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ABSTRACT

This paper takes as its data the assumptions, processes of deduction, and data types used in leading publications of historiometric studies of creativity. The paper uses this data to question the philosophical assumptions of the historiometrics of creativity from within its own positivist paradigm and to argue that its conclusions are substantially affirmations of knowledge from other sources. Historiometrics takes the occurrences of eminence as its data and looks at what else was happening at that time and place to explain these occurrences. In practice, historiometricians assess eminence by the amount of space allotted to a person in dictionaries, encyclopedias, and "Who's Whos." The differences between the historiometrics and sociometrics of creativity are noted. The paper asserts that historiometrics is a dubious branch of psychology in that its conclusions are mainly derived from nonhistoriometric psychological findings. Evidence is cited to argue that the statistical results of historiometricians and their processes of interpretation are questionable because of extensive philosophical and methodological weaknesses, some of which are outlined in this paper. (Contains 45 references.) (SLD)

Historiometrics of Creativity: A Philosophical Critique

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HISTORIOMETRICS OF CREATIVITY: A PHILOSOPHICAL CRITIQUE

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Introduction

This paper takes as its data the assumptions, processes of deduction, and data types used in leading publications of historiometric studies of creativity. The paper uses this data to question the philosophical assumptions of the historiometrics of creativity from within its own positivist paradigm and to argue that its conclusions are substantially affirmations of knowledge from other sources.

This paper first notes differences between the historiometrics and sociometrics of creativity and then demonstrates that historiometrics is a dubious branch of psychology in that its conclusions are mainly derived from non-historiometric psychological findings which it uses to interpret its own questionable statistical results. Evidence from these leading publications of historiometric studies of creativity is cited to argue that their statistical results and the processes of their interpretation are questionable because of extensive philosophical and methodological weaknesses, some of which are delineated in this paper.

The evidence cited in this paper of philosophical and methodological inconsistencies within its own positivist paradigm includes (i) using and reusing manifold contaminated data, (ii) questionably assuming genius is the extreme of mundane creativity, (iii) confusing statistical association with causal effects so that chains of tenuous associations are reported as causal explanation, (iv) 'slippage' in the meanings of variables between measurement and conclusion, (v) confounding meanings and uses of probability to give significant results which have little meaning, predictability or testability, (vi) equating contextually dependent findings from diverse contexts and (vii) ignoring the arrow of time in the use of the scientific method.

It is concluded that the historiometrics of creativity makes a questionable contribution to the science of psychology.

Distinguishing between historiometrics and sociometrics of creativity

Historiometrics: Golden ages and dark ages.

We can always find patterns in natural variation. An example of natural variation is the fluctuations in the numbers of creators. These have varied throughout history in time and place, clime and race. We call the extremes of this variation the Golden Ages and the Dark Ages. Perhaps future historians will look back and include our own technological age with the Renaissance, 5th Century Athens, Tudor England and the 18th century Age of Enlightenment as another Golden Age of creativity.

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Zeitgeist creates creators.

Historiometrics takes the occurrences of eminence as its data and looks at what else was happening at that time and place in order to explain these occurrences. It considers the "Zeitgeist", the general spirit of the historical period. That is those social, cultural, and situational factors that are considered to be beyond the control of the individual (Simonton, 1987, p. 77) - such as war, affluence, civil unrest, urbanization, social structure etc. Even the climate has been considered - Nordic types were thought to be scientific and mathematical whereas Mediterranean areas were thought to give rise to eminence in the arts (Ellis, 1904). These situational events are then assumed to be the influences responsible for encouraging or inhibiting creativity in the population and hence the number of geniuses and other creators of eminence living at that time.

Historiometric eminence by the reused column inch.

In practice, however, historiometricians assess eminence by the amount of space allotted to a person in dictionaries, encyclopedias and Who's Whos. This data is very time consuming to collect so researchers tend to reuse data that was sourced some time ago. An example is the data collected by Alfred Kroeber (1944) identifying 5000 creators who lived between 700 BC and 1900 AD. He and others have used this data base to show that Geniuses come in clusters in time and place - reported by Ochse (1990, p. 50). Similarly, James McKeen Cattel (1903) choose 1000 creators and Havelock Ellis chose 900 creators from different dictionaries (Ochse, 1990 p. 40). Later, Catherine Cox (1926) reused 300 people of "unquestionable" genius from Cattel's original 1000. She estimated their IQ and personality traits post hoc for a further sociometric study. Her data was subsequently reused by White (1930), McCurdy (1957), Walberg, Rasher and Hase (1978), and Simonton ad nauseum (1976, 1984) who called this work "her classic" (Simonton, 1990a, p. 97). The validity of this original data, however, has been severely critisised, for example by Stephen Gould (1981, p. 184). Similarly, Joel Shurkin's opinion of Catherine Cox's "classic" is that it "must rank as one of the silliest experiments in the colorful history of social science. ... She and her researchers accumulated 6,000 typed pages of data, a victory of volume over common sense." (Shurkin, 1992 p. 68,70).

Sociometrics - patterns from biodata.

In contrast to historiometric studies, sociometric studies use personal biodata such as personality traits, family background and personal interests. One early milestone study was Galton's (1869) work dealing with heredity (eugenics) of genius in which he found, among many other things, that scientists tend to be the family's first born children. The data used in sociometrics often comes from biographies. A rich source for the researcher is Rothenberg and Greenberg (1974) compilation of 3145 biographies of famous people. More recently, sociometric data tends to come from studies involving tests and interviews that have been designed especially to collect this data. For example, data on 314 subjects classified by 20 categories collected by the Goertzels (1978) and latter reused by Simonton (1987, p. 84).

The objective of sociometrics is to look for similar patterns across categories of creators in birth order, parental forms of motivation, caretaker behaviour, intelligence ranges, age at which they first did this or that, family and relatives, socioeconomic status, whether they had role models, childhood illnesses, etc. etc. It is thought that statistics might yield a common biodata profile (like a 16 PF) showing that these unique creators where similar in their uniqueness (sic). If this common profile was found it would be assumed necessary for creative eminence. Parents and educational systems could then be guided by it. Michael Howe finishes one of his 1990 books about 'exceptional abilities' by concluding how educational policy and individual parents can use such a common denominator of eminence ".. much can be done to make desirable outcomes more likely. Acquiring an exceptional ability is one such outcome. We can and we should act to make it happen more often." (Howe, 1990, p. 240)

To illustrate the naiveté of this policy, I note that many creators have reported that as children they were punished to the extent of cruelty. Anton Chekhov reports being hit over the head and whipped by his father (Illingworth & Illingworth,

1967, p. 18). Ochse (1990, p. 80), reporting on Ehrenwald (1984), tells us that "Among numerous other victims of parental cruelty was Beethoven, who might be described today as a battered child. His father would drag him out of bed in the middle of the night and make him practice till morning, beating him if he flagged." If hardship or child abuse was a common factor I hope few educators, psychologists or parents would want to pay this price for potential eminence.

Sociometric findings

Interesting findings of little practical use.

There are other interesting findings from sociometrics - for example; that the fathers of 40% of Nobel Scientists were Doctors or worked at Universities (Berry, 1990). Although these interesting findings may throw some light on the understanding of creativity they have little direct practicality for turning Mrs. Smith's little Johnny into a second Einstein. The interested reader will discover such sociometric findings among the many interesting and informative chapters and forwards edited by Robert Albert (1983) in "Genius and Eminence: The social psychology of creativity and exceptional achievement".

The 20:80 rule - 20% of creators give 80% of the products.

Interestingly, from distributions of creative products given by Dennis (1955), Moles (1968), and Simonton (1984), sociometrics shows that the 20:80 service rule applies. In commerce 20% of costumers provide 80% of the business and 20% of the stock gets requested 80% of the time. So it is with creators - about 20% of creators produce about 80% of creative products.

The most creative are disproportionately Jewish.

Jews are heavily represented among Nobel Laureates. For example although only 3% of Americans are Jews, 27% of American Nobel Prize winners are Jews (Zuckerman 1977). Before the second World War 20% of German scientists and mathematicians were Jews (Howe, 1990, p. 99). If you were to make a list of the individuals who you think have outstandingly contributed to shaping our lives - Jesus, Karl Marx, Darwin, Freud, Einstein - you will probably find a disproportionate number were Jewish. The odd one out in my list is Darwin. Surprisingly - from a statistical point of view - as far as I know he wasn't Jewish. The Jews have contributed numbers of creators out of all proportion to the size of their population (Berry 1990, Zuckerman 1977, Visher 1948). Ochse (1990, p. 62), cites eight references with her finding that "Jews are over-represented in samples of highly creative achievers". Even among the highly creative subjects chosen randomly for studies of creativity many are Jewish e.g. coincidentally Revenna Helson's sample of female mathematicians were nearly all Jewish (personal communication, Nov. 1987).

Why? Jewish creators do not necessarily have the advantage of coming from affluent families because 75% of Jewish Noble Laureates come from poor homes (Zuckerman 1977). As few creative scientists are overly interested in religion (Ochse, 1990 p. 63 cites 7 refs) this points to a common cultural influence rather than a direct religious influence. Rhonda Ochse suggests inculcation of cultural values might be responsible, values such as achieving self-worth through intellectual pursuits (Ochse, 1990, p. 163) - very portable to a refugee mentality.

In the 1950s, Terman initiated what has since become one of the most famous longitudinal studies; a study of 1000 gifted children - the 'Termites' - who have been followed up ever since (Shurkin, 1992). Terman later categorised his Termites into two groups (a) the more successful adults and (b) others (Terman & Oden 1959). There were three times as many Jews in the long term successful group of gifted children than in the gifted group who turned out not to be successful adults. He explained this as due to the pressure on them to succeed. Not so - this is unlikely to be a complete explanation. In Singapore, I have found there is great pressure to succeed and continual propaganda for productivity and excellence - children sell their childhoods studying day and night for paper qualifications - but this pressure to succeed produces little if any creativity; only copying, drill and memory.

Rhonda Ochse suggests a more plausible piece of the jigsaw: "It seems, indeed, that the probability of eminence may also be affected by lack of complacence not only of wealth but also of entrenched social stability." (Ochse, 1990, p. 64). My own research indicates that creator's unique enculturation processes leave them with a sense of identity that lacks permanence - a feeling that everything can be taken from them. I call this occurrence in Jewish culture the 'Refugee Mentality' - a mentality that recognises the transient security of 'established' facts. It leads creators to question the unquestionable assumptions that give the rest of us our secure sense of social permanence. I see creative products as the creator's current efforts to establish even a transient identity.

Criticisms of historiometric data and its assumptions

We shall see that historiometric conclusions are difficult to accept because non-historiometric research findings are used to interpret purely statistical results and those statistical results have little credibility because of methodological weaknesses. The historiometric conclusions are then little more than affirmations of the researcher's knowledge from other sources. In illustration of historiometric conclusions, the following are the conclusions from a typical review of historiometric work - mainly Simonton's - by Simonton:

"1. The potential genius must have access to numerous role models very early in life...

"2. Exposure to cultural diversity also seems to nourish the precocious youth...

"3. The young genius adapts to the political environment by generating a set of philosophical beliefs..." (Simonton, 1983, p. 239)

We will see that conclusions of this type are difficult to accept solely on the methods of historiometric analysis.

Contaminated Data: Historical creativity mismeasured and confounded with leadership.

The Who's Who historiometric data used to study creativity is contaminated in many ways. The amount of space allotted to people in directories, encyclopedias etc. is a doubtful indication of their creativity. It is contaminated by social response to leadership, by notoriety, and by personal social advantages like wealth and family social standing. For example the eminence of monarchs depends on what significant historical events happened during their reign (Simonton 1987 p. 8). This is hardly relevant to their personal creative ability. Cox (1926) went to great lengths to avoid some of these contaminations in choosing and reusing 300 'creators' from Cattel's (1903) original 1000. She choose those born after 1450 who did not have the advantages of coming from aristocratic families. Her 300 included famous politicians, soldiers and other leaders as well as those traditionally considered as creators. Because of this data contamination historiometricians have to include 'leadership' of various kinds with 'creativity'.

Historiometric assumption that genius is the extreme of mundane creativity

Genius is assumed to be exaggerated 'every day' creativity.

The assumption behind the historiometric approach is that everyone is creative to some extent and the geniuses are the most creative. Creative ability is assumed to be a continuum. You and I and everyone else are all somewhere along the creativity ruler with the geniuses right out at the far end. Their creativity is the same as everyone else's. They just have more of it. As Margaret Boden puts it "We are all creative to some degree - what we can do, Mozart could do better." (Boden, 1990, p. 14). This assumes that creative genius is further along the ruler, the same ruler, with which we also measure little Johny's finger painting. This is only an assumption, a convenient value assumption that is consistant with the measuring mind set of psychometricians from an egalitarian society.

Zeitgeist is assummed to increase 'every day' creativity so more pass genius mark.

In historiometrics this assumption that genius is the extreme of mundane creativity is followed by the assumption that the genius end of the continuum is pushed out or pulled back over our creativity ruler by the Zeitgeist. This pushing or pulling results in more or fewer cases crossing over the mark of eminence. However, extending the top end could result from (i) having greater variation which stretches the distribution at both ends, or it could result from (ii) increasing everyone's creativity by some amount. Historiometricians do not make this point clear. However, their explanations of how particular aspects of the Zeitgeist result in more genius would apply to the population in general, so presumably (ii) is assumed - that everyone becomes more creative. Self-citing, Simonton says of a review on the subject: "One objection that might be raised against the above review is that much of it is based on historiometric studies of distinguished creators and leaders. How do we know that these results apply to those of us who venture far humbler designs? I maintain that it is merely a matter of degree, not kind, between geniuses who make history and those of us who leave an innovative mark in some far more subtle fashion." (Simonton, 1987, p. 83). Perhaps genius is qualitatively different.

Numerical 'associations' assumed to be 'causes'

In historiometric reports little or no distinction is made between 'numerical patterns in the data' and the 'causes of creativity'. Assumptions and necessity turn numerical 'associations' into reported 'causes' of genius. Numerical association is used interchangeable with 'cause'. Morris Stein, a doyen of creativity research, has said of typical historiometric conclusions "There are points in the article (Simonton, 1990b) when Simonton discusses results as if they were *causally* related to his variables when indeed only correlations have been demonstrated. .. It is crucial not to interpret the word 'association' to mean 'causal'." (Stein, 1990, p. 136, 141). This error probably arises because of two joint conditions (i) the statistics suggests numerical associations and (ii) the historiometricians belief that the Zeitgeist creates creators; that the historical circumstances of the time are responsible for the emergence of geniuses - circumstances such as Political fragmentation, civil disturbances, war etc. For example, simply Simonton says that these events "tend to have a critical impact on the development of creative potential in the young genius." (Simonton, 1983 p. 233). To illustrate we consider how the occurrence of war reportedly 'creates' geniuses.

Simonton reports "although a series of earlier inquiries found no relationship between war and creativity (5 self-citings + one other) these studies failed to distinguish several kinds of war. When such a distinction is implemented, as I have done very recently, a curious result obtains: Although balance-of-power wars fought close to the creative individual tend to discourage productivity *(sic)*, balance-of-power wars fought far away tend to encourage productivity." (Simonton, 1983, p. 234, my italics). Note the causal words "relationship", "discourage" and "encourage". Similarly "we scrutinize how societal creativity *responds to* the coming and going of international war, external threat, political instability, political fragmentation, and civil disturbances." (Simonton, 1990b, p. 87, italics added). Actually Simonton found a numerical association between numbers of wars (two types - near or far) and numbers of eminent people (all considered to be the same). It is only because of the questionable assumption that 'historical events cause people to become geniuses' that the numerical association between simplified categories is concluded to be a 'cause'.

Criticisims of sloppy methodology: believe what you get and get what you believe

The following methodological sloppiness - changing the meaning of the variables, predicting the past, confusing tenuous association with cause - is not unique to the historiometric study of creativity but is common in other areas of creativity study and has contributed contradictory results to the literature. Compare. for example "creativity is by its nature a rare occurrence" (Gardner 1988, p.91) with "all action involves the creative process" (Hodder, 1988, p.101).

'Slippage" of meaning: changing the meaning of the variables

Commonly, names of reported variables mismatch what was actually measured. Variable and factor names match intention not operational reality. In particular, fantasy factor names nominalise researcher's beliefs. In historiometrics there is often a slippage of meaning between what the data represent and what the conclusions are about. This slippage reverts to what the researcher originally intended to measure. But, what was originally intended to be measured does not always correspond with what is actually measured. This difference between what the data factually represent and the original intended meaning is forgotten in the presentation of conclusions.

In illustration let's look at the sociometric finding on formal education and creativity: "formal education tends to increase creativity up to a certain point, after which it has a negative affect." (Simonton, 1983, p. 234). You will notice the causal language, which we have just pointed out is unjustified by using only statistical analysis. But you will also notice the conclusion refers to 'formal education' and 'creativity'. For brevity let's only consider the slippage in the meaning of 'creativity' and also ignore the contamination of 'creativity' by other types of eminence in the data. When we look a little closer we see that this result is from an analysis of Cox's 1926 data on 300 eminent geniuses - including politicians, solders and religious leaders - chosen originally from Cattel's 1000 who were selected by the amount of space allotted to them in dictionaries. Perhaps then, the result should be restated not in terms of *creativity* but in terms of the *amount written about people in dictionaries* e.g. to read, 'formal education tends to increase *the amount written about people in dictionaries* up to a certain point.'

Predicting the past

Sleight-of-hand, slight-of-mind, watch carefully or you will miss it.

The slippage in meaning, from the operational definition to the names given to variables and factors in the conclusions, is toward affirming the original beliefs of the researcher. The conclusion can then be justified by restating the beliefs and referring to the affirmative evidence on which the original beliefs were based. This slight-of-mind goes unnoticed if the reader shares the researcher's beliefs or finds them plausible. It is more obvious if one has the - creative but energy draining - habit of questioning what evidence there is for even plausible beliefs.

Reversing the scientific method always gets it right - the 'I told you so' technique.

The above result on formal education is interpreted like this: "Clearly some formal education greatly aids the development of creative potential, but excessive amounts may inhibit creative development by enforcing an over commitment to traditional perspectives" (Simonton, 1983, p. 234). Now this suggestion may be prompted by Simonton's knowledge of similar sounding findings from previous research with modern school children - not historically eminent people. However, this previous research is presented as evidence confirming, rather than instigating, his interpretation: "This finding fits nicely with some research on creative development in contemporary children (e.g. Torrance, 1962)." (Simonton, 1983, p. 234-235). Here Simonton is reversing the chronological sequence theory/prediction/affirmation by using a previous result that affirms his belief to probably suggest a theory, make a prediction and to be the predicted affirming evidence for an inductive 'proof' of the suggested theory - a tautologically satisfying 'I was right'. By ignoring the arrow of time on which causality rides, this Platonic logic hides which is actually his chicken and which is his egg. (Whitrow, 1980, p. 178ff, Barrow, 1992, pp. 161 ff)

The explanation chain

The game of whispers is fun to play. Write down a message and then whisper it into the first person's ear. S/he whispers it to the next person and so on to the last person who writes down the message. You then compare the two written versions of the same message, the first with the last. Each link in the chain has much in common with its neighbors

but you will find that the first and last messages have little or nothing in common - especially if the message is unexpected.

If A correlates with B and B correlates with C it does not prove that A correlates with C. A and C could be completely uncorrelated. However, in historiometrics this type of chaining explanation is used to show that A explains C.

Chains of tenuous associations reported as causal explanation.

Simonton tells us that one variable that is found to "consistently favor" creativity is "..political fragmentation, or the number of independent states into which a civilization is divided in any given century." (Simonton, 1983 p. 236). The 'reasoning' is a tenuous chain in which, like the game of whispers, each link may have something in common with its neighbour, but the first variable, political fragmentation, has nothing in common with the last, creativity: "I have argued that political fragmentation indicates a large amount of cultural diversity and that cultural diversity tends to nurture the development of creativity (two self-citings). Such cultural diversity tends to encourage the capacity for divergent thinking, remote association, breadth of perspective, and related cognitive attributes required for fully developed creative potential." (Simonton, 1983 p. 236). His 'logical' conclusion is "political fragmentation .. tend(s) to increase creative potential by injecting an awareness of diverse perspectives .." (Simonton, 1983 p. 239.)

Explanations equate debatable findings from diverse contexts - this hidden diversity reduces the validity of explanations.

Each link has something in common with its neighbor, for example, exposing a potentially creative American child to cultural diversity may contribute to his/her creative development, perhaps for the above reasons. However, this is very different from cultural diversity due to political fragmentation which, in contradiction, can result in fossilising, fixing and stultifying group identity through emphasising contrasting in-group/out-group values and behaviour - often to the extent of civil unrest. Ethnic groups competing under political fragmentation tend to traditional fundamentalism that prevents them sharing their cultural diversity. They have their own strong ethnocentricity, not a shared diverse culture. Their lack of shared values and resulting lack of a united opposition makes political control easier. Cultural diversity due to fragmented populations does not favor creativity per se, as will be attested to by any educationalist who has worked in the ethnically diverse, tightly controlled, creative and cultural desert of Singapore where civil fragmentation has been the government's principle strategy for "political control of the press, courts, and religion" (U.S. State Department Report on Human Rights, March 1991 quoted in The New Yorker by Sesser, Jan 13th. 1992, p. 56-57 and banned in Singapore)

Critisicing a confusion of a profusion of probabilities

The basis of historiometric results is the use of probability. However, probability has different meanings according to how we use it. Historiometrics uses probability in three ways, a) for one-off historical events, b) for the rare occurrence of genius and c) for the statistical analysis. These first two uses are not compatible with the use historiometrics makes of probability for statistical analysis.

The 'probability' used for statistics - I shall call it 'dice probability' - can be verified by repeat testing and can be used to predict future outcomes; as when throwing dice. Historiometrics confuses dice probability (c above) with two other types of probability: One that cannot be tested by repeat trials (a above) and the other that is useless for prediction (b above). Data conforming to these reduced meanings of probability (a and b) are used in historiometric's statistical analysis (c above). The historiometric conclusions then erroneously assume the full properties of the dice probability - viz. repeat testing and the usefulness of prediction. If these two properties are missing from the data that goes into the statistical analysis, then they will also be missing from the results that come out of the statistical analysis.

Dice probability

Dice probability - testable by repeated trials and used for prediction.

A common probability with which we are all familiar is what I've call 'dice probability'. We know that when throwing dice we can expect the 3, say, to turn up 1 in 6 times. We know this from experience - throw it many times and about one-sixth of the throws will come up 3.

Incidentally, we also know this from a closed controlled theoretical point of view - the closed sample space. We close the situation so that we only have 6 outcomes and control these to have theoretically the same probability of turning up. We do not allow for practical bias or events outside our preconceived sample space - e.g. our die falling down a drain. Creativity is not as simple as dice. We do not know all possible outcomes and its not repeatable, but in spite of this, dice probability is used to study creativity. It would perhaps be better to use a research method that has an analogous structure to what we are studying.

Statistical analyses uses dice probability.

Dice probability is the probability used for statistical significance testing. Two important things about it are that it can be tested by repeated trials and it can predict future outcomes - you can bet on it. Historiometric results wrongly assume the credibility accorded to dice probability which is normally used for statistical results. Historiometricians are wrong to do this because historiometric results are not based on repeated trials and are practically useless for prediction. Their use of one-off historical events excludes repeated trials. Also the rare events like genius, the data of historiometrics, are highly unpredictable.

Probability of one-off historical events

What is the probability that you will sign a lucrative contract within the next three weeks? Is it as high as 50:50 or as unlikely as only one chance in 1000, or even less. This may be very difficult to decide for there are so many variables to consider and the likelihood of each outcome of each variable perhaps is considerably in doubt. But note that although you have difficulty in arriving at a numerical probability, your process of considering it shows that you do not doubt that a probability - whatever size it is - actually exists. This is the probability of a one-off event. It exists and you can bet on it. You can bet on your favorite candidate becoming the next president, on a child passing an exam, on a civil war breaking out in Washington, on a film star going in a rocket to the moon. They all have their odds and bets can be placed on many such one-off events through bookmakers or insurance companies.

One-off historical events of historiometric data are not repeatable and their 'probability' is not useful for prediction.

The point is that probability of one-off events is not the same as that used in calculating statistical significance. This one-off probability cannot be tested by repeated trials. The source data for historiometrics are such one-off historical events. Yet the results from historiometrics assumes the properties of repeatable data.

How does the historiometrician circumvent this problem? S/he does so by sacrificing meaning for statistical significance. The more statistically significant are the results then the less meaning they have. This is done by collecting the one-off events under a common category like wars, or genius, by ignoring everything about the original events that gave them their unique contextualised meaning, everything except the category label. Thus discarding their meaning turns one-off events into rare events. The more individual contextual meaning that can be discarded, then the larger will be the numbers in each category and the more statistically significant, but practically meaningless, will be the results. So, for example, statistically significant historiometric results on 'genius' refer not to a particular genius but to some unstated abstraction assumed to be shared by all these unique individuals. As the numbers increase so does their the variety and

variation, whatever abstraction they might have in common then becomes vanishingly small - two unusual individuals might have much in common, but a hundred unique individuals, a thousand?

These category counts and column inches are at best only peripheral to creativity. They are so devoid of information on creativity that no amount of statistical processing can extract information to answer the questions that creativity researchers would ask of historiometrics. Morris Stein critically asks "For example, under the conditions studied what are the effects of the redistribution of power and what are the psychological areas in which threat and stress are experienced? ... also focus on the behaviour of scientists and the circumstances under which they work .. matters of allegiance and attitude" (Stein, 1990, pp. 136-137). As Stein under-states "greater psychological specificity would be helpful." (p. 136). If historiometrics cannot answer our questions then why do researchers continue with it? An answer might simply be because result for result its easier. The major historiometrician in the field, Simonton (1990c, p. 147), tells us that these thousands of empty numbers require less effort to collect in comparison to more informationally rich data on just a few subjects, and of course PCs can easily crunch these "big Ns". "And as long as one editor and two referees feel the same way" as Simonton does, he says he will rest content (Simonton, 1990a, p. 111). However, no amount of published statistical processing can extract from numbers information that is not in those numbers - no matter how much more convenient the numbers are to collect and how much easier they are to use in calculations.

Historiometric results lack the credibility of statistical analysis.

The probability of unrepeatable one-off unique events has a different meaning from the 'dice' probability of statistical analysis. In order to use statistical analysis, historiometricians collect one-off events into categories like 'wars' or 'geniuses'. The meaning of a category is the unmentioned, and perhaps non-existent attribute that all wars have in common or all geniuses have in common. Definitely this commonality will shrink as many unique occurrences are collected into a category to give sufficient numbers for statistically significant results. Because the results actually refer to the unstated, and perhaps non-existent 'whatever' that all the wars have in common, or that all geniuses have in common, these results become increasingly meaningless as they become increasingly statistically significant.

Utility of rare probability

The rare events of genius have low probabilities.

Its very rare for a person to be struck by lightning so how would you react to the highly statistically significant fact that it is ten times more likely that you could be struck by lightning in one state than another - would the ten fold risk stop you from going there? This statistical prediction can be considered out of context but cannot be used out of context. It is a practically useless prediction because it is a rare event which in application is overwhelmed by its inseparable context.

The probability of probabilities - Low probabilities are unreliable predictors.

The variation in normal events is related to their mean so, for example a large mean allows for much greater variation - much higher and lower values - than is possible with a small mean. Trees can be as big as redwoods or as small as bonsai because the average height for trees is large compared to a say the average height of people. People cannot vary so much in height as trees can. Similarly the practical predictive reliability of a probability is related to the size of the probability in the same way as is the variation about the mean. When we consider the probability of probabilities then the bigger the probability the more you can depend on it. This is because it is due to a large commonalty in its source context which is likely to also be shared in large part by the application context. But a small probability has less predictive power because it derives from a minute commonality in its source context which is unlikely to be also found in its application context.

Some rare events are valuable precisely because they can be used out of context. For example an ounce of gold won from 5 tones of worthless mud is valuable because you can take it to use in many contexts very different from that in which

it was found. The gold would lose most of its value it you had to take the 5 tones of mud with you as well. Unfortunately we cannot use predictions of genius in contexts very different from those in which geniuses are found.

Historiometric results can hardly be used for prediction.

Historiometric results on genius, may not only have a meaningless statistical significance, but they have also been stripped of the practical predictability of statistical probability because they are rare events that in the practice of prediction are overwhelmed by the context from which they were taken and in which they might be applied. There are overwhelmingly many people with the same historical predispositions who do not become geniuses. So Mrs. Smith would be ill advised to move to a politically fragmented society, in a state of civil disturbance and convert to Judaism, in order to turn her little Johnny into a genius.

Criticising significance of results - the more you try the more you get

Mechanical methodology results in specious historiometric results.

In 1978 the Goertzels wrote a book on "Three hundred eminent personalities". They classified 314 modern eminent people such as T.S. Elliot and Indira Gandhi into 20 categories according to their area of eminence such as being scientists, artists, fiction or non-fiction authors, politicians etc. They also recorded more than 50 biographical variables on their subjects such as sex and aspects of their home environment. This data was then given to Simonton for further analysis: "It was then an easy matter to employ discriminate analysis to pick out which biographical facts go with which endeavors." (Simonton, 1987 p. 84). Some of the conclusions were: "Nonfiction authors are more likely to come from urban centers, military figures from rural regions: women are more prone to become nonfiction authors and performers, men to become politicians and athletes; scientists, philosophers, and reformers tended to come from happy home environments, whereas authors grew up in less auspicious family circumstances; scientists were more fortunate in having supportive fathers; psychiatrists, in contrast, having endured parental rejection ... " and so on and on (Simonton, 1987, p. 84-85). These conclusions are interpretations of those discriminate analysis results that reach statistical significance - and they are very interesting, but how valid are they? In addition, Stevens (1986) reminds us that discriminant analysis is a mathematical maximization procedure "The important thing to keep in mind is that anytime this type of procedure is employed there is a tremendous opportunity for capitalization on chance, especially if the number of subjects is not large relative to the number of variables." (p. 233) "About 20 subjects per variable are needed for reliable results, i.e., to have confidence that the variables selected for interpreting the discriminant function would again show up in *an independent sample from the same population.*" (p. 259). My italics are to remind us that the validity of these results also depends on how many there might be of these independent samples of 314 modern eminent people.

Specious results reported as statistically significant.

The above pair-wise analysis takes one of the 50 variables, say sex, and compares any two categories, say non-fiction writers and politicians to find, in this 'sample', that sex discriminates significantly between politicians and non-fiction writers - more men are politicians but more women are nonfiction writers. The simplest analysis of 20 categories on 50 variables can give 49,000 results to start with. Many of these can be expected to be statistically significant just by chance. This chance significance, which is due to the large number of analyses computed, is not reflected in the reported statistical significance of an individual result, which is dependent on the sample size and variation. Simonton (1990b, p. 87) reports that he creates more variables and categories by subdivision of data from which initially "many preliminary inquiries isolated no association whatsoever .. these studies suffered from unforeseen methodological problems, the most crucial being a generic conception of war and a reliance on time-series units of excessively long duration" By subdividing the data - e.g. into smaller time slices and sub-categories - the many more variables created can give thousands more results from

which to select the increased number of speciously significant results. It is even possible to use numerical techniques to choose the subdivisions that optimise the number and sizes of significant results. Problems then arise in finding other justifications for the categories that have been chosen. Such post hoc justifications can seem like idiosyncratic value judgements. As Stein says "On occasion, Simonton himself is aware that he is making value judgements. .. one person's 'holy war' is another's 'satanic crusade'. .. in scientific articles, value judgements must be avoided." (Stein, 1990, p. 136).

Rare one-off historical data excludes validation with alternative data

Another example for those who are familiar with correlation: The computer simply works out the significance of the correlation between two variables on a given number of subjects. This significance is unaltered no matter how many other variables we choose to correlate at the same time. If we throw 100 variables into the computer we will get 999,000 results many of which are significant only by chance. The more variables we throw in the more significant results we can expect to get out. However, when reporting the individual results and their individual significance, no mention is made of all those non-significant results to which our chosen result owes its significance. When we are analyzing common events any particular significance could be retested by a rerun of data collection and analysis - we could re-roll the dice. But when we are analyzing historical one-off events there is only one set of data. Retesting by a rerun of data collection is not possible - a rerun of history is not one of our options for checking the statistical significance of a particular historiometric result.

Miscellaneous illusions of significance - tricks of the trade

Historiometrics often finds functions to fit to its data - sometimes including a post hoc pseudo explanation of the types criticised above. The closer the fit the more this result is thought, erroneously, to contribute to the understanding of creativity. However, there is a post hoc choice from an infinite number of functions to closely describe historiometric data. One may even fit an esoteric function from another field. For example Simonton tells us "In order to derive the formula that so tightly predicts the age curves, I had to introduce differential equations that formally parallel those often used to describe the velocity of chemical reactions!" (Simonton, 1990a, p. 109). The low construct validity can be judged from the 'explanation' given for the fit; that 'mental chemistry' is a metaphor for creativity.

One objective of historiometry is to get 'sample' sizes as large as possible, so increasing the number and statistical significance of the results. Even though these vast data sets are practically exhaustive they are treated as statistical samples. To consider these data as samples implies that there were other leaders, geniuses and creators of equal stature who have no column inches in the Who's Whos. This in itself is contradictory because the number of column inches is taken as the measure of stature - so zero column inches should indicate zero stature. Hence, by the definition of its measure, the data is a population rather than a sample. However, 'sample' sizes are now in the order of 15,000. The point is that "virtually any study can be made to show significant results if one uses enough subjects regardless of how nonsensical the content may be" (Hays, 1974, p. 326). Because of this, and many other reasons, statistical significance testing has received considerable criticism as a way of developing knowledge in the social sciences (Carver, 1978). For example Stevens (1971) says "in the long run scientists tend to believe only those results they can reproduce ... statistical tests of significance, as they are so often miscalled, have never convinced a scientist of anything" (p. 440). In some areas of social science e.g. research in mathematics education, researchers have suggested that statistical significance testing - which is the substance of historiometrics - should be discontinued altogether (Menon, 1993).

I wonder what 'causes favorable' to creativity could be deduced by analyzing the names of creators. Do creators with an odd number of letters in their names tend towards the arts like Picasso and those with an even number tend to the sciences like Ampère. Do the occurrences of wars or warm climates favor creators with long or short names, with more or less vowels, initials in the first half or last half of the alphabet, etc. What type of curvilinear relationship is there between the degree of eminence and the number of consonants in the creator's name for different fields of creativity. Given available large 'samples' of 'creators' - in the order of 5000 (Kroeber, 1944), 10,000 (Simonton 1988), 15000 (Simonton, 1980)

- given the huge variety of statistical techniques, the infinite choice of variables, and the infinite ways of combining and subdividing these variables, and the choice of first names and last names and any combinations, there must be many statistically significant patterns for us to interpret. For example many musical geniuses have names starting with 'B', Brahms, Bach, Beethoven, - even double 'B's, Bela Bartok, Benjamin Britten. If statistically significant, this result could be interpreted by historiometricians as "a name beginning with 'B' tends to encourage a boy to become a musical genius." We can look forward to many such results. Using a mixed metaphor saying that his "well" is not likely to "run dry" Simonton refers to "the information still left to be mined" "the wealth of archival data available for addressing a virtually infinite range of empirical questions." (Simonton, 1990a, p. 108). We shall have to wait for historiometricians to analyze the data and interpret the results for us.

Summary

Distinguishing between historiometrics and sociometrics of creativity

- The numbers of creators alive at any point in history varies in time and place. The extremes are known as Golden ages and Dark ages. Future historians may look back on our technological age as another Golden age like the Renaissance.
- Historiometricians believe that the number of eminent people alive at any time is influenced, even caused by the historical events that were happening about the same time - events like wars and civil unrest. These general situational factors beyond the control of an individual are known by the German literary term 'Zeitgeist' - the general spirit of the historical period.
- Historiometricians judge a person's eminence by the amount of space allotted to them in encyclopedias. Making lists of thousands of eminent people is very time consuming so historiometricians tend to reuse the lists that were compiled by the early researchers.
- Sociometrics on the other hand uses personal data from biographic sources or, more recently, biodata from surveys and personal interviews.
- Sociometrics looks for similar biodata patterns to which categories of creators conform - like scientists tending to be first born children. It is causally thought that if these patterns can be reproduced they might be used to guide educational planning for parents and governments to produce creators.

Sociometric findings

- There are many statistical findings from sociometrics but they may have little practicality for encouraging the creativity of any one particular child or adult.
- Of all the creative products, most are produced by a few top creators. This is the 20:80 rule - about 20% of the creators produce about 80% of the products.
- One of the most pervasive findings from Nobel prize winners and the creatively gifted is that Jews are heavily represented among eminent creators, out of all proportion to their numbers in the general population.
- A plausible over-arching social influence on creativity might be an a-cultural lack of complacency for wealth and entrenched social stability - a refugee mentality that recognises the transient security of established facts, both physical and mental - the thousand years of the Third Reich or the way God treats his chosen people.
- Creative products are an externalisation of the creator's insecure identity - the needed current proof of existence.

Historiometric data and assumptions

Contaminated data

- The data used by historiometrics are: (i) the numbers and eminence of creators that lived throughout history at different times and places, and (ii) the numbers wars and other such events of the time.
- A creator's 'eminence' is measured by how much is space is allotted to him or her in encyclopedias.
- This data is contaminated by many factors having little to do with their creativity e.g. their notoriety (Hitler), family background (monarchs), the importance of the area of their eminence (soldiers, politicians, popes) etc.
- The difficulty of decontaminating the data forces historiometricians to argue for 'leadership' to be included in the traditional criteria for creative eminence.

Questionable implicit assumptions

- At the foundation of the historiometric approach there are two questionable assumptions about creativity:
  i) the assumption that creative geniuses have the same kind of creativity as everyone else, but more of it and
  ii) the Zeitgeist increases or decreases the creativity of everyone, moving everyone either up or down the creativity ruler so that, in a particular time and place, more or fewer people are pushed over the line marking the genius level.

Assumption that association equals cause

- Historiometric conclusions misleadingly report numerical association as cause.
- This is probably exacerbated by the combination of (i) only having statistics, (ii) the statistics only being able to identify numerical associations of historic events with genius, and (iii) the assumption that historical events cause genius.

Criticism of sloppy methodology: believe what you get and get what you believe

Changing the meaning

- Conclusions are misleadingly reported using names of variables or factors that the researcher intended to measure rather than what was actually measured - the operational definition.
- The actual variables that were measured are different from the misleading names reported in historiometric conclusions e.g. 'creativity' is reported but space allotted in encyclopedias is measured.
- In the case of factor names, these are pure fabrications coloured by the researcher's beliefs.

'I told you so' technique

- The scientific method of theory/prediction/affirmation is reversed. Previous findings that affirm the researcher's beliefs are used to suggest a theory that 'predicts' these previous findings. These previous findings are then cited as proof of the theory.

Invalid causal explanations and tenuously linked evidence

- Explanations of results use an invalid chain of argument concatenating miscellaneous non-historiometric findings. This takes the form A is linked to B, B is linked to C therefore A is the cause of C, so confusing 'tenuous association' with 'cause'.

- The links on which explanations depend are (i) debatable findings and (ii) from very diverse contexts e.g. 'creativity' of modern school children indicated by divergent thinking tests is linked with 'creativity' of historically eminent people indicated by space allotted to them in encyclopedias.
- The links between these findings are tenuous because the findings refer to diverse contexts which have little in common. The validity of explanations that depend on successively linking these findings is reduced because they ignore the tenuousness of these successive links.
- The column inch is a measure so peripheral to creativity and informationally sparse that historiometrics is unable to extract valid results that are meaningful to creativity research.

Significantly meaningless results

- Historiometrics inputs into its statistical analysis one-off unrepeatable historic events and the occurrence of unique genius.
- Statistical analysis compares categories of similar occurrences - the more there are in each category then the more statistically significant will be the result associating the common factor in one category with the common factor of the other category.
- The problem is that the more unique events that are combined into a particular category then the less they will all have in common. Hence, the increase in numbers which gives greater statistical significance at the same time reduces what the results are about - viz. the common factor.
- In addition the common factor shared by these unique events is an implicit abstraction that may not even exist, and if it did exist it definitely vanishes as the numbers increase. This means that the more statistically significant the historiometric result then the less meaning it has.

Confusion of probabilities

- The probability of a die turning up 3 can be tested by repeated trials to be one-sixth. This fact can also be used for predicting how often a 3 will turn up. This 'dice probability' is the type of probability assumed in the statistical analyses of historiometric data.
- Historiometric data does not have these properties - the 'probability' of one-off historical events cannot be tested by repeated trials and is meaningless for predicting how often the unique historical event will repeat itself.
- Historiometric results wrongly assume a) the credibility of retesting and b) predictive power accorded to the statistical analyses used.
- Alternatively the dice probability of one-sixth can be theoretically determined by restricting the number of all possible outcomes to six - and notionally restricting each outcome to the have the same unbiased chance of occurring. This alternative way of determining dice probability is, again, unsuitable for historiometrics because we do not know a) the number of different ways history might have turned out and b) that each was equally probable and c) even if it is meaningful to ask such questions as we do with dice.

Historiometric results - practically useless for prediction

- Historiometric results are also assumed to be useful for prediction because the dice probability on which they are based offers practical 'predictability'. However, this 'predictability' depends on being able to abstract the result from its context for application in another, perhaps similar context.
- Rare events like genius are rare only in relevance to large contexts like whole cultures. The larger the context then the more extreme is the abstraction and the less practical is its predictability in some other context.
- Historiometric results have little or no use for predicting the rare events of great creativity.

Chance significance

- Historiometric results can be statistically significant by chance just because there are so many variables, combinations and statistical techniques to try.
- The more variables, combinations and statistical techniques that are thrown into a computer then the more speciously significance results will be printed in the output.
- This chance significance due to the variety of methodology and variables available is not reflected in the calculation of the reported significance of an individual result which stands irrespective of how many unmentioned combinations were tried.
- Because rare one-off historical data are used, such a chance significance cannot even be tested by a rerun with new data.

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