The three issues explored here offer a brief glimpse of the value and practicality of pursuing a "vertically integrated" approach to educational research. The coupling of the social sciences with the natural sciences need not entail mutual negation. On the contrary, it holds forth the promise of a more comprehensive, more rounded approach, one which grounds our most *humanistic* endeavors in an appropriate understanding of *human nature*.



## References

- Boulton, M. J. & Smith, P. K. (1992). The social nature of play fighting and play chasing: Mechanisms and strategies underlying cooperation and compromise. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 429-444). New York, NY: Oxford University Press.
- Brunsma, D. & Rockquemore, K. (1998). Examining the effects of student uniforms on attendance, substance use, disciplinary behavior problems and academic achievement. *The Journal of Educational Research*, 92, 53-62.
- Buss, D. M. (2004). *Evolutionary psychology: The new science of the mind*. Boston, MA: Pearson Education.
- Cosmides, L. & Tooby, J. (1992). Cognitive adaptations for social exchange. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 163-228). New York, NY: Oxford University Press.
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. London, UK: SAGE Publications.
- Daly, M. & Wilson, M. (1988). *Homicide*. Hawthorne, NY: Aldine de Gruyter.
- Dawkins, R. (1986). *The blind watchmaker*. New York, NY: Norton.
- Geary, D. C. (2002). Principles of evolutionary educational psychology. *Learning and Individual Differences*, 12, 317-345.
- Geary, D. C. (2007). 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. 1-99). Charlotte, NC: Information-Age Publishing.
- Geary, D. C. & Bjorklund, D. F. (2000). Evolutionary developmental psychology. *Child Development*, 71, 57-65.
- Harris, J. R. (1998). *The nurture assumption: Why children turn out the way they do*. New York, NY: Touchstone.
- Johnson, D. & Johnson, R. (2001). *Cooperative learning*. Retrieved from <http://www.clcrc.com/pages/cl.html>.
- Kagan, S. (1994). *Cooperative learning*. San Clemente, CA: Kagan Publishing.
- Kaplan, R. & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, UK: Cambridge University Press.
- Kaplan, S. (1992). Environmental preference in a knowledge-seeking, knowledge-using organism. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 581-598). New York, NY: Oxford University Press.
- Kirkpatrick, L. A. & Ellis, B. J. (2001). An evolutionary-psychological approach to self-esteem: Multiple domains and multiple functions. In G. J. O. Fletcher & M. S. Clark (Eds.), *Blackwell handbook of social psychology: Interpersonal processes*. Oxford, UK: Blackwell.
- Kirkpatrick, L. A., Waugh, C. E., Valencia, A., & Webster, G. D. (2002). The functional domain-specificity of self-esteem and the differential prediction of aggression. *Journal of Personality and Social Psychology*, 82, 756-767.
- Labaree, D. F. (1998). Educational researchers: Living with a lesser form of knowledge. *Educational Researcher*, 27, 4-12.
- Pinker, S. (1994). *The language instinct: How the mind creates language*. New York, NY: HarperCollins.
- Pinker, S. (1997). *How the mind works*. New York, NY: Norton.

Pinker, S. (2002). *The blank slate: The modern denial of human nature*. New York, NY: Penguin.

Symons, D. (1992). On the use and misuse of Darwinism in the study of human behavior. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 137-159). New York, NY: Oxford University Press.

Tooby, J. & Cosmides, L. (1992). The psychological foundations of culture. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19-136). New York, NY: Oxford University Press.