Studying Creative Genius

An Overview of Historiometric Methods

Outline

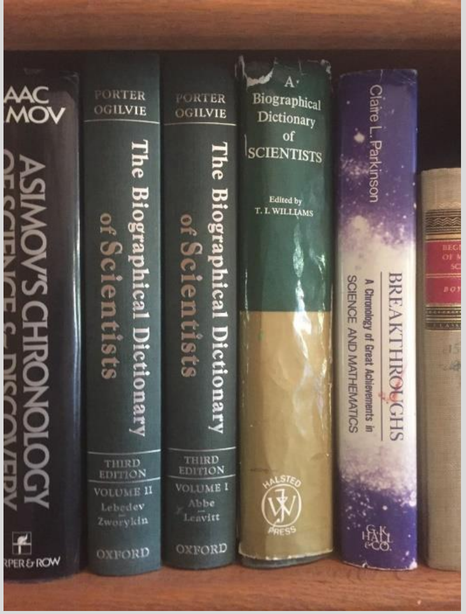
- Definition
- History
- Applications
- Conclusion

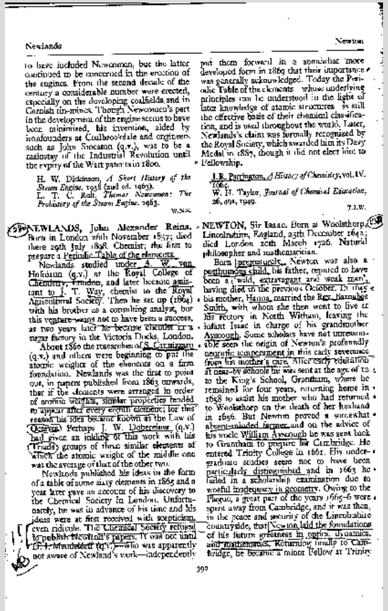
Definition

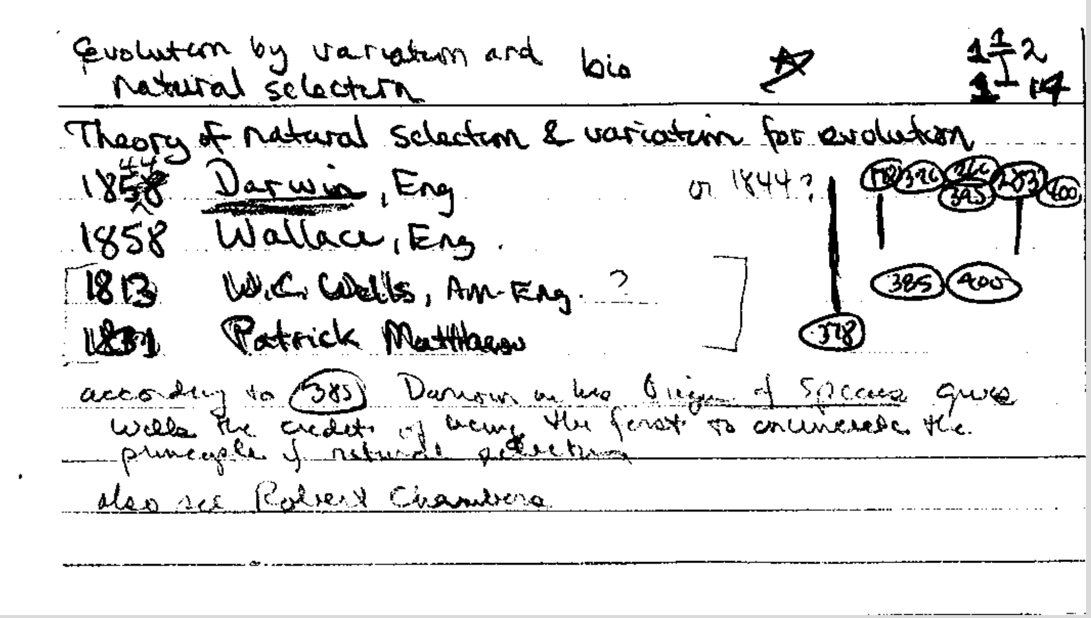
- "Historiometry is a scientific discipline in which nomothetic hypotheses about human behavior are tested by applying quantitative analyses to data concerning historical individuals" (Simonton, 1990, p. 3)
  - Historical individuals = eminent creators and leaders (aka "geniuses")
  - Data = biography and history ("names, dates, and places")
  - Quantitative = both measurement and statistical analyses (or math models)
  - Nomothetic hypotheses: e.g., the "laws of history"
  - N.B.: Historiometry ≠ psychohistory, psychobiography, nor even cliometrics

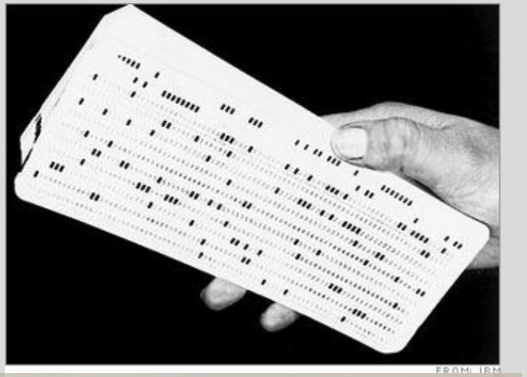
History

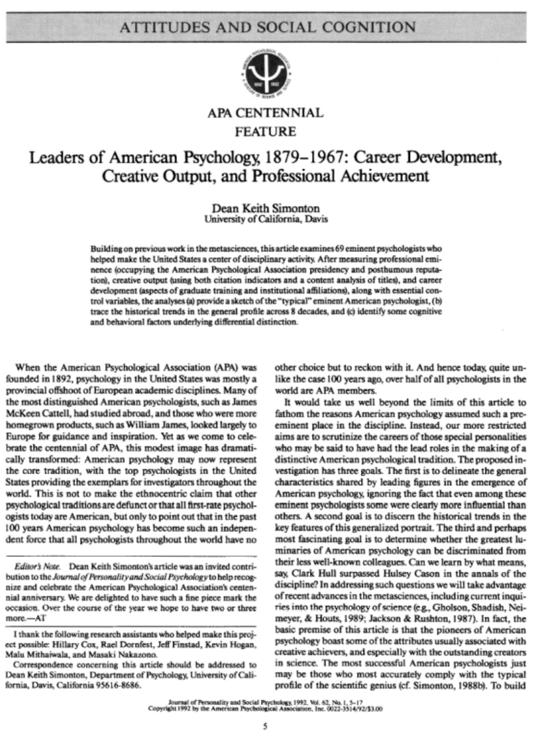
- First historiometric study: Quételet (1835) on the age-creativity relation
- First definition: "historiometry" or "historiometrics"
  - "A new name for a new science" (Woods, 1909): term modeled after "biometry"
  - "Historiometry as an exact science" (Woods, 1911): designed to study the "psychology of genius" and the "causes underlying the rise and fall of nations" (p. 568)
- First historiometric classic: Cox (1926) on the intelligence-eminence relation
- Own historiometric research: 1974ff (albeit major technological changes)











ATTITUDES AND SOCIAL COGNITION

APA CENTENNIAL
FEATURE

Leaders of American Psychology, 1879–1967: Career Development, Creative Output, and Professional Achievement

Dean Keith Simonton
University of California, Davis

Building on previous work in the metasciences, this article examines 69 eminent psychologists who helped make the United States a center of disciplinary activity. After measuring professional eminence (occupying the American Psychological Association presidency and posthumous reputation), creative output (using both citation indicators and a content analysis of titles), and career development (aspects of graduate training and institutional affiliations), along with essential control variables, the analyses (a) provide a sketch of the "typical" eminent American psychologist, (b) trace the historical trends in the general profile across 8 decades, and (c) identify some cognitive and behavioral factors underlying differential distinction.

When the American Psychological Association (APA) was founded in 1892, psychology in the United States was mostly a provincial offshoot of European academic disciplines. Many of the most distinguished American psychologists, such as James McKeen Cattell, had studied abroad, and those who were more homegrown products, such as William James, looked largely to Europe for guidance and inspiration. Yet as we come to celebrate the centennial of APA, this modest image has dramatically transformed: American psychology may now represent the core tradition, with the top psychologists in the United States providing the exemplars for investigators throughout the world. This is not to make the ethnocentric claim that other psychological traditions are defunct or that all first-rate psychologists today are American, but only to point out that in the past 100 years American psychology has become such an independent force that all psychologists throughout the world have no other choice but to reckon with it. And hence today, quite unlike the case 100 years ago, over half of all psychologists in the world are APA members.

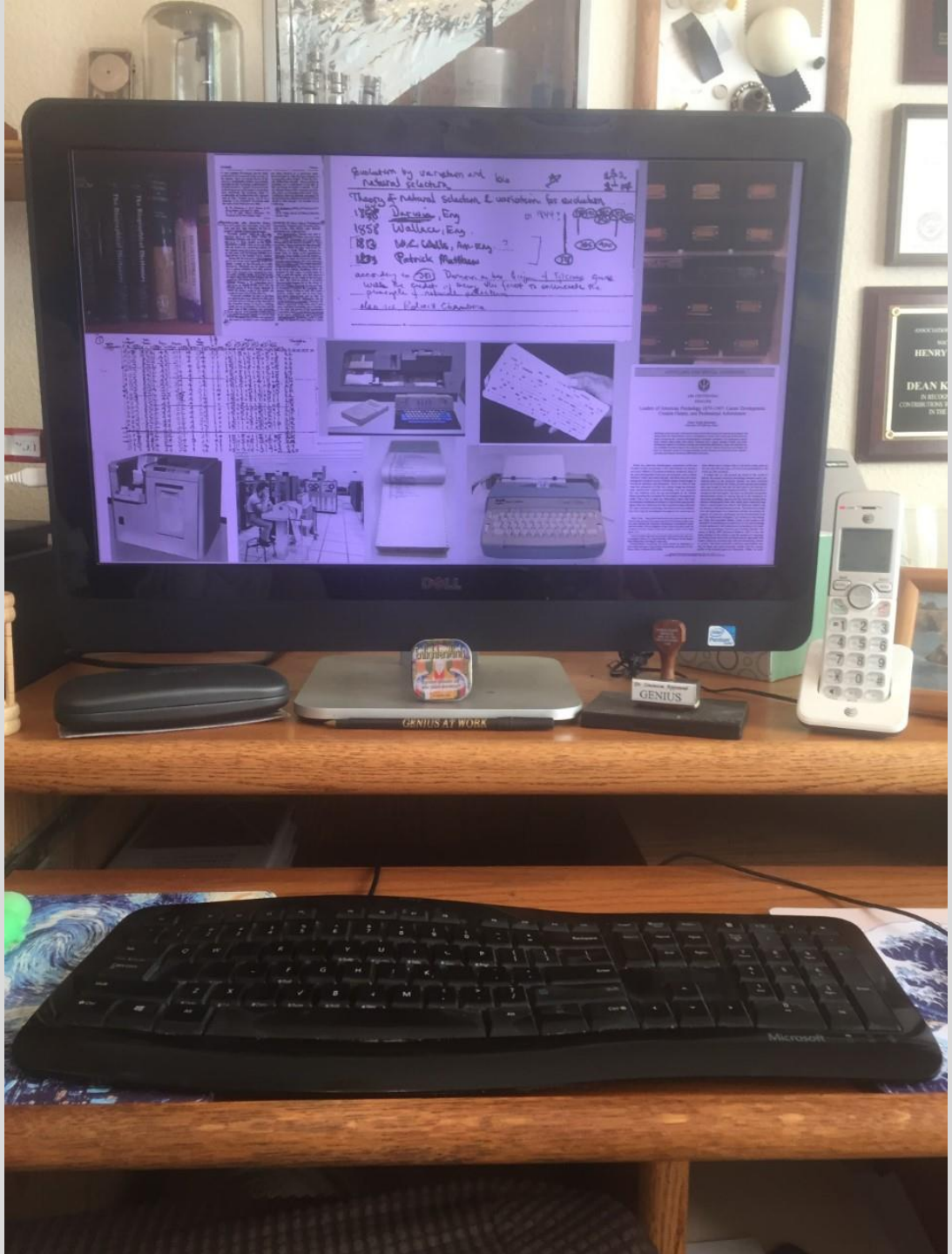
It would take us well beyond the limits of this article to fathom the reasons American psychology assumed such a preeminent place in the discipline. Instead, our more restricted aims are to scrutinize the careers of those special personalities who may be said to have had the lead roles in the making of a distinctive American psychological tradition. The proposed investigation has three goals. The first is to delineate the general characteristics shared by leading figures in the emergence of American psychology, ignoring the fact that even among these eminent psychologists some were clearly more influential than others. A second goal is to discern the historical trends in the key features of this generalized portrait. The third and perhaps most fascinating goal is to determine whether the greatest luminaries of American psychology can be discriminated from their less well-known colleagues. Can we learn by what means, say, Clark Hull surpassed Hulsey Cason in the annals of the discipline? In addressing such questions we will take advantage of recent advances in the metasciences, including current inquiries into the psychology of science (e.g., Gholson, Shadish, Neimeyer, & Houts, 1989; Jackson & Rushton, 1987). In fact, the basic premise of this article is that the pioneers of American psychology boast some of the attributes usually associated with creative achievers, and especially with the outstanding creators in science. The most successful American psychologists just may be those who most accurately comply with the typical profile of the scientific genius (cf. Simonton, 1988b). To build

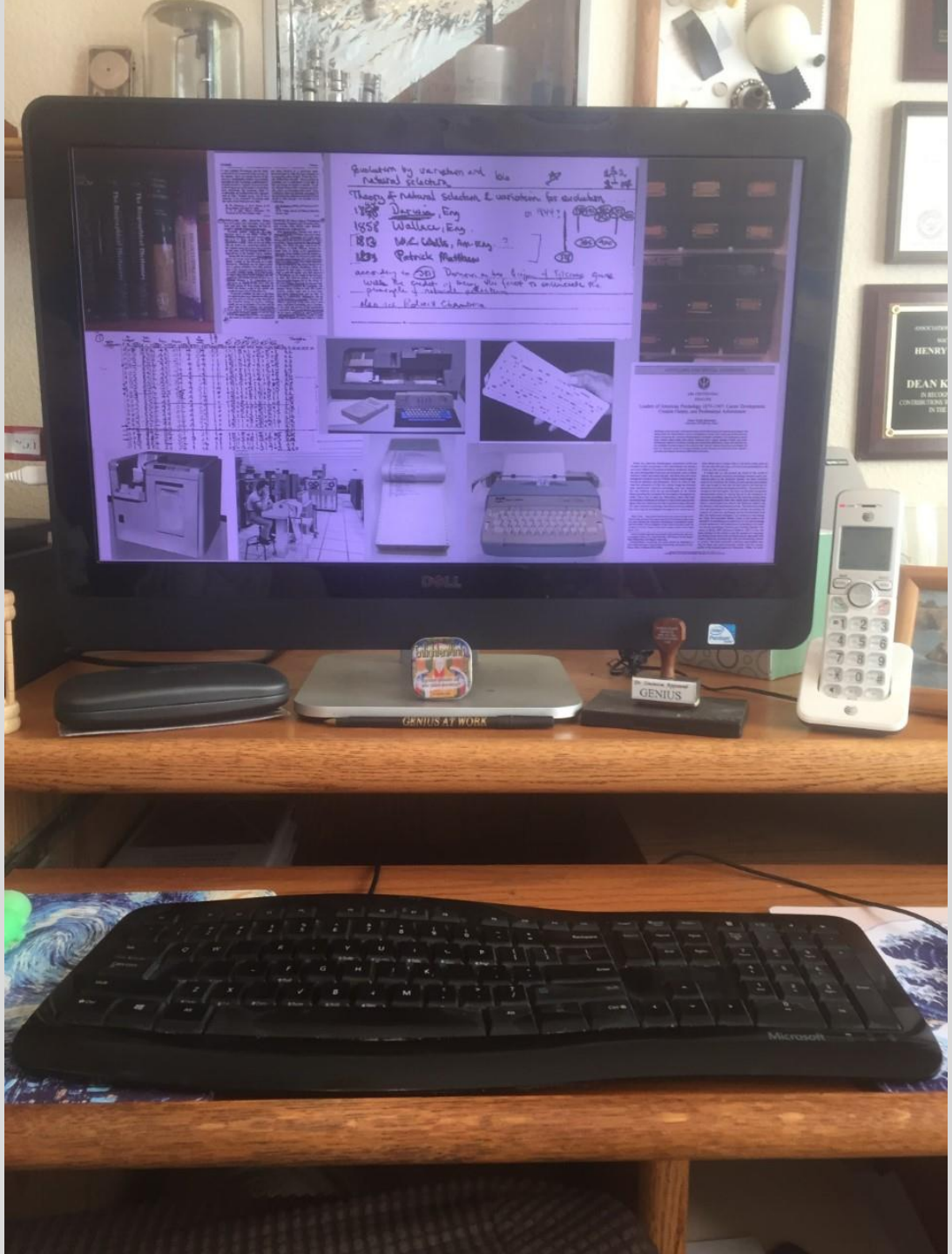
Editor's Note. Dean Keith Simonton's article was an invited contribution to the *Journal of Personality and Social Psychology* to help recognize and celebrate the American Psychological Association's centennial anniversary. We are delighted to have such a fine piece mark the occasion. Over the course of the year we hope to have two or three more.—AT

I thank the following research assistants who helped make this project possible: Hillary Cox, Rael Dornfest, Jeff Finstad, Kevin Hogan, Malu Mithaiwala, and Masaki Nakazono.

Correspondence concerning this article should be addressed to Dean Keith Simonton, Department of Psychology, University of California, Davis, California 95616-8686.

Journal of Personality and Social Psychology, 1992, Vol. 62, No. 1, 5–17


GENIUS
GENIUS AT WORK
Microsoft


GENIUS
GENIUS AT WORK
Microsoft

Applications

- Products
  - Masterworks
- Persons
  - Geniuses
- Periods and Places
  - Golden Ages

Products

- Analytical units
- Sampling strategies
- Quantitative measures
- Measurement quality
- Specific illustration

Products

- Analytical units
  - Music: themes/melodies; songs; symphonies; operas
  - Art: sketches; paintings; architecture; films
  - Literature: couplets/quatrains; poems; plays; short stories; novels
  - Science: titles; abstracts; articles; books

Products

- Sampling strategies
  - Population
  - Awards/nominations
  - Random

Products

- Quantitative measures
  - Expert ratings; consumer ratings
  - Performance/recording frequencies; anthology selection frequencies
  - Sales figures, box office, and auction values
  - Awards/honors/prizes
  - Citation indices/quotation frequencies

Products

- Measurement quality
  - Reliability (random error)
    - In general, reliability coefficients (such as alpha) are comparable to the best psychometric instruments (i.e., .80s to .90s)
    - However, some assessments are not unidimensional (e.g., cinematic impact)
  - Validity (systematic bias)
    - Although measures enjoy an undeniable "face validity," they are also subject to extraneous influences that can undermine their validity (e.g., creation date), requiring the implementation of statistical controls

Products

- Specific illustration
  - "Fickle fashion versus immortal fame: Transhistorical assessments of creative products in the opera house" (Simonton, 1998)
    - 496 operas created by 55 composers who contributed at least one opera to the repertoire
    - Contemporary impact: productions and languages in first decade
    - Current impact: recordings, videos, performances, dictionaries, histories, rankings →
      - global success (composite)

Table 1

Correspondence Between Contemporary and Current Impact Measures

	Zero-order correlations (r)		Regression coefficient (β)	
Measure	Productions	Languages	Productions	Languages
Recordings	.48	.37	.59	.48
Videos	.46	.35	.52	.42
Performances	.56	.46	.57	.47
Dictionaries	.42	.31	.51	.40
Histories	.37	.24	.53	.38
Rankings	.31	.21	.43	.33
Global success $\alpha = .95$	.46	.35	.56	.44

Note. All zero-order correlations and standardized partial regression coefficients are statistically significant at the $p < .001$ level or better. The regression coefficients have the effects of performance date and libretto language partialed out. $N = 496$. Operas first produced 1607-1938

Persons

- Analytical units
- Sampling strategies
- Quantitative measures
- Measurement quality
- Specific illustration

Persons

- Analytical units:
  - Individuals (as in psychometric research):
    - e.g. inventors, scientists, philosophers, writers, artists, composers, filmmakers
  - However, individual lifespans or careers may be split into time-series units, such as years, half-decades, or decades (e.g., to study career trajectories), yielding "cross-sectional time series" when $N > 1$

Persons

- Sampling strategies
  - Population
  - Eminence
  - Awards
  - Random

Persons

- Quantitative measures
  - Archival space measures (encyclopedias, biographical dictionaries, histories, etc.)
  - Expert ratings/surveys
  - Lifetime productivity
  - Citations (total, h-index, etc.)

Persons

- Measurement quality
  - Reliability (random error)
    - Again, reliability coefficients in the same range as the best psychometric instruments
    - Moreover, “test-retest” reliabilities may extend across decades, even centuries
  - Validity (systematic bias)
    - Controls often necessary for domain and various demographic variables

Persons

- Specific illustration
  - "Scientific eminence historical and contemporary: A measurement assessment" (Simonton, 1984)
    - all 2026 Scientists and inventors granted entries in three selective biographical dictionaries of science
    - 23 alternative eminence measures (biographical dictionaries, encyclopedias, Nobel, etc.; deliberately heterogeneous in measurement properties)

Table 3
Statistics for eminence, publication, and citation measures
by century and overall $k = 23$

Century Born	N	Reliability α Eminence	Mean			Eminence Correlated With	
			Eminence	Publications	Citations	Publications	Citations
⩽ 15	139	0.80	24	1	2	0.54***	0.55***
16	81	0.85	24	5	19	0.27**	0.14
17	119	0.83	23	4	4	0.43***	0.27**
18	405	0.83	20	5	8	0.34***	0.26***
19	1075	0.74	17	33	102	0.26***	0.14***
20	207	0.68	13	75	668	0.22**	0.13*
Any	2026	0.78	18	27	125	0.08***	-0.01

*$p < 0.05$
**$p < 0.01$
***$p < 0.001$

mathematics 0.88, astronomy 0.89, physics 0.90, chemistry 0.87, biology 0.88, medicine 0.84, technology 0.77, earth sciences 0.73, behavioral sciences 0.85, miscellaneous 0.81; English 0.89, American 0.76, German 0.86, French 0.88, Italian 0.90, Dutch 0.91, Russian/Soviet 0.83.

N.B.: Publications and citations from *Science Citation Index Five-Year Cumulation 1970-1974.*

Periods and Places

- Analytical units
- Sampling strategies
- Quantitative measures
- Measurement quality
- Specific illustration

Periods and Places

- Analytical units
  - Cross-sectional: domains, cultures, nations, civilizations
  - Time-series: years, decades, generations, centuries (i.e., 1, 10, 20, and 100 years)

Periods and Places

- Sampling strategies
  - Sampling of cross-sectional and time-series units largely contingent on the product or person samples that are then aggregated into the larger units
  - For example, in time-series analysis, the series starts in accord with the earliest product or person in the sample and ends with the most recent product or person in the sample
  - For analytical purposes, the resulting series should consist of contiguous time units (hence, some internal units may have zero aggregate scores)

Periods and Places

- Quantitative measures
  - Products or persons aggregated into cross-sectional and/or time-series units
    - e.g. generational time-series analyses: persons assigned to 20-year period according to 40-year old floruit rule
  - Unweighted versus weighted tabulations
    - e.g. count Newton more than John Flamsteed
    - Thus arises the issue of optimal weighting procedure

Periods and Places

- Measurement quality
  - Reliability (random error)
    - Although reliability also tends to be high, the degree of reliability depends on certain methodological factors, such as the size of the time units (i.e., given the same products or persons to be tabulated, reliability increases with the size of the unit)
  - Validity (systematic bias)
    - Cross-sectional (e.g., ethnocentric biases; population size)
    - Time-series (e.g., discounting; population growth)

Periods and Places

- Specific illustration: First
  - "Galtonian genius, Kroeberian configurations, and emulation: A generational time-series analysis of Chinese civilization" (Simonton, 1988)
    - 10,160 eminent Chinese creators and leaders aggregated into 141 twenty-year periods for 35 achievement categories
    - generational time-series analyses indicated
      - (a) that major and minor figures tend to fluctuate together across historical time and
      - (b) that both unweighted and weighted fluctuations are adequately described by first- or second-order autoregressive models (once exponential trends are removed): e.g., …

Table 3
Trend and Autoregressive Coefficients for Creators at Generation g

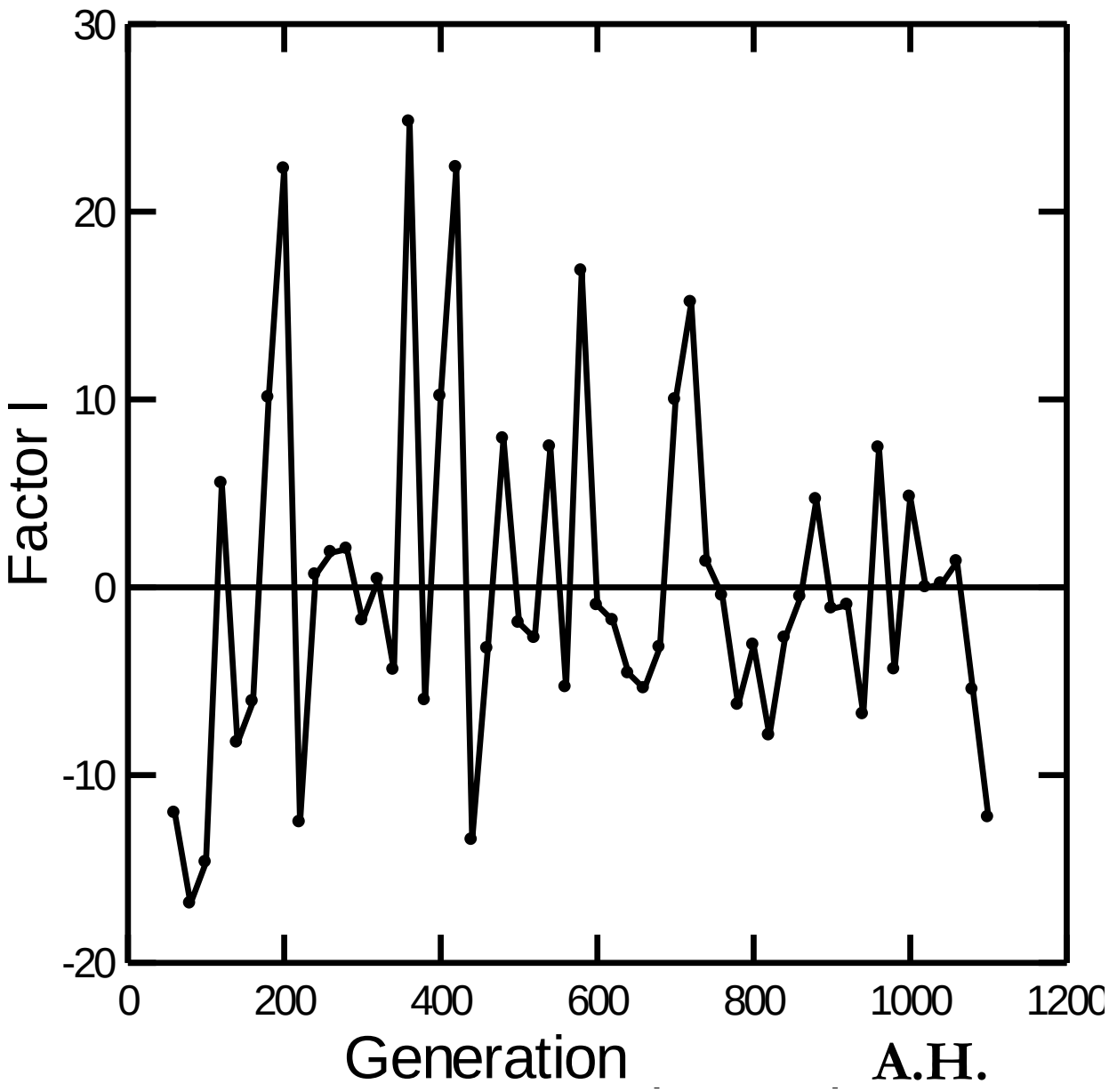
$N = 5724$ creators

Category	Unweighted			Weighted		
	Trend	$g-1$	$g-2$	Trend	$g-1$	$g-2$
Inventors	.43	.24	.25	.31	.26	.23
Mathematicians	.50	.51	—	.40	.34	—
Physical scientists	.28	.38	—	.21	.38	—
Biological scientists	.65	.29	—	.49	.23	—
Other scientists	.63	.28	.27	.56	—	—
Native religionists	.22	.31	—	*.13*	.26	*.22*
Alien religionists	.60	.75	—	.51	.69	—
Philosophers	.37	.50	—	*.08*	.30	—
Nonfiction authors	.87	.44	—	.62	.31	—
Fiction authors	.61	.37	—	.56	.31	—
Poets	.58	.37	*.20*	.36	.26	.30
Calligraphers	.29	.16	—	.25	.22	—
Painters	.86	.22	—	.79	.31	.11
Sculptors	*.03*	.77	—	*−.16*	.44	.44
Architects	.24	*.08*	.30	.24	.22	.22
Artisans	.32	.80	—	.27	.80	—
Musicians	*.16*	—	—	*.07*	.17	—

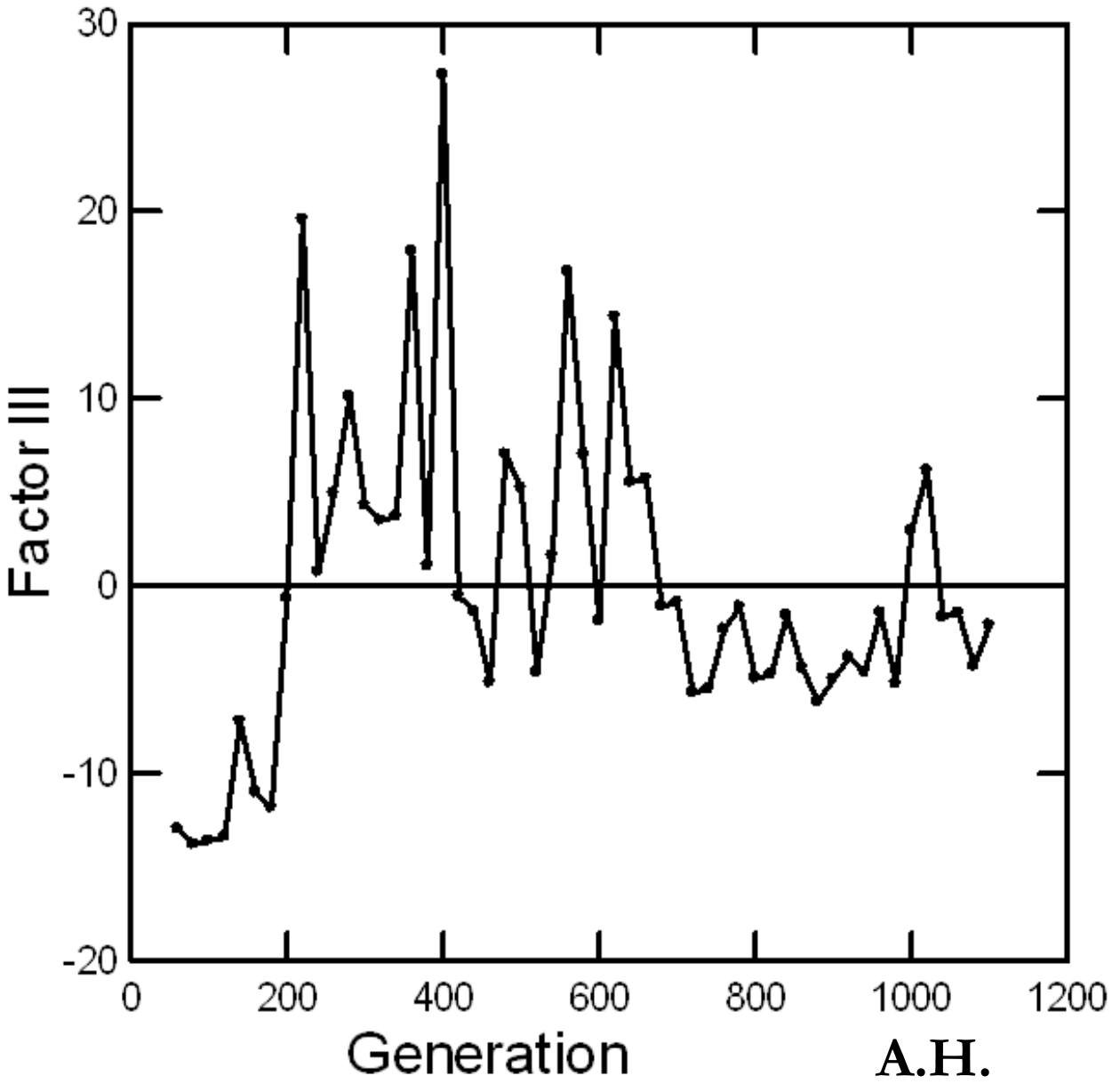
Note. Nonsignificant coefficients are in italics (when estimated).

Periods and Places

- Specific illustration: Second
  - "Intellectual genius in the Islamic Golden Age: Cross-civilization replications, extensions, and modifications" (Simonton, 2018).
    - Zero autocorrelation for theology, jurisprudence, scholarship, biography, and linguistics: Islamic tradition inspired (building on founders)
    - Second-order autocorrelation for philosophy, mathematics-astronomy, medicine, and physics ($\varphi_1 = .40$, $\varphi_2 = .35$): Extra-Islamic heritage inspired (building on immediate predecessors)



Random fluctuations in the weighted counts of thinkers in the achievement domains of theology, jurisprudence, scholarship, biography, and linguistics.



Positively autocorrelated fluctuations in the weighted counts of thinkers in the achievement domains of philosophy, medicine, mathematics-astronomy, and physics.

Conclusion

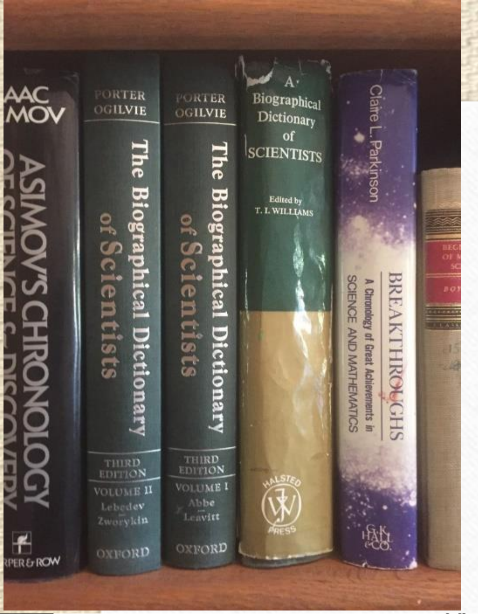
- Foregoing focused on the historiometric analysis of exceptional creativity as outcome variables, whether in products, persons, or periods and places
- Yet most historiometric inquiries are just as interested in the antecedents or correlates of these outcomes, such as multiple and diverse cognitive, differential, developmental, and sociocultural factors
- Moreover, such investigations sometimes entail extremely complex designs
  - e.g., products are nested in persons who are in turn nested in periods and places

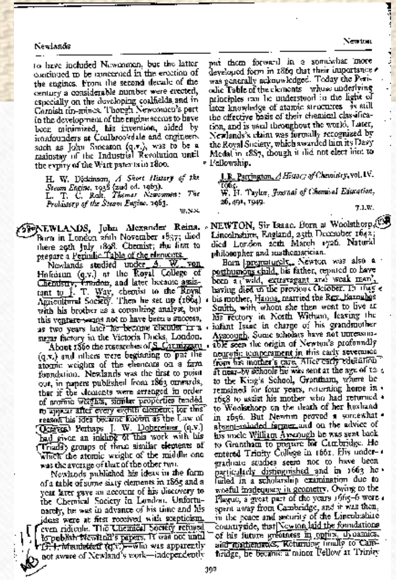
References

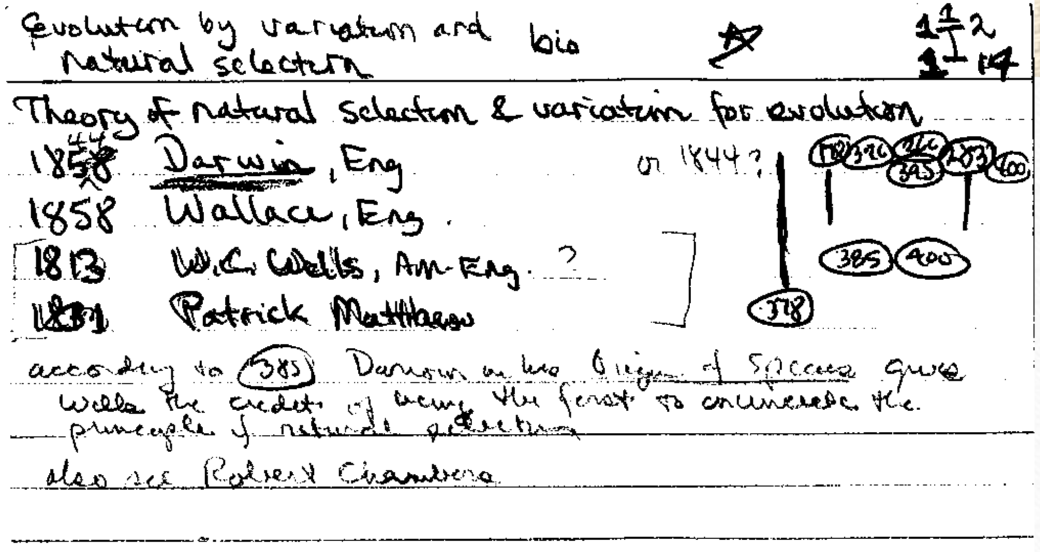
- Cox, C. (1926). *The early mental traits of three hundred geniuses*. Stanford, CA: Stanford University Press.
- Quételet, A. (1968). *A treatise on man and the development of his faculties*. New York: Franklin. (Reprint of 1842 Edinburgh translation of 1835 French original)
- Simonton, D. K. (1984). Scientific eminence historical and contemporary: A measurement assessment. *Scientometrics, 6,* 169-182.
- Simonton, D. K. (1988). Galtonian genius, Kroeberian configurations, and emulation: A generational time-series analysis of Chinese civilization. *Journal of Personality and Social Psychology, 55*, 230-238.
- Simonton, D. K. (1990). *Psychology, science, and history: An introduction to historiometry*. New Haven, CT: Yale University Press.
- Simonton, D. K. (1998). Fickle fashion versus immortal fame: Transhistorical assessments of creative products in the opera house. *Journal of Personality and Social Psychology*, *75*, 198-210.
- Simonton, D. K. (2018). Intellectual genius in the Islamic Golden Age: Cross-civilization replications, extensions, and modifications. *Psychology of Aesthetics, Creativity, and the Arts*, *12*, 125-135.
- Woods, F. A. (1909, November 19). A new name for a new science. *Science*, *30*, 703-704.
- Woods, F. A. (1911, April 14). Historiometry as an exact science. *Science*, *33*, 568-574.

Further Reading

- Crayne, M., & Hunter, S. T. (2018). Historiometry in organizational science: Renewed attention for an established research method. *Organizational Research Methods*, *21*, 6-29.
- Ligon, G. S., Harris, D. J., & Hunter, S. T. (2012). Quantifying leaders lives: What historiometric approaches can tell us. *The Leadership Quarterly*, *23*, 1104-1133.
- Simonton, D. K. (2014). Historiometric studies of genius. In D. K. Simonton (Ed.), *The Wiley handbook of genius* (pp. 87-106). Oxford: Wiley.
- Simonton, D. K. (2019). The sociocultural context of exceptional creativity: Historiometric methods. In I. Lebuda & V. P. Glăveanu (Eds.), *Palgrave handbook of social creativity research (pp. 13-25)*. London: Palgrave Macmillan.
- Simonton, D. K. (2019). The sociocultural context of exceptional creativity: Historiometric studies. In I. Lebuda & V. P. Glăveanu (Eds.), *Palgrave handbook of social creativity research (pp. 177-189)*. London: Palgrave Macmillan.





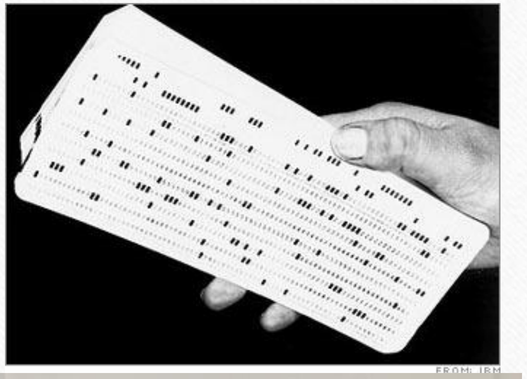

Evolution by variation and natural selection bio 1½ 1 14

Theory of natural selection & variation for evolution

1844 1858	Darwin, Eng	or 1844?
1858	Wallace, Eng	
1813	W.C. Wells, Am-Eng	?
1831	Patrick Matthew	

according to 385 Darwin in his Origin of Species gives Wells the credit of being the first to enunciate the principle of natural selection

also see Robert Chambers




ATTITUDES AND SOCIAL COGNITION

APA CENTENNIAL
FEATURE

Leaders of American Psychology, 1879–1967: Career Development, Creative Output, and Professional Achievement

Dean Keith Simonton
University of California, Davis

Building on previous work in the metasciences, this article examines 69 eminent psychologists who helped make the United States a center of disciplinary activity. After measuring professional eminence (occupying the American Psychological Association presidency and posthumous reputation), creative output (using both citation indicators and a content analysis of titles), and career development (aspects of graduate training and institutional affiliations), along with essential control variables, the analyses (a) provide a sketch of the "typical" eminent American psychologist, (b) trace the historical trends in the general profile across 8 decades, and (c) identify some cognitive and behavioral factors underlying differential distinction.

When the American Psychological Association (APA) was founded in 1892, psychology in the United States was mostly a provincial offshoot of European academic disciplines. Many of the most distinguished American psychologists, such as James McKeen Cattell, had studied abroad, and those who were more homegrown products, such as William James, looked largely to Europe for guidance and inspiration. Yet as we come to celebrate the centennial of APA, this modest image has dramatically transformed: American psychology may now represent the core tradition, with the top psychologists in the United States providing the exemplars for investigators throughout the world. This is not to make the ethnocentric claim that other psychological traditions are defunct or that all first-rate psychologists today are American, but only to point out that in the past 100 years American psychology has become such an independent force that all psychologists throughout the world have no other choice but to reckon with it. And hence today, quite unlike the case 100 years ago, over half of all psychologists in the world are APA members.

It would take us well beyond the limits of this article to fathom the reasons American psychology assumed such a preeminent place in the discipline. Instead, our more restricted aims are to scrutinize the careers of those special personalities who may be said to have had the lead roles in the making of a distinctive American psychological tradition. The proposed investigation has three goals. The first is to delineate the general characteristics shared by leading figures in the emergence of American psychology, ignoring the fact that even among these eminent psychologists some were clearly more influential than others. A second goal is to discern the historical trends in the key features of this generalized portrait. The third and perhaps most fascinating goal is to determine whether the greatest luminaries of American psychology can be discriminated from their less well-known colleagues. Can we learn by what means, say, Clark Hull surpassed Hulsey Cason in the annals of the discipline? In addressing such questions we will take advantage of recent advances in the metasciences, including current inquiries into the psychology of science (e.g., Gholson, Shadish, Neimeyer, & Houts, 1989; Jackson & Rushton, 1987). In fact, the basic premise of this article is that the pioneers of American psychology boast some of the attributes usually associated with creative achievers, and especially with the outstanding creators in science. The most successful American psychologists just may be those who most accurately comply with the typical profile of the scientific genius (cf. Simonton, 1988b). To build

Editor's Note. Dean Keith Simonton's article was an invited contribution to the *Journal of Personality and Social Psychology* to help recognize and celebrate the American Psychological Association's centennial anniversary. We are delighted to have such a fine piece mark the occasion. Over the course of the year we hope to have two or three more.—AT

I thank the following research assistants who helped make this project possible: Hillary Cox, Rael Dornfest, Jeff Finstad, Kevin Hogan, Malu Mithaiwala, and Masaki Nakazono.

Correspondence concerning this article should be addressed to Dean Keith Simonton, Department of Psychology, University of California, Davis, California 95616-8686.

Journal of Personality and Social Psychology, 1992, Vol. 62, No. 1, 5–17