Table 4
Multiple Regression Equations for Predicting Eminence

Measure	Themes		Works	
	b	β	*b*	β
Birth year	−0.022	−.442**	−0.027	−.544**
Lifetime output	0.013	.484**	0.068	.353**
Age at first hit	−0.100	−.207*	−0.083	−.220*
Age at last hit	0.053	.193*	0.053	.211*
Constant	42.156		51.822	
R^2		.708**		.623**

Note. The unstandardized partial regression coefficients are designated by *b*, the standardized ones by β. The adjusted R^2s for themes and works, respectively, are .698 and .610.
* $p < .01$. ** $p < .001$.

example, because Beethoven went through three distinct stylistic periods, there is "something for everyone" in the sense that some may appreciate the formal elegance, precision, and reserve of his classicist first period, others the rambunctious rebellion and proclamation of his romantic middle period, and still others the more serene depth and experimentation of his reflective late period. In any case, this creative transformation may be far less conspicuous in the sciences, where creators usually devote their whole lives to the elaboration and promulgation of some central theme or metaphor (see Holton, 1973; Simonton, in press; cf. Gruber & Davis, 1988). However, before much is made of this contrast between the two creative domains, one can infer from the standardized regression coefficients that the impact of either career landmark is only around half that found for lifetime productivity, and hence the latter variable still serves as the more potent antecedent of posthumous reputation (cf. Simonton, 1991b).

Predicting output. According to the model presented in the Introduction, the total productivity at the end of a career should be a function of three factors: the age at first hit, the maximum annual output, and the age at last hit. These three variables demarcate the beginning, the peak, and the termination of the career course for the curves shown in Figure 1. Unlike the previous analyses, the results clearly confirm expectation. Again using a hierarchical regression, lifetime output was a function of the three specified variables and these alone, not even birth year entering the equations. For the thematic measures, the total production of hits was a negative function of age at first hit ($b = -3.617$, $\beta = -.201$), $t(116) = -3.784$, $p < .001$, and a positive function of age at last hit ($b = 1.413$, $\beta = .528$), $t(116) = 2.676$, $p < .01$, and of the maximum annual output, ($b = 5.809$, $\beta = .753$), $t(116) = 14.549$, $p < .001$, with $R^2 = .736$ ($p < .001$, adjusted $R^2 = .729$, and constant = 7.350). Likewise for the works measures, the lifetime output was a negative function of age at first hit ($b = -0.491$, $\beta = -.250$), $t(116) = -3.765$, $p < .001$, and a positive function of age at last hit ($b = 0.214$, $\beta = .163$), $t(116) = 2.630$, $p < .05$, and maximum annual output ($b = 3.731$, $\beta = .599$), $t(116) = 9.006$, $p < .001$, with $R^2 = .581$ ($p < .001$, adjusted $R^2 = .570$, and constant = 2.836).

It is striking that the absolute value of the unstandardized coefficient for age at first hit is roughly double that for age at last hit for both themes and works. According to the age curves observed empirically and predicted theoretically, the slope of the prepeak ascent should be greater than the slope for the postpeak descent, and consequently changes in the career location of the first landmark should have more impact than changes in the location of the last landmark (Simonton, 1989a). In particular, by applying differential calculus to the equations that generate the age curves shown in Figure 1, it can be shown that the slope at the point of first hit should be approximately twice as steep as the slope at the point of last hit (see Figure 1). Therefore, this comparison provides indirect support on behalf of the age curves that have guided the central deductions.

Discussion

It has been shown here that the career pattern for classical composers is, in all essentials, the same as that observed earlier for scientists and inventors. This replication succeeded despite the shift not only in domain of creativity, but in the operational definitions besides. Furthermore, the demonstration went beyond mere replication by introducing new variables relevant to a complete evaluation of the proposed theoretical framework. Naturally, it still should not be claimed that the theoretical model that generated Figure 1 has been conclusively proven. Nonetheless, the current results, in conjunction with a considerable body of other research published over the past century, expand an intricate matrix of relationships that impose strong constraints on the range of possible explanations (see Simonton, 1988a, 1991a). For example, any explication must also handle the cross-culturally invariant differences in the age curves across disciplines, the skewed distribution of lifetime productivity and maximum output rate, and the probabilistic connection between quantity and quality that holds both within and across creative careers. On the basis of the whole collection of well-established findings, a long inventory of offered theories has been rendered empirically untenable. For instance, one must reject explanations that specify developmental changes in creativity in terms of chronological age or assume that quality (or creativity) has a different age function than quantity (or productivity). Especially critical for any theoretical alternative is the necessity of specifying at least three independent factors underlying individual differences in career trajectories: career onset, disciplinary activity, and something that serves the same causal function as creative potential (see Simonton, 1991a).[3]

[3] One may be rightfully wary of any theory that hypothesizes inherently unmeasurable variables. To the casual observer, for example, there may appear a certain circularity in using lifetime output, maximum output rate, and other observables as indicators of initial creative potential to test theoretical predictions, without access to alternative indicators that are independent of the theory being evaluated. However, there is nothing intrinsically unscientific about hypothesizing latent variables so long as they lead to empirical propositions that can be objectively discriminated from what one would predict in the absence of these unobserved contructs (see, e.g., Simonton, 1991b). In this sense, the epistemological status of creative potential is approximately the same (albeit not nearly so secure) as that of the atom in the physical sciences or the gene in the biological sciences. The pattern of relationships predicted by the current model is so distinctive that it is difficult to conceive how a theory would explicate the same findings without