

Original Article

Introductory Psychology Texts as a View of Sociobiology/Evolutionary Psychology's Role in Psychology

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Abstract: Sociobiology and its descendant evolutionary psychology (EP) have struggled to gain ground within the social sciences over the past 30 years. While some have heralded the *Triumph of Sociobiology* (Alcock, 2001), others have critiqued it as a poor approach to understanding human behavior and would prefer that a Darwinian perspective remain outside the domain of human social sciences. We attempt to assess just how successful (or not) it has been by examining how it has been covered in introductory psychology textbooks over the past 30 years. Our findings indicate that a Darwinian perspective has gained influence and acceptance within the field of psychology over the past three decades. However, we also find that EP as a sub-discipline is often perceived as narrowly defined and limited to research on mating strategies. We address how these perceptions may affect the future of EP, and possible steps needed to increase both the acceptance and importance of evolutionary theory to psychology.

Keywords: Evolutionary Psychology, Introductory Textbooks, Psychology, Sociobiology.

1. Introduction

Following the 25th anniversary of Wilson's *Sociobiology: The New Synthesis* (1975) the status of sociobiology was much discussed by both supporters and

opponents. Wilson had boldly predicted that it would subsume the social sciences. Perhaps in reaction to such boldness, critics subjected it to one attack after another (e.g., Gould, Lewontin, Kamin, etc.). These early attacks were often laced with political overtones, taking the debate beyond the halls of science. They accused sociobiologists of reductionism, genetic determinism and, in one notorious case, of something verging on Nazi complicity (Segerstråle, 2000, p. 14). Over the years, the attacks have been answered as often as they have been made, yet there still remain a few disgruntled scientists who just don't get it (Rose and Rose, 2001). In 2001, Alcock hailed *The Triumph of Sociobiology*. It seemed the traditional attacks against it had finally withered away. However, controversy remains around the descent of sociobiology, evolutionary psychology (EP).

The controversy has changed, somewhat, over the past few years. Attacks target the ideas of EP's prominent theorists (e.g., Pinker, 1997; Tooby and Cosmides, 1992; Buss, 1994) rather than the general premise of an evolutionary perspective on psychology. We do not deny that political ideology continues to influence the debate, but across the social sciences most of the arguments now focus on theoretical and methodological issues rather than on ideology. Sociology, however, remains as an exception (Cornwell, Hettterscheidt, Palmer, and Davis, 2001). It continues to hold Darwinian explanations under suspicion, and expresses this in terms that have not changed since the heyday of the sociobiology wars of the late 70s and early 80s (for a thorough treatment see Segerstråle, 2000).

The acceptance of a Darwinian perspective varied across the social sciences. To understand this, a bit of history is needed. While it is not our intention to deliver a detailed account of the history of evolutionary theory in the social sciences (the subject has already been superbly treated by Carl Degler in his book *In Search of Human Nature*, (1991), a brief account is warranted for sake of clarity.

1.1. Historical Factors Affecting Psychology's Acceptance of Sociobiology / Evolutionary Psychology

Two early influences on the social sciences were Jean-Baptiste Lamarck and Charles Darwin. The Lamarckian view of evolution implied directive or purpose for nature to follow, while Darwin's theory of natural selection appeared far more brutish and meaningless. Lamarckism was more acceptable to progressive Victorian sensibilities, and this seduction still dogs the social sciences. Its vestigial appeal is especially curious considering the modern-synthesis and the work of Weismann dismissed the theory; and, one might have expected Lamarckism to be but a footnote to the history of biology. This was not to be the case. Social scientists found Lamarck's theory of inheritance and acquired characteristics to fit in all too well with the desire to solve all social ills through changes to the environment. The science of 'environmentalism' would become an important tool to be used by social reformers to fight against social inequities and injustice. That the theory behind their science was wrong was simply ignored. Thus, the division between the natural and social sciences

sharpened. As the theory of natural selection ascended to prominence in the biological sciences, it was being systematically extirpated from the social sciences.

There was, however, one very notable exception. The development of psychology was strongly influenced by ties to physiology and animal studies. Darwin brought an evolutionary perspective to the study of behavior with the publications of *The Descent of Man* (1871) and *Expression of the Emotions in Man and Animal* (1872). Naturalists such as Romanes focused on animal behavior in order to demonstrate the continuum between animals and humans. By the end of the 19th century, psychology was primarily a laboratory science focusing on internal psychological phenomenon; however, the contributions of the methods and ideas of the physiological and biological sciences were significant. For example, Wilhelm Wundt entitled his 1873-1874 psychology text, *Grundzuge der Physiologischen Psychologie* (Principles of Physiological Psychology), and William James accorded biological sciences a prominent place in his classic *Principles of Psychology* (1890). Darwin's influence is reflected in James' emphasis on creating a physiological perspective of psychology within the 'context of evolutionary theory' and to 'situate psychology within the domain of the natural sciences.' (Taylor, 1990). These early influences of biology and the continuity between animal and man would remain an important, if somewhat temporarily silent, aspect within psychology.

Despite these influences, psychology was not immune to the environmentalism sweeping the social sciences, and it too fell victim to the strong anti-biology rhetoric that emphasized the influence of environment. The commitment of the environmentalists led to the ascendancy and protracted period of behaviorism. J. B. Watson, the father of American behaviorism, was a strong proponent of animal experiments (Degler, 1991). Early in his career he emphasized 'no dividing line between man and brute' (Degler, 1991). This changed as Watson began to focus on humans, and in practice he eventually abandoned the idea of human instincts arguing that human emotions were a conditioned response. This view of human behavior as being wholly malleable opened the floodgates to extreme environmentalism and the abandonment of a Darwinian approach. For the next 30 years, the behaviorist's model would come to dominate psychology in the U.S.A. In its most extreme form, the behaviorist Zing Yang Kuo, described as 'out Watsoning Watson' (Degler, 1991, p. 158), virtually denied any role to biology. Many behaviorists implicitly acknowledged the importance of biology (e.g., in the case of B. F. Skinner see the special edition of *American Psychologist*, volume 47, issue 11, 1992, especially Castania, pp. 1521-1530; also see Skinner, 1990), but only a smattering of individuals emphasized it in their research. The majority of the emphasis was on observable behavior and the general laws of learning; the human infant was viewed as a *tabula rasa* with virtually no built-in predispositions (Skinner, 1953). Behaviorism inundated the discipline of psychology, and its grip did not wane until the development of cognitive psychology and a parallel emphasis on the importance of an organism's natural history. Influential studies such as Breland and Breland's (1961) demonstration of behavioral drift, the tendency to revert to evolved adaptations;

Garcia and Ervin's (1968) conditioned taste aversion, demonstrating the importance of an organism's natural history in the context of its behavior; and Brown and Jenkins' (1968) study of auto-shaping, indicating that not all stimuli and responses are equally associable all helped to reintroduce Darwinism into psychology.

Eventually, the influence of behaviorism and extreme environmentalism was weakened as it was recognized that biology offered a broader and more unifying approach to psychology. However, the environmental approach remains appealing and continues within the social sciences, and contributes to the resistance against Darwinian approaches to human behavior. We have examined psychology introductory textbooks to provide a snapshot of the both the status and the acceptance (or resistance) of sociobiology/EP within the discipline of psychology.

As our measure of how sociobiology and EP have been accepted (or rejected), we have examined freshman level introductory psychology textbooks. Introductory texts are a revealing window into a discipline: Authors must be well versed in all areas and sub-disciplines within the field, and for a theoretical concept to gain admittance into an introductory text it must be of acknowledged significance. Because textbook authors cannot be experts in every aspect of their discipline, they must rely on the common assessments and ideas held by others, and are therefore vulnerable to widely perceived misunderstandings and misinterpretations. Introductory textbooks conveniently and revealingly disclose widespread assumptions held by academics about a discipline. Accordingly we have examined the introductory textbooks that have been published in the 30 years since *Sociobiology*.

2. Methods

We examined 262 introductory textbooks spanning a period of 30 years, beginning with 1975, the year *Sociobiology* was published, and up through the year 2004. Books were grouped into 5-year periods and assessed according to five criteria: (1) does the text discuss any theoretical aspects of sociobiology or EP; (2) is the treatment of sociobiology or EP accurate or inaccurate; (3) was the treatment of sociobiology or EP neutral/positive or negative; (4) the topic discussed; and (5) the sociobiology and EP theorists cited.

2.1. Does Text Discuss Sociobiology/Evolutionary Psychology?

Whether or not a textbook discussed sociobiology or EP was broken down into three classifications: a) nothing, b) citation only, and c) treated. In order to apply these classifications we needed a working definition that would include both sociobiology and evolutionary psychology. Following Alcock, we found E. O. Wilson's one-sentence definition of sociobiology ('the systematic study of the biological basis of all social behaviors' (Wilson, 1975, p. 4)) to be too broad, and that "in reality persons who call themselves sociobiologists [or evolutionary psychologists], or at least those who tolerate this label, invariably use evolutionary

theory as the primary analytical tool for their work” (2001:10). Thus we regarded as sociobiologists or evolutionary psychologists, authors who explicitly used natural selection to explain behavior, and had appeared to at least tolerate the label of “sociobiologist” or “evolutionary psychologist.” . Although this definition proved to be relatively easy to apply in our examination of textbooks, it does have the drawback of excluding earlier works that explicitly addressed evolutionary reasons for behavior, but occurred before the label of sociobiology was established (e.g., Ardry, 1966; Tiger & Fox, 1971).

We counted the topic of sociobiology or EP as having been discussed only when a textbook explicitly mentioned sociobiology or EP, or linked a specific hypothesis to sociobiology or EP. To further refine our data, we included the classification ‘citation only’ to note textbooks that include data and findings from sociobiologists or evolutionary psychologists but failed to make explicit any connection to sociobiology or EP. Daly and Wilson’s work on stepchild abuse is a common example found in psychology textbooks.

2.2. Is the Treatment of Sociobiology/EP Accurate or Inaccurate?

Another category we tracked was whether or not the text was accurate or inaccurate. As some authors came excruciatingly close to misrepresenting theoretical premises, not so much for what they wrote but for their omissions, we developed a guideline to judge a textbook’s accuracy. Certain concepts were considered to be clearly inaccurate, including the all too familiar standard accusations of genetic determinism, learning and/or environment not being important, the naturalistic fallacy, and for the more politically minded, the ever faithful maintenance of the *status quo*. However, if the authors attempted to present a balanced view or premised inaccurate concepts as attacks made by the opponents of sociobiology or EP, the text was classified as accurate (since the representation of the criticism itself was not incorrect). If the criticism leveled was inaccurate, or was presented as widely accepted, unresolved, or matter of fact then the text was defined as inaccurate. For example, in the case of the naturalistic fallacy, Ratus (1984) states “Sociobiology also seems to suggest that aggressiveness is natural and desirable. Thus, efforts to control aggression can be seen as doomed to failure and even morally questionable, as interfering with the natural order of things.” (p.14).

2.3. Is the Treatment of Sociobiology/Evolutionary Psychology Negative or Positive?

Our third category examined the negative or positive/neutral treatment of sociobiology or EP. Negative tone was defined as any text characterized in an unpopular or undesirable manner. Inaccurate text *per se* was not necessarily classified as a negative treatment; rather it would have to be clearly biased in its representation of inaccurate and negative criticisms. We combined positive and neutral into one classification to remove any ambiguity from the classification. An example of a

positive treatment comes from Mussen and Rosenzweig's textbook (1977) 'Evolutionary interpretations of behavior and behavioral mechanisms will become more powerful and more widespread... which some are already calling 'sociobiology'.' An example of a negative tone can be found in Dworetzky's textbook (1985) in which he wrote of sociobiology as a form of genetic determinism and 'The ideas of sociobiology are disturbing, and to some, even shocking.' Often textbooks reflected a negative tone without explicitly attacking sociobiology or EP. Their negative bias often came from the caveats and criticisms presented. For example, if it read, 'Most psychologists do not accept the tenets of sociobiology or EP...' or ended the discussion with unanswered criticisms, thus leaving naïve undergraduates with disparaging impressions, the treatment was assessed as negative.

2.4. Topics Discussed.

Our fourth category tracked topics specific to sociobiology or EP. To do this we examined the percent of books covering a topic, and counted the number of paragraphs devoted to the overview of sociobiology and/or EP, or to a more specific topic, such as kin selection. The category of topics was divided into the following classifications: sociobiology, EP, altruism, parental care, kin selection, mating strategies, gender differences, personality, aggression, and other.

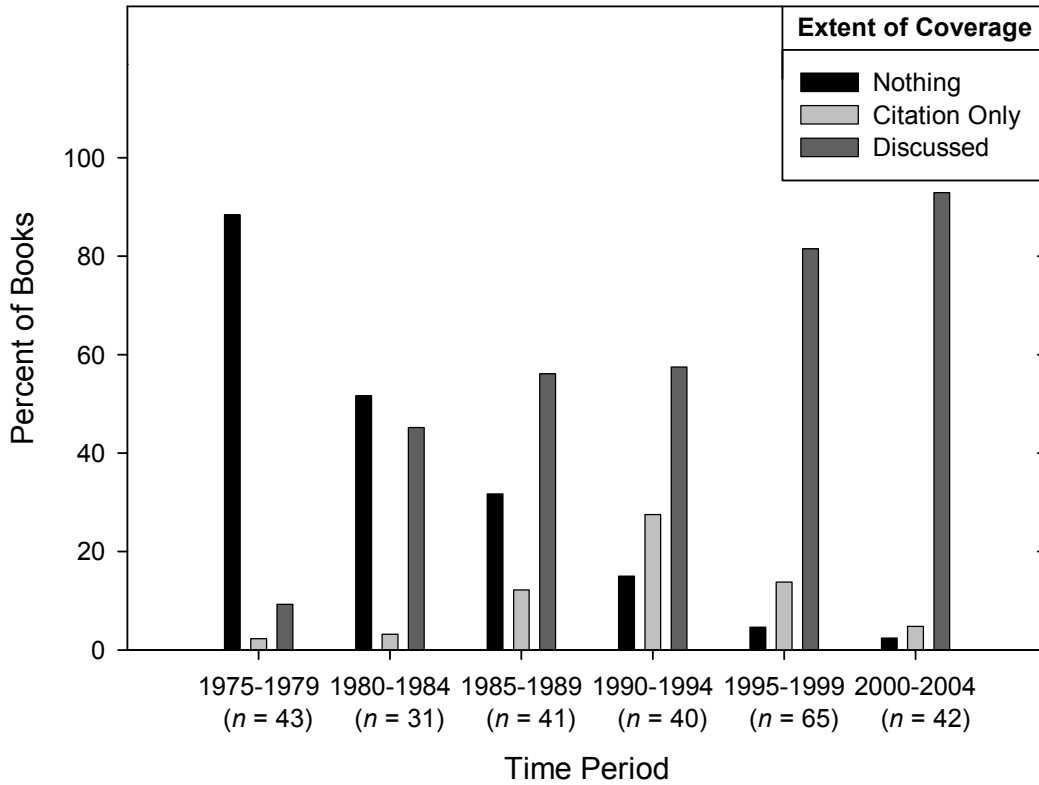
2.5. Major Author Citations During the Last 30 Years.

Our final category looked at citations, and we counted those attributed to the major theorists in sociobiology and EP. This allowed us to examine the changes over the past 30 years. Specifically, we tracked E.O. Wilson, W.D. Hamilton, R. Trivers, and R. Dawkins and a few others as leading sociobiology theorists and Tooby and Cosmides, Daly and Wilson, Buss, and Kendrick and a few others as leading EP theorists.

3. Results

A total of 262 introductory psychology textbooks, over 75% of the U.S.A. market, were examined and we treated these as the population of introductory texts rather than a sample. The text obtained constituted a very large sample of convince, with text from the 'vanity press' or obscure publishers the most likely to be excluded. Our sample contains text from the leading publishers in the U.S.A., thus, we have no reason to believe that our sample would be biased for or against EP. Accordingly, we provide descriptions of the population rather than statistics on a sample. As indicated in Figure 1, over the past 30 years, there has been a significant increase in the number of books that discuss either sociobiology or EP.

Figure 1: The number of books by 5-year periods that included nothing concerning sociobiology and/or evolutionary psychology, citation only, or discussed the topic is shown for introductory psychology textbooks.

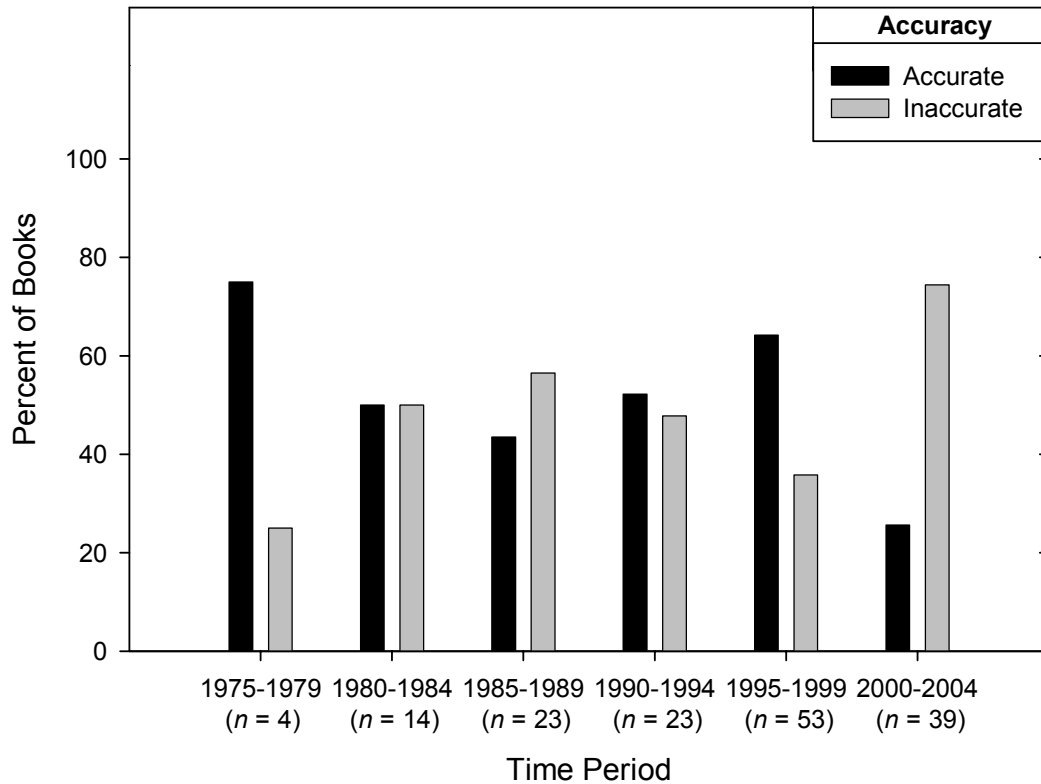


In the first period after the publication of Wilson’s *Sociobiology*, few textbooks discussed sociobiology. During the 80s about half the books discussed either sociobiology or EP. The 90s reflect a further increase to about 80% of text, and the last period indicates that virtually all textbooks now discuss sociobiology/EP. The focus too has changed, shifting to EP while sociobiology is seldom mentioned in the last 5 years.

The category ‘Accuracy of Treatment’ in Figure 2 shows a constant increase in the accuracy of treatment up until the last time period. Early inaccuracies were easy to identify because they frequently involved errors such as the naturalistic fallacy, or claims that sociobiology/EP promoted genetic determinism. The greater coverage of sociobiology/EP during the last time period may have left more room for inaccuracies to occur, and the greater depth of discussion appears to have made way

for more frequent and subtler inaccuracies. For example, adaptations are equated with flexibility, and natural selection is sometimes described as acting through differential survival rather than reproduction.

Figure 2: The number of books with accurate versus inaccurate discussion of sociobiology and/or evolutionary psychology is shown in 5-year periods for introductory psychology textbooks.

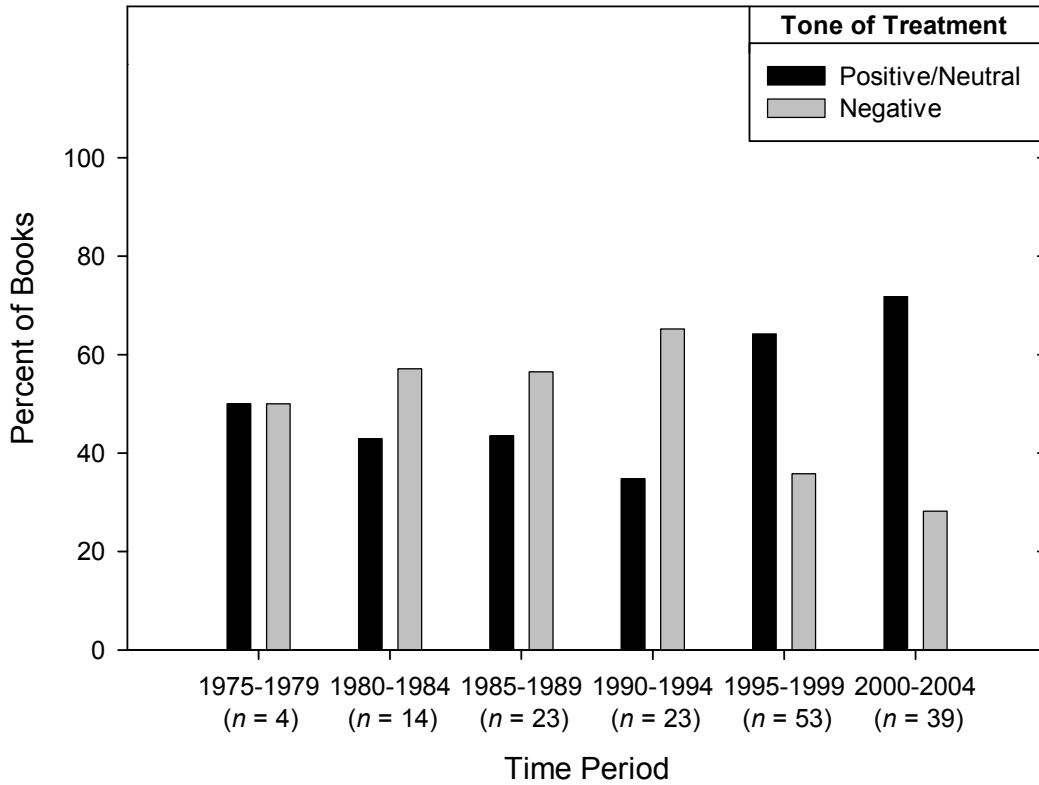


Tone of treatment presented in Figure 3 indicates that the positive reception of sociobiology and/or EP within introductory textbooks has increased.

In particular, the last 5-year period with about 75% of the textbooks falling into the positive/neutral category, shows a marked change over the past 25 years.

The nature of topics discussed, such as a general overview of sociobiology, EP, altruism, kin selection, parental investment, mating strategies were tracked over the 30 year period and changes and trends are indicated in Figure 4a and 4b.

Figure 3: The number of books with negative versus positive/neutral treatment of sociobiology and/or evolutionary psychology is shown in 5-year time periods for introductory psychology textbooks.



While all topics have shown some increase, for specific topics it is EP and mating strategies that have made the most dramatic gains.

Figure 4a and 4b: The topics discussed within introductory psychology textbooks are shown by 5-year periods as percentage books (4a) and as number of paragraphs allotted (4b). (overleaf)

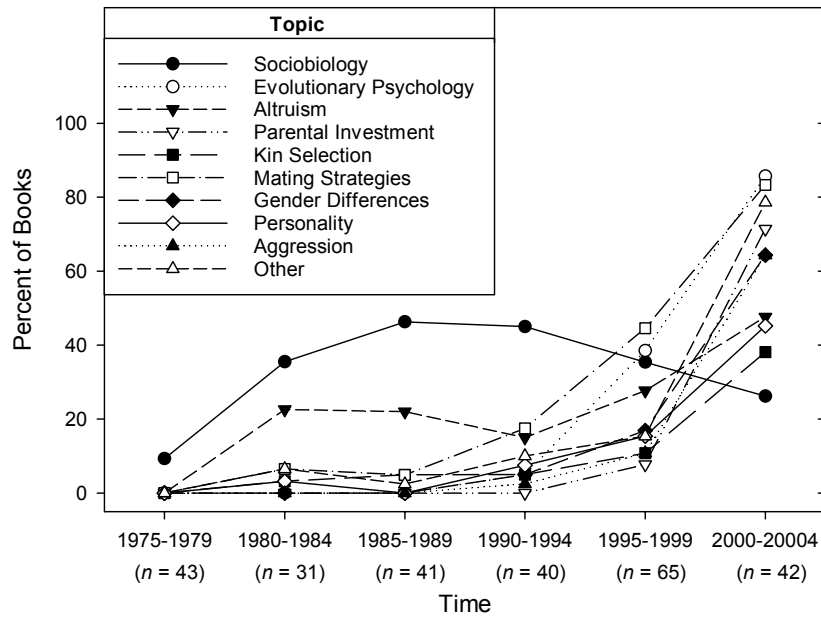
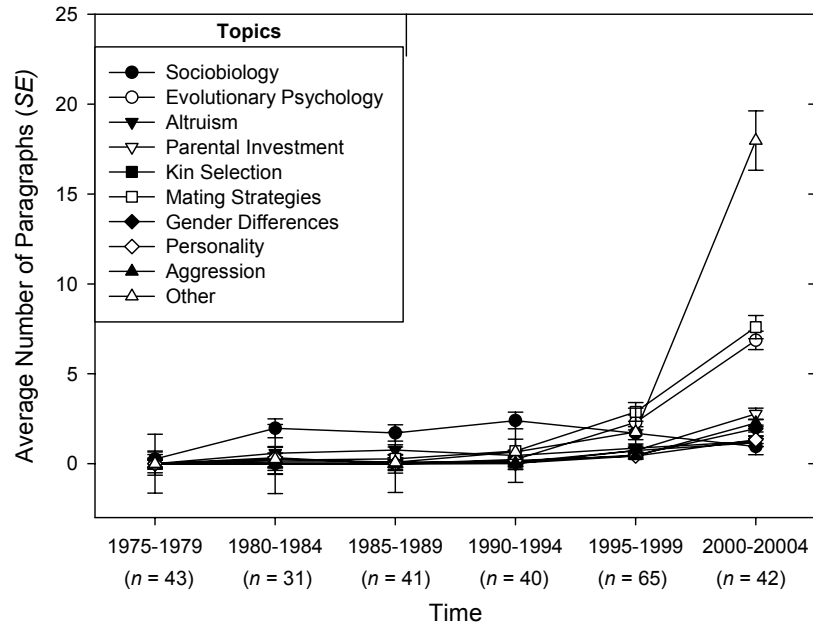
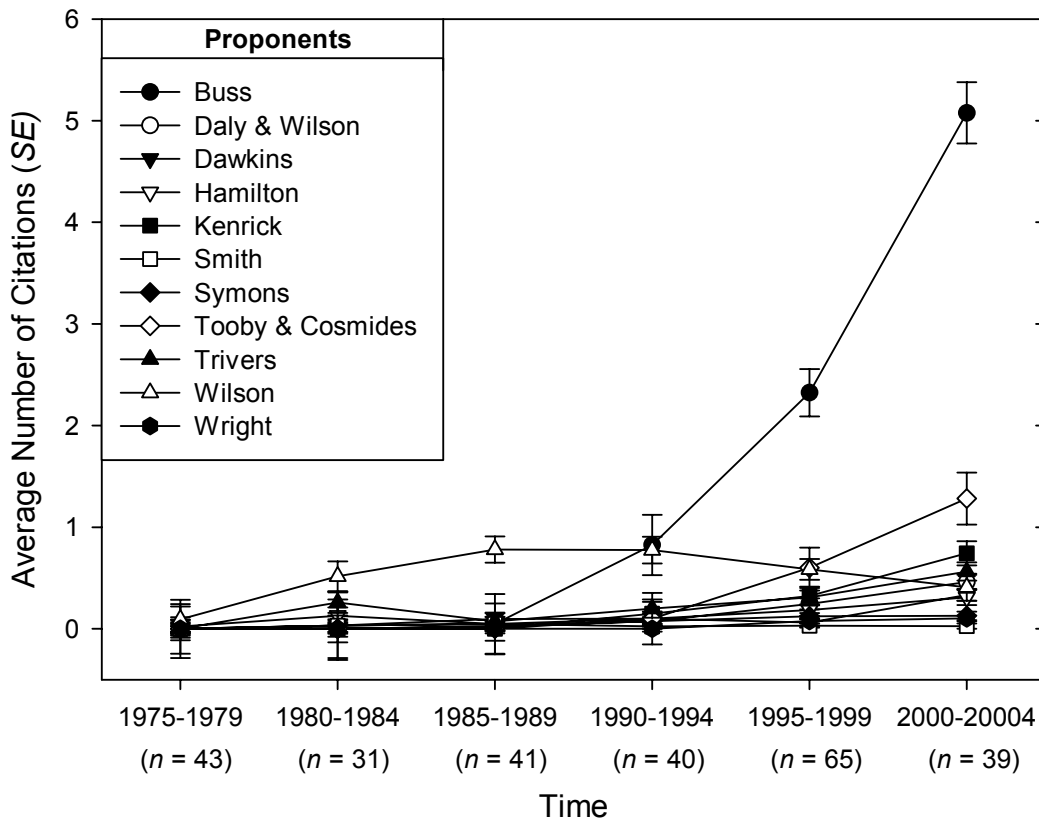


Figure 5 shows the most frequently cited theorists in the early years were sociobiologists, but in more recent times the EP theorists have become the most cited contributors in introductory text. Indeed, in the last 5 years David Buss has not only

become the most cited author in sections on EP, but is cited more frequently than all other authors combined.

Figure 5: The authors tracked for citations in introductory psychology textbooks are shown in 5-year periods.



4. Discussion

The data from introductory psychology textbooks reflect both good and bad news concerning the treatment of sociobiology and/or EP. The good news is that sociobiology and EP have gained increasing exposure, better and more accurate treatment, a more positive slant, and less undefended criticisms. Most encouraging have been two recent introductory textbooks by Peter Gray (2002) and Drew Westen (2002). Both books take a much more integrative approach and expose the reader to an evolutionary perspective covering a variety of areas (e.g. cognition, family life, psychopathology, etc.).

The bad news is that far too many of the textbooks appear to have narrowed the discipline to mating strategies (Figure 4a and 4b). The research on mating strategies may be of particular interest to college students (and sex does sell). But if mating strategy is offered as the most prominent representation of sociobiology or EP while giving much less attention to topics such as parent-offspring conflicts, social interaction, development, and cognition, many students will remain ignorant of the integrative nature of an evolutionary approach. As previously noted, David Buss's work is represented in excess compared to the work of other noted Darwinian psychologists. These data are troubling when one considers undergraduates might conclude that EP is mainly a science of mating strategies studied by David Buss. He would be the first to agree this perception is far from accurate.

4.1. Potential Problems on the Path to Disciplinary Success.

There appear to be several potential problems for the future of EP. First, there is the question as to whether EP should focus solely on human behavior. Second, is EP threatening to become too narrow? Third, should EP be considered a sub-discipline of psychology? And finally, how should EP be defined, and what are the implications?

On the first issue, psychologists like Martin Daly and Margo Wilson (1999) have cogently argued for EP to maintain strong ties with comparative psychology, while others (Buss, 1995a; 1995b) seem to suggest that evolutionary psychology should focus on the study of the human mind. This is not merely a squabble over how to define the term, it is a squabble as to the value, methods, and theoretical framework of EP in the future and perhaps more importantly, it defines its practitioners. If EP chooses the latter it is in danger of not only greatly limiting itself by isolationism, but it threatens to once again exaggerate the gap between human and non-human animals. This must not be considered lightly, and we hope the strength of the arguments offered by Daly and Wilson (1999) guides EP away from the path of anthropocentrism.

The second danger against which EP must guard is the narrowing of the field. As noted, the specific topic most often discussed in introductory textbooks was mating strategies. While mating strategy is certainly very interesting, it is hardly representative of EP's diversity. Evolutionary psychologists studying other aspects of behavior must make their work better known to those individuals writing the introductory textbooks.

The third potential problem for EP is whether or not it should become a sub-discipline or a perspective within psychology. There are certainly cogent arguments for both views. It is no coincidence that the Darwinian perspective within psychology gained increased coverage, more favorable reviews, and more accurate treatment shortly after the introduction of the term EP. By staking a claim as a sub-discipline, we suggest it produced a sense of ownership garnering more interest among psychologists, thus more accurate assessment of the perspective. The benefits of the

name change, however, must be weighed in against its less desirable effects.

4.2. Is Evolutionary Psychology the New \$2.00 Bill?

The U.S. government has repeatedly attempted to introduce the \$2.00 bill, the last two in 1975 and 1995. Each introduction was publicized, and the idea seemed a good one – it saved money (reduced printing costs) and, on paper, appeared more convenient. It seemed certain that the \$2.00 bill should continue to circulate and increase in popularity– yet it failed. Why? Anyone who worked in merchandizing at the time of its multiple introductions could have given the answer: there was simply no place in the cash drawer for the bills. Cash registers were designed to hold \$1.00, \$5.00, \$10.00, and \$20.00 bills – *not* \$2.00 bills. When a cashier received a \$2.00 bill during a purchase, the only place he could place the bill was under the cash drawer – along with \$50.00 bills and checks. When it came to giving change, the \$2.00 bills were literally ‘out-of-sight, out-of-mind’ and at the end of the day they simply went back to the bank. The influence of the design of the cash drawer was simply not taken into consideration and the failure to do so has rendered the \$2.00 to an odd little footnote in numismatology. So what has this to do with Evolutionary Psychology?

Psychology has long held a very rigid set of sub-disciplines recognized by academic psychologists and administrators. Like the bill slots in our cash drawer analogy, these include abnormal, developmental, social, clinical, cognitive, personality, quantitative, comparative, biological, and neuropsychological psychology. An applicant to a department who refers to him or herself as an ‘Evolutionary Psychologist’ may find that the department does not know where he or she fits into the scheme of the department. If evolutionary psychology continues to see itself as a sub-discipline of psychology, it may find itself a victim of the same fate as the \$2.00 bill. However, if *evolutionary perspective* is used to identify the ideas and hypotheses stemming from the theory of natural selection, it’s a whole new ballgame. Gone is the need to try to force fit an academic slot, instead it is a ready-made, easily fitted, developmental (or just as easily, a cognitive, clinical, social, etc.) psychologist that just happens to hold an evolutionary perspective. It is this psychologist who has the better chance of being hired as compared to the evolutionary psychologist who may appear to not fit in at all.

4.3. What's in a Name: Maybe too many Theoretical and Methodological Commitments.

A number of scientists have become concerned with the numerous variations of the term ‘Evolutionary Psychology’ and how they influence the area’s direction as well as the nature of criticisms against it.

In our review of *Alas, Poor Darwin* (Cornwell, Palmer, and Davis, 2001) we dismiss most of the criticisms leveled against EP as vestiges of the sociobiology wars. However, one of the chapters struck us as providing a viable criticism against a

particular hypothesis, and we were somewhat perplexed with the assumption that the hypothesis was inextricably linked with EP. The chapter was authored by Annette Karmiloff-Smith, a well-respected developmental psychologist and author of *Beyond Modularity* (1995). While this paper is not the place to discuss the validity of specific hypotheses, it does seem relevant to question what hypotheses should define EP and the criticisms against them. To identify the ways EP is defined, we examined both the professional and popular literature and found a number of discrete and competing definitions. The list we are presenting is not exhaustive, but it should offer some insight into EP's current identity crisis.

In a best selling book about evolutionary psychology, *The Moral Animal* by Robert Wright (1994), EP is defined as 'a whole new science of mind' (p. 11). If such a characterization does not seem detailed enough, at the other extreme we offer Caporael's (2001) more equivocal definition published in the prestigious *Annual Review of Psychology* (authors' note: the use of the third person is cited directly from Caporael's paper):

Caporael (1995, 1997) combines elements of multilevel selection theory and systems approaches (Caporael and Baron, 1997). She suggests that the observation that psychologists attempt to explain by resorting to genes is recurrence. Rather than using genes in a metaphoric sense, she proposes a vocabulary based on the 'repeated assembly' of reliably recurrent resources. Organisms, their settings, artifacts, and practices may be repeatedly assembled. The objective of evolutionary psychology would then be to understand the system dynamics that result in variation, retention, and selection of the component parts of repeated assemblies (Caporael 1999). Taking a developmental-evolutionary approach, Caporael (1995, 1997) proposes a model of group structure with core subgroup configurations based on considerations of group size and modal tasks... The basic hypothesis is that aspects of mental systems should correspond to features of modal tasks characteristic to configurations, which in turn are grounded in morphology and ecology. (pp. 617-618)

We felt that a better definition could be gotten from Cosmides, Tooby, & Barkow (1992) often identified as among EP's leading founders. They write 'Evolutionary psychology is simply psychology that is informed by the additional knowledge that evolutionary biology has to offer, in the expectation that understanding the process that designed the human mind will advance the discovery of its architecture. It unites modern evolutionary biology with the cognitive revolution in a way that has the potential to draw together all of the disparate branches of psychology into a single organized system of knowledge (p. 3).' Another more concise definition comes from perhaps one of the most popular evolutionary psychologist, David Buss, who writes that it is a way of 'understanding the human

mind/brain mechanisms from an evolutionary perspective' (1999). After filtering through the many definitions of evolutionary psychology, one common thread became apparent, that is, evolutionary psychology is the study of behavior from an evolutionary perspective. Further distinctions remain unsettled.

Certainly, the theory driving EP is the theory of natural selection (Darwin, 1859), and the fundamental hypotheses of kin selection (Hamilton, 1964), reciprocal altruism (Trivers, 1971), and selfish-gene (Dawkins, 1976) do pervade EP. However, secondary level theories such as good-gene theory (Andersson, 1994), fluctuating asymmetry (Thornhill and Gangestad, 1993; Thornhill and Gangestad, 1994), waist-to-hip ratio (Singh, 1993; 1994), and cheater-detection modules (Cosmides and Tooby, 1992) remain in debate. Herein, we wish to emphasize that their final outcome will not determine the success or failure of an evolutionary perspective, and their discussion is one of thousands of healthy debates found within science on any given day.

With this in mind, it should be disturbing to anyone advocating an evolutionary approach that these and other secondary hypotheses are viewed as *defining* EP. Buller (2000) has noted that some scientists committed to an evolutionary perspective of behavior distance themselves from EP because of the perceived requirement of a particular theoretical and methodological commitment. These individuals call themselves by labels such as Darwinian anthropologists, human behavioral ecologists, or human sociobiologists. Scientists with evolutionary perspectives have raised questions about the extent to which EP is committed to a study of human behavior to the exclusion of other species (e.g., Panksepp, and Panksepp, 2000; Daly and Wilson 1999; Heyes, 2000). As noted above, Daly and Wilson (1999) and others (e.g., Shettleworth 2000) have made a strong case for a comparative approach in any evolutionary perspective of cognition. While evolutionary psychologists may assert that EP is a way of unifying all of psychology or a way of thinking about all psychology problems, it is not clear that the pioneers of EP (with the exception of Daly and Wilson) actually extend their work to non-humans. There is also strong concern about the Swiss Army Knife metaphor of the mind as a group of highly specialized encapsulated modules (i.e., domain specific in that a module is activated by particular inputs and follows module specific rules for processing information) that evolved to solve specific problems our ancestors faced during the Pleistocene (Tooby and Cosmides, 1992). For example, Karmiloff-Smith (1992) has emphasized the role of development in the selection of modules for domain specific-computations, and Mithen (1996) has developed a provocative evolutionary theory of mind where there are general purpose processors as well as specialized modules, and modules that are capable of interaction with other modules rather than being encapsulated and domain isolated. Finally, others have questioned what has been called the predictive agenda of EP (Grantham and Nichols, 1999). Specifically, Cosmides and Tooby (1994) have suggested that by examining the types of problems faced by our ancestors in the Pleistocene, evolutionary psychologists will be able to predict a number of cognitive modules that will fit into the Swiss Army

Knife metaphor of mind. Presumably, this will allow a linking of functional cognitive modules to brain areas. Grantham and Nichols note that innate mechanisms for language and vision were developed by Chomsky and Marr without consideration of the adaptive problems faced by our ancestors. They argue that Tooby and Cosmides have no basis for claiming that many cognitive mechanisms will be discovered by considering human's ancestral adaptive problems.

The linking of particular hypotheses with an emerging discipline is nothing new. Richard Dawkins (personal communication, 2001) points out that ethology struggled similarly with its identity when it became identified with a particular theory of animal behavior, namely Konrad Lorenz's theory of psycho-hydraulic motivation and instinct. The main point is that ethology survived very well and EP is likely to follow suit. However, that does not mean that issues should be ignored, and it must be made clear that among supporters of an evolutionary perspective of behavior there is room to debate any number of EP's theoretical and methodological commitments. This after all *is* science.

4.4. Political Foes and Straw-Man Issues.

Tooby and Cosmides (1992) have suggested the criticisms and resistance to an evolutionary perspective are a result of extreme environmentalism subsumed under what they and others refer to as the Standard Social Science Model (SSSM). The SSSM is based on the conjecture that the human mind is initially a *tabula rasa*. It is the belief that culture and environment are what primarily shape human behavior; the pervasiveness of this model provides a strong impetus against all things Darwinian. There is considerable debate over whether the SSSM is an accurate characterization of the social sciences, or a strawman (see Rose and Rose 2000). Our study found that the strong biological roots of psychology have impeded the overwhelming influence of the SSSM, and, at least when examining psychology textbooks, the SSSM appears to be a straw man. although some textbook authors who took a negative attitude toward EP did invoke the importance of environment and culture, the majority of authors noted EP's lack of empirical evidence (ignoring the large number of human and animal studies) as its greatest weakness. However, a study of sociology textbooks (Cornwell, Palmer, Davis, 2000) indicates that the SSSM is an accurate characterization of that discipline.

The treatment of sociobiology and EP in introductory psychology textbooks likely will continue to expand, if for no other reason than the field cannot be ignored. Recently, the primatologist Frans B.M. de Waal predicted that psychology will be transformed by neuroscience and evolutionary psychology (Carpenter, 2001). de Waal, often a critic of both sociobiology and EP, contends that the emphasis on a Darwinian outlook within psychology is inevitable and necessary (Carpenter, 2001). Unfortunately, this shift to biology as the dominant theoretical basis within psychology is not likely to come any time soon, at least as indicated in recent introductory textbooks. In most all of the textbooks reviewed, the focus on biology

was confined to one chapter, and often anything concerning biology was 'softened' by an emphasis on environment. We found that environmental explanations were rarely, if ever, countered with a biological explanation, but the reverse rarely held true when biological explanations were discussed.

4.5 What Now?

Much more work is needed to evaluate fully how sociobiology or EP is being integrated within the social sciences. One step would be to survey university instructors, postgraduates, and undergraduates to assess their basic knowledge and attitude regarding sociobiology and EP. Some small surveys assessing knowledge of Darwinian theories (natural selection, sexual selection, etc.) have found that among biology and psychology majors, biology majors had a much more accurate and broad knowledge of Darwinian concepts (Knapp and Rasmussen, 1998). In a survey of psychology majors, Knapp, Rasmussen and Wagner (1997) found that while seniors had a broader knowledge of Darwinian theory than when they began their studies, they saw it as less applicable to psychology than freshmen. The indication that the appreciation for the role of biology in human behavior diminishes as the undergraduate progresses through his or her studies is more than a little disconcerting. How and why this occurs is only conjectured, but we suggest the SSSM may not be a straw-man after all when it comes to the instruction of undergraduate and even graduate psychology.

As disturbing as the aforementioned surveys may be, there has been a great deal of progress made toward the acceptance and integration of sociobiology and EP concepts into psychology. More textbooks are devoting space to the topic and in general giving it more positive treatment. More importantly, at least in psychology, the issue of human evolution is increasingly taken into consideration when formulating and integrating theories and hypotheses. The neurosciences will continue to expand the research on brain functioning, and evolutionary approaches will help psychologists understand how and why these functions exist. Many psychologists believe, just as Darwin contended, that 'psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation' (1859, p.458). As we continue to gain an understanding of the ultimate causes of human behavior, we can begin to uncover and understand the proximate mechanisms subserving our current behavior.

So what is the final judgment on the triumph of sociobiology (and EP)? In many respects it has triumphed and it continues to triumph within the halls of science. However in the trenches, that being the university classrooms, the battle for the hearts and minds of students (and lecturers) is still being fought.

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5. References

- Alcock, J. (2001). *The Triumph of Sociobiology*. New York: Oxford University Press.
- Andersson, M. (1994). *Sexual Selection*. Princeton, NJ: Princeton University Press.
- Ardrey, R. (1966). *The territorial imperative*. New York: Atheneum.
- Breland, K. and Breland, M. (1961). The misbehavior of organisms. *American Psychologist*, 61, 681-684.
- Brown, P. L. and Jenkins, H. M. (1968). Auto-shaping of the pigeon's key-peck. *Journal of the Experimental Analysis of Behavior*, 11, 1-8.
- Buller, D. (2000). Evolutionary Psychology. In Marco Nani and Massimo Marraffa (Eds.). *A Field Guide to the Philosophy of Mind*. An official electronic publication of the Department of Philosophy of University of Rome 3. Available at <http://www.uniroma3.it/kant/field/>.
- Buss, D. M. (1994). *The evolution of desire: Strategies of human mating*. New York: Basic Books, Inc.
- Buss, D. M. (1995a). Evolutionary psychology: A new paradigm for psychological science. *Psychological Inquiry*, 6(1), 1-30.
- Buss, D. M. (1995b). The future of evolutionary psychology. *Psychological Inquiry*, 6(1), 81-87.
- Buss, D. M. (1999). *Evolutionary psychology: The new science of the mind*. Needham Heights, MA: Allyn and Bacon, Inc.
- Caporael, L. R. (2001). Evolutionary psychology: Toward a unifying theory and a hybrid science. *Annual Review of Psychology*, 52, 607-628.
- Carpenter, S. (2001). Psychology is bound to become more Darwinian, says eminent primatologist. *APA Monitor*, 32(4), 90-91.
- Catania, A. C. (1992). B. F. Skinner, organism. *American Psychologist*, 47, 1521-1530.
- Cornwell, R. E., Palmer, C. T. and Davis, H. P. (2000). *Sociobiology and evolutionary psychology: A 25-year retrospective on the change and treatment in psychology and sociology*. Paper presented at the European Sociobiology Society Annual Meeting, Washington, D.C.
- Cornwell, R.E., Hetterscheidt, K. Palmer, C.T. & Davis, H.P. (2001). *The status of sociobiology/evolutionary psychology across the social sciences*. Poster presented at the annual meeting of Human Behavior and Evolutionary Society, London, UK.
- Cornwell, R. E., Palmer, C. T. and Davis, H. P. (2001). Alas, poor science: A review of 'Alas, poor Darwin' edited by Hilary and Steven Rose. *Journal of Politics and Life Sciences*. 22(2):17-22.
- Cosmides, L. and Tooby, J. (1992). Cognitive adaptations for social exchange. In J. H. Barkow, L. Cosmides, and J. Tooby (Eds.), *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (pp. 163-228). New York: Oxford University Press.
- Cosmides, L., and Tooby, J. (1994). Origins of Domain specificity: The evolution of

- functional organization. In L. Hirschfeld, and S. Gelman (Eds.), *Mapping the Mind*. Cambridge: Cambridge University Press.
- Cosmides, L., Tooby, J., and Barkow, J. H. (1992). Introduction: Evolutionary Psychology and Conceptual Integration. In J. H. Barkow, L. Cosmides, and J. Tooby (Eds.), *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (pp. 3-15). New York: Oxford University Press.
- Daly, M., and Wilson, M. I. (1999). Human evolutionary psychology and animal behaviour. *Animal Behaviour*, 57, 509-519.
- Darwin, C. (1859). *On the origin of species* (1 ed.). London: John Murray (Penguin Books).
- Darwin, C. (1871). *The descent of man*. London: John Murray.
- Darwin, C. (1872). *Expression of the emotions in man and animals*. London: John Murray.
- Dawkins, R. (1976). *The Selfish Gene*. Oxford: Oxford University Press.
- Degler, C. N. (1991). *In search of human nature: The decline and revival of Darwinism in American social thought*. New York: Oxford University Press.
- Dworetzky, J. P. (1985). *Psychology* (2 ed.). New York: West Publishing.
- Garcia, J., and Ervin, F. R. (1968). Gustatory-visceral and telereceptor-cutaneous conditioning-adaptation in internal and external milieu. *Communications in Behavioral Biology*, 1, 389-415.
- Gray, P. (2002). *Psychology* (4th ed.). New York: Worth Publishers.
- Grantham, T., and Nichols, S. (1999). Evolutionary psychology: Ultimate explanations and Panglossian predictions. In V. G. Hardcastle (Ed.), *Where biology meets psychology. Philosophical essays* (pp. 47-66). Cambridge, MA: MIT Press.
- Hamilton, W. D. (1964). The genetical theory of social behavior, I, II. *Journal of Theoretical Biology*, 7(1), 1-52.
- Heyes, C. (2000). Evolutionary psychology in the round. In C. Heyes and L. Huber (Eds.), *The Evolution of Cognition* (pp. 3-22). Cambridge, MA: MIT Press.
- James, W. (1890). *Principles of psychology*. New York: Holt.
- Karmiloff-Smith, A. (1995). *Beyond Modularity* (2 ed.). London: MIT Press.
- Knapp, T. J., Rasmussen, C., and Wagner, M. J. (1997). What psychology students know and believe about Charles Darwin. *Psychological Reports*, 81, 1372-1374.
- Knapp, T. J., and Rasmussen, C. T. (1998). Psychology and biology students: What they know and believe about Charles Darwin. *Psychology: A Journal of Human Behavior*, 25(3-4), 39-43.
- Kroeber, A. L. (1917). The Superorganic. *American Anthropologist*, 19, 207.
- Mithen, S. (1996). *The prehistory of the mind*. London: Thames and Hudson.
- Mussen, P., and Rosenzweig, M. (1977). *Psychology: An introduction*. Lexington: D. C. Heath.
- Panksepp, J., and Panksepp, J. B. (2000). The seven sins of evolutionary psychology. *Evolution and Cognition*, 6, 108-131.

- Pinker, S. (1997). *How the mind works*. New York: Norton
- Rose, H., and Rose, S. (Eds.). (2001). *Alas, poor Darwin. The case against evolutionary psychology*. New York: Harmony Books.
- Segerstråle, U. (2000). *Defenders of the truth. The battle for science in the sociobiology debate and beyond*. New York: Oxford University Press.
- Shettleworth, S. (2000). Modularity and the evolution of cognition. In C. Heyes and L. Huber (Eds.), *The Evolution of Cognition* (pp. 43-60). Cambridge, MA: MIT Press.
- Singh, D. (1993). Body shape and women's attractiveness: The critical role of waist-to-hip ratio. *Human Nature*, 4(3), 297-321.
- Singh, D. (1994). Ideal female body shape: Role of body weight and waist-to-hip ratio. *International Journal of Eating Disorders*, 16(3), 283-288.
- Skinner, B. F. (1953). *Science and Human Behavior*. New York: Macmillan.
- Skinner, B. F. (1990). Can psychology be a science of mind? *American Psychologist*, 45, 1206-1210.
- Taylor, E. (1990). William James on Darwin. An evolutionary theory of consciousness. *Annals of the New York Academy of Sciences*, 602, 7-33.
- Thornhill, R., and Gangestad, S. W. (1993). Human facial beauty: Averageness, symmetry, and parasite resistance. *Human Nature*, 4(3), 237-269.
- Thornhill, R., and Gangestad, S. W. (1994). Human fluctuating asymmetry and sexual behavior. *Psychology Science*, 5(5), 297-302.
- Tiger, L., and Fox, R. (1971). *The imperial animal*. New York: Holt, Rinehart and Winston.
- Tooby, J., and Cosmides, L. (1992). The psychological foundations of culture. In J. H. Barkow, L. Cosmides, and J. Tooby (Eds.), *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (pp. 19-136). New York: Oxford University Press.
- Trivers, R. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology*, 46(4), 35-37.
- Westin, D. (2002). *Psychology: Brain, behavior and culture* (3rd ed.). New York: John Wiley and Sons.
- Wilson, E. O. (1975). *Sociobiology: The new synthesis*. Cambridge: Harvard University Press.
- Wright, R. (1994). *The Moral Animal: Why we are the way we are*. St. Ives: Clays Ltd.