

Original Article

What's in a Name: Is “Evolutionary Psychology” Eclipsing “Sociobiology” in the Scientific Literature?

Gregory D. Webster, Department of Psychology, University of Illinois at Urbana-Champaign, Champaign, IL 61820, USA. Email: webster3@uiuc.edu (Corresponding author)

Abstract: Is the term “evolutionary psychology” supplanting “sociobiology” in the scientific literature? How influential was E. O. Wilson’s (1975) book, *Sociobiology*, in establishing the discipline of the same name? Similarly, how influential were the two Tooby-Cosmides chapters appearing in *The Adapted Mind* (Cosmides and Tooby, 1992; Tooby and Cosmides, 1992) in establishing evolutionary psychology as a viable outgrowth of sociobiology? The purpose of the present research was to answer these questions using quantitative analyses of publication trends. The Internet search engine Google Scholar was used to count the number of hits (i.e., the number of scholarly works, citations, etc.) for “sociobiology” and “evolutionary psychology” separately per year from 1960 to 2003. Interrupted time-series analyses revealed significant increases (intercept shifts) for sociobiology hits between 1974 and 1975, and for evolutionary psychology hits between 1991 and 1992. Evolutionary psychology hits also experienced a significant increase in change-over-time (a slope shift) between 1991 and 1992. Growth curve analyses revealed that the rate of growth for evolutionary psychology, which was accelerating over time, was significantly greater than that for sociobiology, which was decelerating. The implications of these findings for understanding the histories of sociobiology and evolutionary psychology are discussed.

Keywords: evolutionary psychology, history of science, interrupted time-series analysis, publication trends, sociobiology

Introduction

The purpose of the present research was to quantify and compare two key developments in evolutionary science that emerged during the latter half of the twentieth century: sociobiology and evolutionary psychology (see Table 1 for sample definitions). Sociobiology, pioneered by E. O. Wilson (1975) in his landmark book of the same name, challenged conventional thinking about the biological emergence of social behavior and

forced many social scientists to consider the biological determinants of behavior. Following its 1975 publication, *Sociobiology* inspired numerous researchers to re-evaluate their models of animal—and occasionally human—behavior. The word “sociobiology” soon became incorporated into the scientific vernacular. For example, the scientific journal *Evolution and Human Behavior* was entitled *Ethology and Sociobiology* from its founding in 1979 until new editors adopted a more anthropocentric perspective in 1997. Sociobiology has had a profound impact on evolutionary science since 1975 and continues to influence evolutionary research today.

Table 1. Sample definitions of sociobiology and evolutionary psychology.

Term	Definitions	
	Dictionary.com	American Heritage Dictionary
Sociobiology	The study of social behavior in animals with emphasis on the role of behavior in survival and reproduction, engaging branches of ethology, population genetics, and ecology.	The study of the biological determinants of social behavior, based on the theory that such behavior is often genetically transmitted and subject to evolutionary processes.
Evolutionary Psychology	The branch of psychology that studies the mental adaptations of humans to a changing environment, especially differences in behavior, cognition, and brain structure.	The study of the psychological adaptations of humans to the changing physical and social environment, especially of changes in brain structure, cognitive mechanisms, and behavioral differences among individuals.

Evolutionary psychology was in some ways an outgrowth of sociobiology. Not only did evolutionary psychology provide answers to some of the criticisms of sociobiology, but it also took an anthropocentric focus that drew on cognitive science and biological anthropology. Whereas sociobiology was built on social insect models, evolutionary psychology would be built on studies of humans. Arguably two of the most-cited works in evolutionary psychology have been the two chapters in *The Adapted Mind* (Barkow, Cosmides, and Tooby, 1992) coauthored by John Tooby and Leda Cosmides: “The Psychological Foundations of Culture” (Tooby and Cosmides, 1992) and “Cognitive Adaptations for Social Exchange” (Cosmides and Tooby, 1992). For many researchers, these chapters crystallized what had previously been a loose amalgamation of evolutionary perspectives on human behavior. Following their 1992 publication, the term “evolutionary psychology” and its Darwinian perspectives became adopted by many researchers in the human social sciences. Shortly thereafter, popular textbooks (e.g., Buss, 1999) and a scientific handbook (Buss, 2005) championed the no-longer-nascent discipline of evolutionary psychology. *The Adapted Mind* chapters coauthored by Tooby and Cosmides in 1992 remain indispensable citations for evolutionary psychologists today.

Although Wilson's (1975) book was an obvious candidate for a tipping-point (cf. Gladwell, 2000) in the development of sociobiology, the extent to which the Tooby-Cosmides chapters provided a similar boost to evolutionary psychology was comparatively less clear. To this end, preliminary analyses of citations in the PsycINFO abstract database revealed that the two Tooby-Cosmides chapters had been cited 386 (Tooby and Cosmides, 1992) and 326 (Cosmides and Tooby, 1992) times as of September 2007 ($M = 356$, $SD = 42.43$). In comparison, the other 16 chapters in *The Adapted Mind* had only been cited an average of 34.06 times ($SD = 20.03$)—significantly less than the Tooby-Cosmides chapters ($t_{16} = 19.42$, $p < .001$, $R^2 = .96$). An additional PsycINFO search of all works published from 1990 to 1994 revealed that the two 1992 Tooby-Cosmides chapters were also the most-cited works relating to “evolutionary psychology” published during that time. Thus, it appears that the Tooby-Cosmides chapters from *The Adapted Mind* may have indeed been key works in the promotion and development of evolutionary psychology as a viable scientific discipline.

But what can these great works tell us about their respective impacts on sociobiology and evolutionary psychology over time? Feist (2006) recently chronicled the history of another emerging field: the psychology of science (see also Simonton, 1988). Feist proposed that the other three meta-sciences (i.e., the philosophy, history, and sociology of science) each had key events such as the establishment of peer-reviewed journals and regular conferences that facilitated their development. Using the Google Scholar search engine and interrupted time series analyses, Webster (2007a) empirically showed that establishing a journal was indeed key to an emerging meta-science's viability, whereas regular conferences were not. The present research adopted Webster's (2007a) methodologies to quantify and test whether Wilson's (1975) *Sociobiology* and the Tooby-Cosmides (1992) chapters from *The Adapted Mind* had a significant impact on the emergence of sociobiology and evolutionary psychology, respectively.

The purpose of the present research was to test some of the assertions mentioned above using quantitative analyses of publication trends. Specifically, given the historical events, theoretical perspectives, and empirical research cited above, three specific predictions were developed:

1. E. O. Wilson's (1975) book would lead to a significant and immediate increase (intercept shift) in Google Scholar hits for “sociobiology” following its publication.
2. The Tooby-Cosmides chapters from 1992's *The Adapted Mind* would lead to a significant and immediate increase (intercept shift) in Google Scholar hits for “evolutionary psychology” following its publication.
3. Evolutionary psychology's increasing empiricism (Webster, 2007d) and recent penetration into the scientific literature (Webster, 2007a, 2007b) would result in it having a significantly greater rate of increase over time than sociobiology.

Method

The Internet search engine Google Scholar was used to count hits for scholarly works in which the terms “sociobiology” and “evolutionary psychology” were mentioned

(separately) each year from 1960 to 2003 (44 years). Google Scholar was chosen over PsycINFO because the latter would have underestimated counts for “sociobiology” due to the fact that PsycINFO is inherently psychology-focused, whereas many works pertaining to sociobiology appear in biological and anthropological publications that are not indexed by PsycINFO. In contrast, Google Scholar provides a more global, comprehensive search tool that draws on all areas of science and allows for a fairly unbiased comparison of publication trends between sociobiology and evolutionary psychology.

To avoid conflating counts by including articles in which both terms occurred, a conservative approach was taken by searching for “sociobiology” without “evolutionary psychology,” and for “evolutionary psychology” without “sociobiology.” The year 1960 was chosen because it allowed for a baseline to be established prior to the publication of E. O. Wilson’s (1975) landmark book. The year 2003 was chosen because there is a lag in the time it takes for articles and their citations to be indexed on Google Scholar, which catalogues thousands of books and journals. This method allowed for interrupted time-series analyses to be conducted.

To compare growth curves over time between hits for sociobiology and evolutionary psychology, a three-year moving average was calculated to smooth-out some of the short-term fluctuations; this reduced the year range to 42 years (1962–2003; cf. Webster, 2007b). Following procedures outlined by Webster (2007a), the three-year moving averages were then \log_{10} transformed because the frequency counts for both terms tended to grow exponentially over time. The log-transformed moving average hits were then modeled using standard longitudinal growth curve regression techniques (cf. Cohen, Cohen, West, and Aiken, 2003; Judd and McClelland, 1989; Singer and Willett, 2003).

Results

Following procedures outlined by Shadish, Cook, and Campbell (2002), interrupted time series analyses were performed to determine the extent of the impact of Wilson’s (1975) book and the two Tooby-Cosmides (1992) chapters as landmark works on sociobiology and evolutionary psychology, respectively. Interrupted time series analyses allow for the assessment of discontinuities in intercepts (mean shifts) and slopes (trend shifts) over time (see Appendix for details). Log hits for sociobiology shot up significantly following the publication of Wilson’s (1975) sensational book (a mean shift); however, following this initial spike, sociobiology grew less rapidly, resulting in a significantly less positive change-over-time slope since 1975 (a slope shift; Table 2, Figure 1). Log hits for evolutionary psychology also increased significantly following the publication of Tooby and Cosmides’ (1992) influential chapter (a mean shift); moreover, evolutionary psychology grew more rapidly since 1992, resulting in a significantly more positive change-over-time slope (Table 3, Figure 1). In concert, these results suggest that each of the examined works had a substantial impact on their respective fields. Although both fields benefited from immediate increases following key publications, this increase was more sustained for evolutionary psychology than it was for sociobiology.

Figure 1. Raw data and interrupted time-series models for Google Scholar hits (\log_{10} scale) for “sociobiology” and “evolutionary psychology” by publication year (1960–2003).

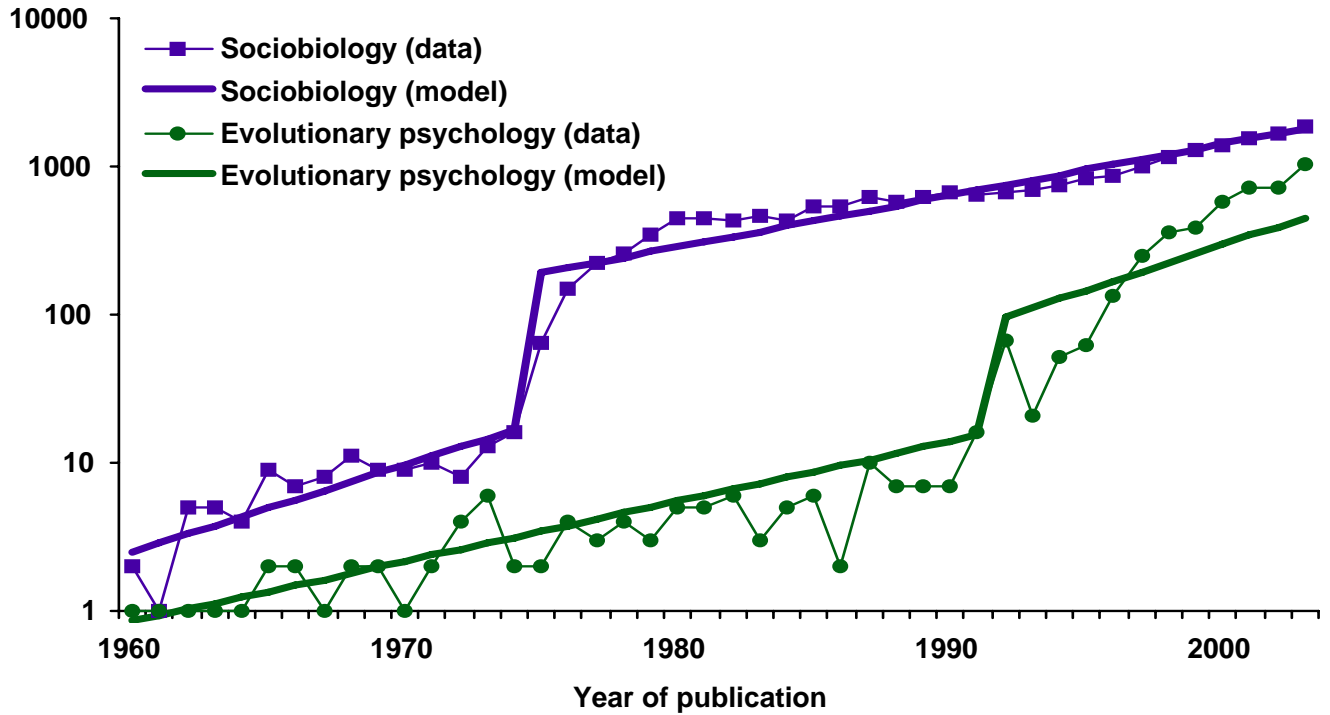


Table 2. Interrupted time-series results for Google Scholar hits for “sociobiology” without “evolutionary psychology,” 1960–2003.

Variable	<i>b</i>	<i>t</i>	<i>pr</i>
Step 1: Mean shift ($R^2 = .977$)			
Intercept	1.659	61.90**	.99
Linear time (publication year – 1974.5)	0.038	11.80**	.88
Pre-post E. O. Wilson (1975) effect	1.131	13.24**	.90
Step 2: Slope shift ($R^2 = .981$)			
Intercept	1.760	38.63**	.99
Linear time (publication year – 1974.5)	0.047	10.26**	.85
Pre-post E. O. Wilson (1975) effect	1.014	11.12**	.87
Linear time x pre-post E. O. Wilson (1975) effect	–0.024	–2.65*	–.39

Note. Effects of interest appear in boldface. * $p \leq .01$. ** $p < .001$.

Table 3. Interrupted time-series results for Google Scholar hits for “evolutionary psychology” without “sociobiology,” 1960–2003.

Variable	<i>b</i>	<i>t</i>	<i>pr</i>
Step 1: Mean shift ($R^2 = .920$)			
Intercept	1.574	30.27**	.98
Linear time (publication year – 1991.5)	0.037	7.29**	.75
Pre-post Tooby and Cosmides (1992) effect	1.050	7.34**	.75
Step 2: Slope shift ($R^2 = .932$)			
Intercept	1.577	32.52**	.98
Linear time (publication year – 1991.5)	0.051	7.15**	.75
Pre-post Tooby and Cosmides (1992) effect	0.745	4.24**	.56
Linear time x pre-post Tooby and Cosmides (1992) effect	0.021	2.67*	.39

Note. Effects of interest appear in boldface. * $p \leq .01$. ** $p < .001$.

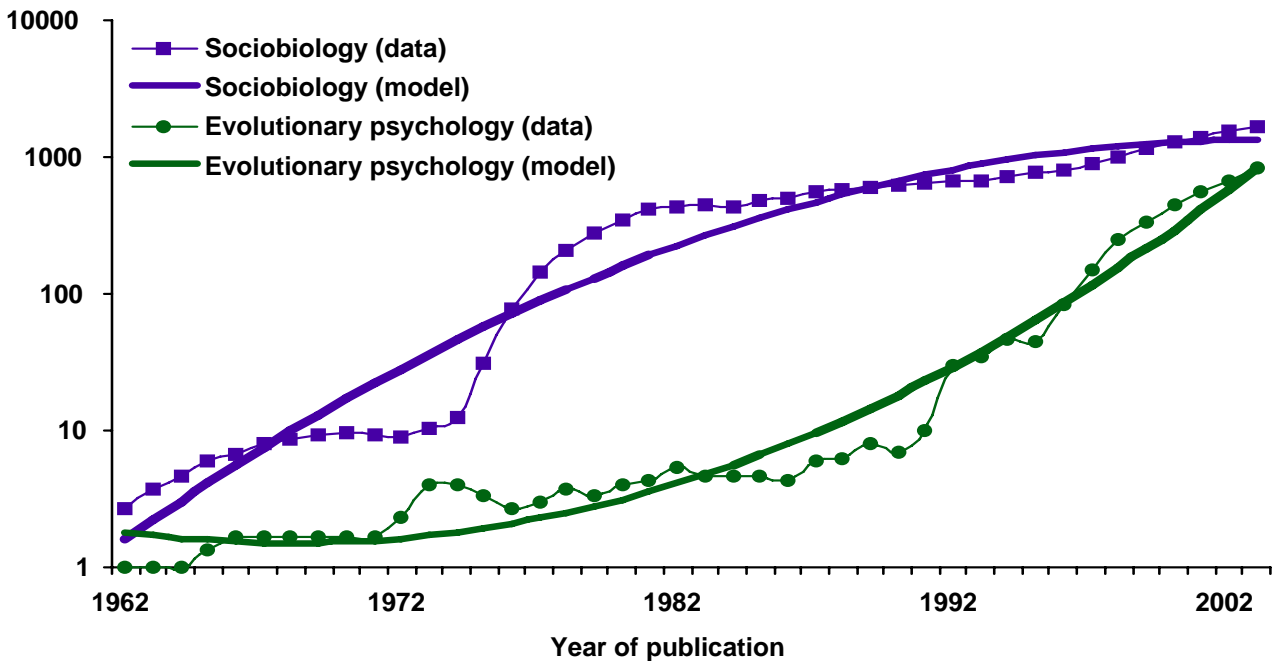
The log-transformed three-year moving average hits for both sociobiology and evolutionary psychology were submitted to a multiple regression growth curve model that allowed for linear and quadratic temporal trends (Table 4, Figure 2; see Appendix for details). First, unsurprisingly, sociobiology received significantly more hits than did evolutionary psychology at the mean publication year of 1982.5. Second, averaging across these two related disciplines of evolutionary science, significant linear growth (in log terms) was observed over time. Third, the linear change-over-time slope was marginally ($p < .10$) more positive for sociobiology than it was for evolutionary psychology at the midpoint of 1982.5. Fourth, and most importantly, the rate of growth (quadratic effect) was significantly more positive for evolutionary psychology than it was for sociobiology. Simple effects tests confirmed that, although both sociobiology ($b = 0.071$, $t_{78} = 26.63$, $p < .001$, $pr = .95$) and evolutionary psychology ($b = 0.065$, $t_{78} = 24.27$, $p < .001$, $pr = .94$) showed significant linear growth, sociobiology's quadratic effect showed deceleration over time ($b = -0.0017$, $t_{78} = -6.98$, $p < .001$, $pr = -.62$), whereas evolutionary psychology's exhibited acceleration over time ($b = 0.0022$, $t_{78} = 9.08$, $p < .001$, $pr = .72$).

Table 4. Regression results for \log_{10} three-year moving averages of Google Scholar hits as a function of “sociobiology” (without “evolutionary psychology”) versus “evolutionary psychology” (without “sociobiology”) and publication year, 1962–2003.

Variable	<i>b</i>	<i>t</i> ₇₈	<i>pr</i>
Intercept	1.5176	44.16**	.98
Evolutionary Psychology vs. Sociobiology (EP vs. SB)	1.7429	25.36**	.94
Linear Time (publication year – 1982.5)	0.0680	35.99**	.97
Quadratic Time ([publication year – 1982.5] ²)	0.0003	1.49	.17
Linear Time x EP vs. SB	0.0063	1.67†	.19
Quadratic Time x EP vs. SB	-0.0040	-11.36**	-.79

Note. $R^2 = .96$. † $p < .10$. ** $p < .001$.

Figure 2. Raw data and growth curve regression models for Google Scholar hits (\log_{10} three-year moving average) for “sociobiology” and “evolutionary psychology” by publication year, 1962–2003.



The time variable was re-centered by subtracting 2003 from each publication year and the interaction terms were re-calculated. Simple effects tests revealed that, by 2003, evolutionary psychology had practically closed the gap with sociobiology, such that the two were no longer significantly different in terms of Google Scholar hits ($b = 0.207$, $t_{78} = 1.58$, $p = .12$, $pr = .18$). Moreover, the simple change-over-time slopes for sociobiology and evolutionary psychology were significantly different in 2003 ($b = -0.156$, $t_{78} = -10.55$, $p < .001$, $pr = .77$; i.e., the lines tangent to each respective curve at 2003 in Figure 2 were different). Further tests showed that the simple slope for evolutionary psychology in 2003 was significantly positive ($b = 0.157$, $t_{78} = 14.98$, $p < .001$, $pr = .86$), whereas the simple slope for sociobiology in 2003 was virtually flat ($b = 0.00056$, $t_{78} = 0.05$, $p = .96$, $pr = .006$).

Discussion

So has the term “evolutionary psychology” eclipsed “sociobiology” in the scientific literature? Although the short answer is “no,” a more accurate answer might be “not yet.” Although hits for sociobiology continued to grow, its rate of growth over time has been eclipsed by hits for the newer, related field of evolutionary psychology. Evolutionary

psychology may have an advantage, however, in that it is still a “hot” and occasionally controversial discipline in the social sciences, whereas sociobiology experienced a similar growth spur in the late 1970s. Thus, it remains to be seen whether evolutionary psychology can maintain or even increase its current rate of growth in the future.

Were Wilson’s (1975) *Sociobiology* and the two Tooby-Cosmides (1992) chapters from *The Adapted Mind* truly catalysts that spurred the respective expansions of sociobiology and evolutionary in the scientific literature? As indicated by the significant mean shifts, it appears the answer is “yes” for both sets of works. In addition, the Tooby-Cosmides chapters appear to have been important enough to have also increased the trajectory of growth over time for evolutionary psychology (a slope shift). Although these interrupted time-series results show temporal precedence, they cannot rule out possible spurious, “third-variable” explanations. For example, the heated political controversy ignited by reactions to *Sociobiology* may have had the unintended consequence of increasing its exposure, which may have made *Sociobiology* a more important work than it would have been without such controversy (Segerstråle, 2000). Similarly, perhaps in 1992 the time was ripe for an “evolution revolution” in the social sciences, and the Tooby-Cosmides chapters were more of a consequence of a newfound groundswell of support for Darwinian ideology rather than a cause of it. Nevertheless, although temporal precedence is not sufficient to establish causation, it is necessary, and the present findings suggest both sets of works played definitive roles in the development of their respective fields of evolutionary science.

One possible limitation of the present research is that Google Scholar is not a perfect measure of a scientific discipline’s growth over time. For example, journal articles and other scholarly works are less likely to be catalogued electronically the older they are. Moreover, because Google Scholar is constantly striving to provide broad, comprehensive searches of the scientific literature, its searchable database continues to expand. Thus, there is likely to be some instability in Google Scholar’s hit count. For example, a search performed in 2008 for “sociobiology” for the 2006 publication year might reveal substantially more hits than if the same search were performed in 2007. This instability is less of a concern for the present study, however, because it is more concerned with relative hits than absolute hits. Recall that the purpose of this study is one of comparison: (a) comparing sociobiology to evolutionary psychology and (b) comparisons within each discipline before and after the publication of an influential work. Because of this comparative approach, any bias or instability in hit counts is likely to affect both elements in the comparison equally and in a consistent direction. Moreover, established databases like PsycINFO suffer from similar limitations when they change which journals they index.

Another potential limitation of the present research is the choice of the \log_{10} metric. Because of hit counts were log transformed for analyses, linear growth actually reflects exponential growth over time. Nevertheless, the log transformations were necessary to avoid violating the normality and homogeneity-of-variance assumptions of regression because hit counts were extremely positively skewed. Thus, although some loss in interpretability was incurred by the use of the log metric, this was largely offset by the gain of adhering to the central tenets of regression.

Overall, the present results suggest that Wilson's (1975) book and the Tooby-Cosmides (1992) chapters were truly seminal works that were particularly instrumental in facilitating the rapid growth of sociobiology and evolutionary psychology, respectively. Although Feist (2006) and Webster (2007a) suggested that the establishment of journals play a key role in a scientific field's development, the present findings suggest that the publication of an influential book or chapter might be equally important. On a more specific level, these findings suggest that evolutionary psychology's influence is now growing more rapidly than sociobiology, the discipline that helped inspire it. As demonstrated by a number of empirical studies, evolutionary theory is gaining ground in psychology textbooks (Cornwell, Palmer, Guinther, and Davis, 2005), the *Journal of Personality and Social Psychology* (Webster, 2007b), and neuroscience journals (Webster, 2007c). Some of these gains may be due to evolutionary psychology's increased focus on empirical research over the last quarter century (Webster, 2007d). It is hoped that the present study will not only elucidate the historical emergence of both sociobiology and evolutionary psychology, but also empirically establish that evolutionary psychology has grown to the point that it is now at parity with sociobiology in the scientific literature.

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References

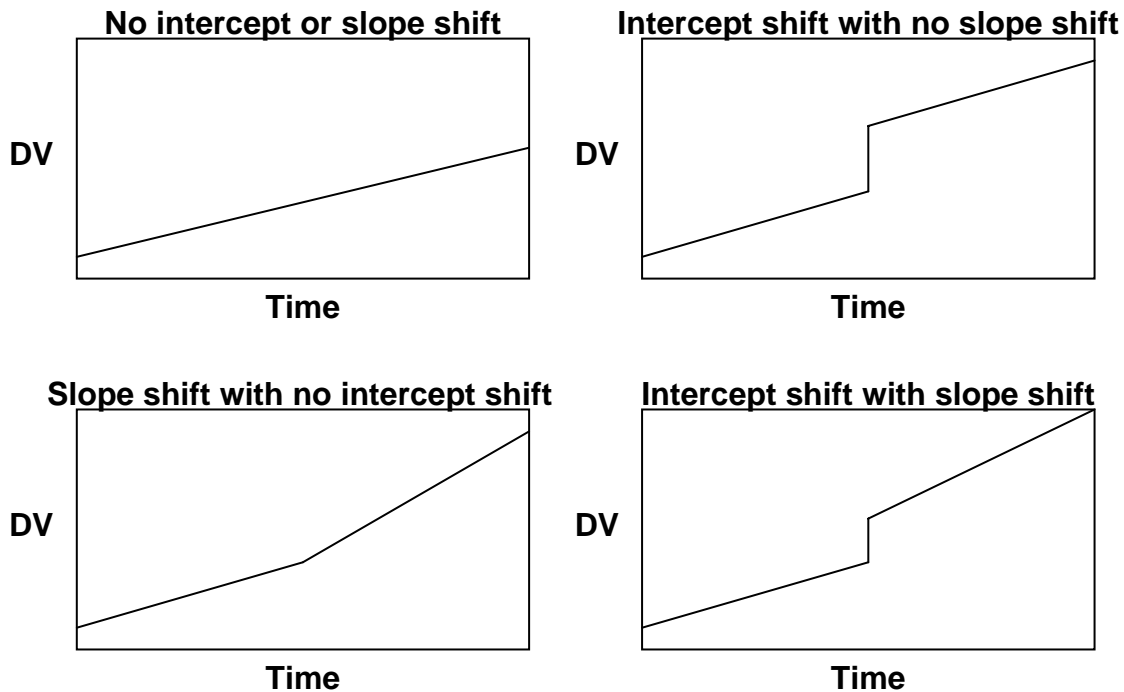
- Barkow, J. H., Cosmides, L., and Tooby, J. (Eds.) (1992). *The adapted mind: Evolutionary psychology and the generation of culture*. New York: Oxford University Press.
- Buss, D. M. (1999). *Evolutionary psychology: The new science of mind*. Boston: Allyn and Bacon.
- Buss, D. M. (Ed.). (2005). *The handbook of evolutionary psychology*. Hoboken, NJ: Wiley.
- Cohen, J., Cohen, P., West, S. G., and Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.
- Cornwell, R. E. Palmer, C., Guinther, P. M., and Davis, H. P. (2005). Introductory psychology texts as a view of sociobiology/evolutionary psychology's role in psychology. *Evolutionary Psychology*, 3, 355-374.
- 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.
- Feist, G. J. (2006). *The psychology of science and the origins of the scientific mind*. New Haven, CT: Yale University Press.
- Gladwell, M. (2000). *The tipping point: How little things can make a big difference*. New York: Little, Brown and Company.
- Judd, C. M., and McClelland, G. H. (1989). *Data analysis: A model-comparison approach*. San Diego, CA: Harcourt Brace Jovanovich.
- Segerstråle, U. (2000). *Defenders of the truth: The battle for science in the sociobiology debate and beyond*. New York: Oxford University Press.
- Shadish, W. R., Cook, T. D., and Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton-Mifflin.
- Simonton, D. K. (1988). *Scientific genius: A psychology of science*. Cambridge, UK: Cambridge University Press.
- Singer, J. D., and Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press.
- 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.
- Webster, G. D. (2007a). *An emerging psychology of science: A quantitative review of publication trends in the meta-sciences*. Manuscript submitted for publication.
- Webster, G. D. (2007b). Evolutionary theory's increasing role in personality and social psychology. *Evolutionary Psychology*, 5, 84-91.
- Webster, G. D. (2007c). Evolutionary theory in cognitive neuroscience: A 20-year quantitative review of publication trends. *Evolutionary Psychology*, 5, 520-530.
- Webster, G. D. (2007d). Increasing impact, diversity, and empiricism: The evolution of *Evolution and Human Behavior*, 1980–2004. *HBES Winter 2007 Newsletter*, pp. 16-19. http://www.hbes.com/Hbes/Newsletters/2007_Winter.pdf
- Wilson, E. O. (1975). *Sociobiology: The new synthesis*. Cambridge, MA: Belknap Press of Harvard University Press.

Appendix: Analyses of Interrupted Time Series and Growth Curves

A detailed discussion of interrupted time-series designs and analyses can be found in Shadish et al. (2002). Essentially, interrupted time-series designs are a family of quasi-experimental methods whereby the dependent variable (DV) is measured repeatedly over several (preferably equal) intervals of time (Time) and the independent variable (IV) often represents a single important (often historical) event or the presence or absence of something important over the course of the time series (e.g., an influential new work is published, a terrorist attack occurs, a new law is passed, a drug is administered, etc.). The IV is typically coded dichotomously, with dummy codes (0, 1) or effects codes (-0.5, 0.5) representing observations before and after the event of interest. The first step tests for an intercept shift by regressing the DV onto Time and the IV simultaneously. The effect of interest is the IV, which tests the intercept shift—the extent to which the IV’s introduction is associated with a discontinuity in the regression line over time. The second step is to tests for a slope shift by regressing the DV onto time, the IV, and the Time x IV interaction simultaneously. The effect of interest is the interaction, which tests the slope shift—the extent to which the change-over-time slope differs before and after the introduction of the IV. Any combination of null and significant effects for intercept and slope shifts is possible (Figure 3). Mean-centering the time variable (by subtracting its mean from each observation) and the IV (by using effects codes [-0.5, 0.5] instead of dummy codes [0, 1]) can often aid in the interpretation of the regression coefficients.

Figure 3. A schematic diagram of four possible interrupted time-series outcomes.



As applied here, growth curve analysis is simply a change-over-time regression analysis that incorporates a nonlinear component, such as a quadratic effect. The time variable (publication year) was mean-centered (by subtracting 1982.5 from each observation) to facilitate the interpretation of linear slope in the simple effects tests. For example, mean centering allows one to ask what the average linear growth is for either sociobiology or evolutionary psychology in the context of the full quadratic model. Geometrically, these are the lines tangent to their respective curves (for sociobiology and evolutionary psychology) at the midpoint of the time window (i.e., 1982.5; Figure 2). For a detailed discussion of polynomial growth models, see Cohen et al. (2003, pp. 193-214), Judd and McClelland (1989, pp. 267-280), or Singer and Willett (2003, pp. 189-242).