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NEWSLETTER

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The 2014 Constantine Panunzio Distinguished Emeriti Awards

CUCEA extends sincere congratulations to the 2014 Constantine Panunzio Distinguished Emeriti Awardees, **Professor Emeritus Norman H. Anderson (UCSD)** and **Professor Emeritus Rein Taagepera (UCI)**. The newsletter is proud to feature articles by Professor Anderson and Professor Taagepera that offer a glimpse of their work for which they are renowned.

UNIFIED PSYCHOLOGY BASED ON THREE MATHEMATICAL LAWS

By **Norman Henry Anderson**, University of California, San Diego

Psychology is unique among the sciences for its focal concern with dual worlds: the *internal world* of feeling and thought, and the *external world* of observable stimuli and response. The first major movement in psychology, the introspectionist movement of the late 1800's, took the attractive direct attack of studying consciousness. Introspective methods led to disarray, however, to be largely replaced by intolerant behaviorism, caricatured in Aldous Huxley's *Brave New World*, which allowed only observables. This approach led to useful results as with Pavlov's conditioned reflexes, rat bar presses in Skinner boxes, and rote learning begun by Ebbinghaus.

Some liberation from behaviorism has developed since 1950, for example, as with social attitudes and computer models of cognition.

The net result, however, has been a steady fragmentation of psychology into largely non-communicating areas, all of interest, but with little progress on unifying the internal and external worlds.

Internal-external unification has been provided with Information Integration Theory (IIT), outlined in the following Integration Diagram. Virtually all feeling and thought involve integration of two or more sources of information. By inestimable beneficence of Nature, such integration follows one of three simple, algebraic laws in most areas of human psychology. These laws unify the internal and external worlds. These three laws are *nomothetic* in their generality across age and across culture, and *idiographic* in their allowance for each individual's personal values. These laws have done well in virtually every area of psychology, from affect and motivation to learning and perception. They are a foundation for unifying psychological science.

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ALGEBRAIC LAWS OF THOUGHT AND ACTION

Mathematical psychology is a solid reality. Three simple algebraic laws—adding, averaging, multiplying—have been demonstrated in experimental studies in most areas of human psychology, from psychophysics and learning to social attitudes and moral judgment. These three laws allow for personal values of each individual person. Yet they hold generally with young children and adults. And they have been demonstrated in numerous nations around the globe.

Dreams of mathematical laws have haunted the imagination of many psychologists. Some have presented hopeful equations as early as Aristotle’s equation for fair division between two persons, A and B, working on some mutual project:

$$\text{share for A} \div \text{A's contribution} = \text{share for B} \div \text{B's contribution}$$

A simpler conjecture applies to judgment of blame, ubiquitous in society, from family to politics:

$$\text{Blame} = \text{Harm} + \text{Responsibility}$$

Psychological measurement is the critical obstacle to such conjectures: all three terms in this blame equation are personal values in the blamer’s head. Thus, responsibility may be imputed by the blamer to the blamee for carelessness or lack of forethought even though no actual harm resulted.

Psychological measurement is thus necessary to test this blame hypothesis. We must get inside the blamer’s head to measure his/her personal values of all three terms. The same applies to diverse other hopeful equations of thought and action that have been proposed.

FUNCTIONAL MEASUREMENT THEORY

True measurement of psychological quantities has been vainly sought by many investigators for well over a century but with little success. Indeed, a special committee of the Royal Society concluded in 1940 that true measurement was impossible in psychology because there was no way to implement the condition of equal additive units (as with centimeters on a meter stick or weight on a balance scale) which was considered essential. In this view, which reflected accepted views in physical science, measurement was considered preliminary to finding physical laws.

Success in psychology was obtained by fundamental conceptual shift: true measurement was seen as derivative from psychological laws, not as prior to. Experimental examples are shown in the figures below. First, however, the logic of this approach will be given.

INFORMATION INTEGRATION DIAGRAM

Figure 1 presents the essential problem. Stimulus informers, S_A and S_B , impinge on the person and are transmuted into psychological values, ψ_A and ψ_B , by the valuation operator, both in relation to the operative GOAL. These values are integrated by the integration operator, I , to produce an internal response, ρ . Then ρ is externalized by the action operator, A , to become the observable response, R .

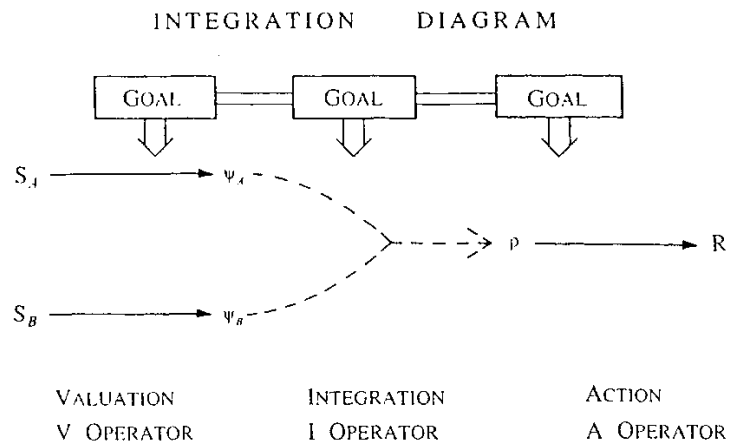


Figure 1. Information integration diagram. Chain of three operators, $V - I - A$, leads from observable stimulus field, $\{S\}$, to observable response, R . *Valuation operator, V*, transmutes stimuli, S , into subjective representations, ψ . *Integration operator, I*, transforms subjective field, $\{\psi\}$, into internal response, ρ . *Action operator, A*, transforms internal response, ρ , into observable response, R .

Success of this approach depended on two things. *First*, development of the method of functional rating response, which eliminates well-known biases of ordinary rating methods and validates Premise 2. *Second*, the miraculous beneficence of Nature which instilled the mind with simple algebraic laws of stimulus integration.

PARALLELISM THEOREM

Analysis of adding-type models, such as the foregoing blame equations, is given by the parallelism theorem. The two stimulus informers are presented in an ordinary row \times column factorial design. The subject responds to each cell in this design as illustrated in **Figure 2**.

The parallelism theorem requires two premises.

Premise 1: The internal integration is additive: $\rho = \psi_A + \psi_B$.

Premise 2: The action function is linear: $R = \rho$.

These two premises imply that the row \times column graph of R will show parallel curves (see following figures). Observed parallelism thus provides a cornucopia of benefits.

Benefit 1. Support for an adding-type model.

Benefit 2. Support that R is a linear response measure of internal response.

Benefit 3. Support for treating the mean response in row j (column k) as a true measure of ψ_{Aj} (ψ_{Bk}). This is called *functional measurement*, because it measures the values that functioned in the reaction (Benefits 2 and 3).

Benefit 2 solves the long-standing obstacle of true measurement of response. Benefit 3 solves the obstacle of true measurement of stimulus.

EMPIRICAL APPLICATIONS

The integration laws of Information Integration Theory have done well in almost every field of human psychology from psychophysics and learning to attitude theory, person science, and moral judgment. A few examples of adding-type laws are noted here.

Blame. Blaming follows an adding-type law even in young children as shown by the parallelism in Figure 2. Subjects judged amount of blame for a child who threw a rock with specified intent (malice, displacement, accident) that caused four degrees of harm to another child (horizontal axis). The parallelism supports the additive law.

$$\text{Blame} = \text{Harm} + \text{Responsibility.}$$

This blame law has been confirmed and extended by several investigators.

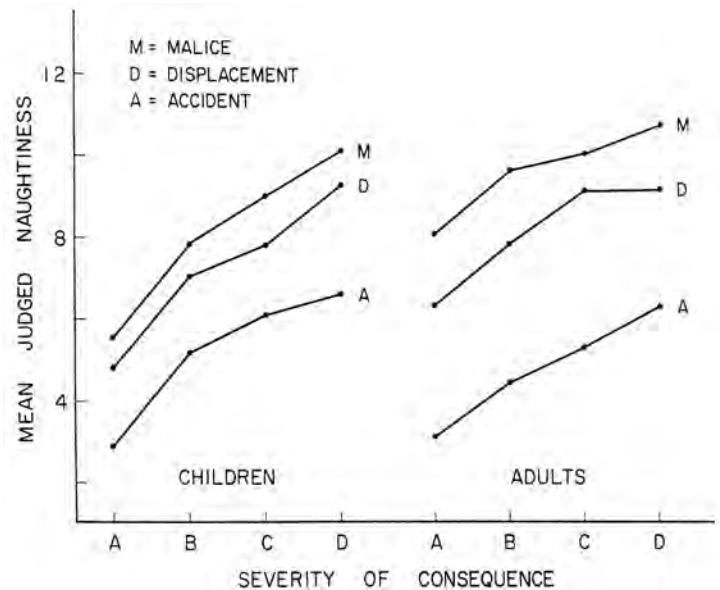


Figure 2. Parallellism supports the averaging law: Blame = Intent + Consequences. Graph plots rated naughtiness of a story child who threw a rock with one of three intents (curve parameter) producing one of four levels of harm (horizontal axis). Left panel shows third-, fifth-, and seventh-graders; right panel shows college students. No age trends except perhaps the apparent increase in main effect of Intent. This experiment used Piagetian stories standardized by Crowley (1956).

Piaget’s stage theory of child development, as well as that of Kohlberg, has thus been shown to be seriously invalid. Stage theories claim that development falls into more-or-less discrete stages, claims that can be extremely seductive. But Piaget and Kohlberg both relied on verbal rationalization of choices in moral dilemmas, a fatal mistake that was revealed as soon as the methods of Information Integration Theory were applied. These integration studies have shown, for example, that children even younger than 4 years of age have metric capabilities that Piaget claimed only developed in his stage of formal operations at 10-12 years of age.

Functional Memory versus Reproductive Memory. An essentially new conception of memory emerged from the integration laws. Traditional memory research took for granted that memory was *remembering*—accurate reproduction or recognition of given material to be memorized. This traditional view was universally accepted. In social attitude theory, for example, it was long an “article of faith” that the

attitude produced by a message was determined by what of the message remained in memory.

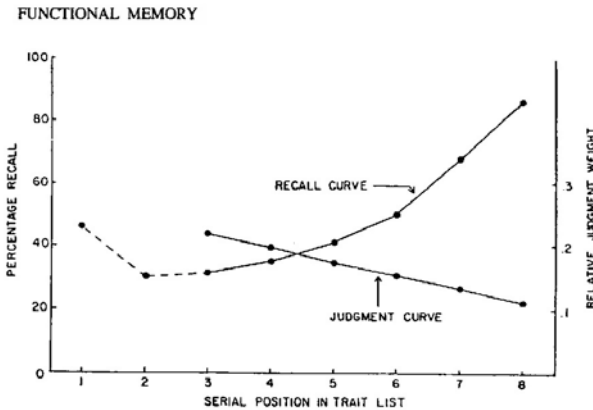


Figure 3. Functional memory differs conceptually and empirically from traditional verbal memory. *Recall curve* for adjectives in person description shows strong recency over last six serial positions, a standard result. *Judgment curve* for effect of these same adjectives in person cognition shows uniform primacy, with lesser effects at later serial positions. Contrast between recall recency and judgment primacy implies basic differences between person memory and verbal memory.

Instead, a *dissociation* between attitude and memory was found in a 1963 experience on IIT (see **Figure 3**). The recall data showed the standard *recency effect*: the later items in the message were better remembered. In sharpest contrast, the earlier items had the greater effect on the attitude produced by the message items—a *primacy effect*. This dissociation has been widely supported.

Person Cognition. Interpersonal interaction is ubiquitous in everyday life: family, work, politics, TV news, movies, and novels. Person cognition has been studied in numerous studies of information integration. In simplest form, a hypothetical person is described by a set of trait objectives; the subject judges, for example, likableness of the person. **Figure 4** summarizes judgments of social desirability of hypothetical persons described by two of their traits, listed in the figure. The parallelism reveals an adding-type integration.

Consciousness gives a very different picture. People strongly feel that trait adjectives interact to change one another’s meaning. Thus, *preoccupied* might seem to have a different meaning in an *earnest* person than in an *unproductive* person. Not a few researchers have vehemently agreed.

But the parallelism implies that each adjective had a constant value, regardless of which other adjective it was paired with. This *meaning invariance* was verified in other experiments in which subjects wrote a paragraph describing the person in their own words before rating the person. This would destroy the parallelism if the adjectives interacted to change one another’s meanings. But parallelism was still obtained, as shown also by other investigators. This result also shows how integration theory can go below consciousness in analysis of cognition.

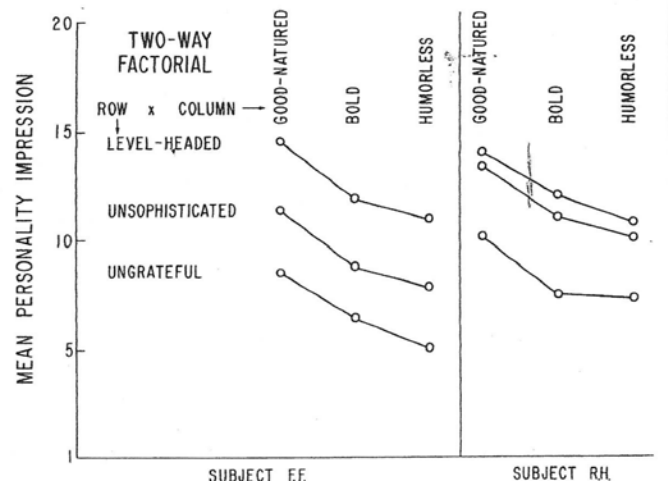


Figure 4. Parallelism pattern supports adding-type rule in person perception. Subjects judge likableness of hypothetical persons described by two trait adjectives from indicated Row x Column design, with row adjectives of level-headed, unsophisticated, and ungrateful and column adjectives of good-natured, bold, and humorless. Each of these 3 x 3 = 9 person descriptions corresponds to one data point. Data averaged over third adjective for simplicity.

Marital Interaction and Cognition Utilization. Complex stimuli can be treated as cognitive units, exactly measurable, by the integration laws. The valuation operation may be quite complicated but its end result is a single number that can be exactly measured with an integration law.

One illustration of cognitive unitization comes from a study of wife–husband discussion. In the first phase, both spouses received a common scenario in which a child had performed a harmful action with certain intent. Each spouse made a private judgment about badness of this action. Next, husband and wife received separate, private information, slightly negative for one spouse, moderately extenuating for

the other. They then discussed their own opinion and their added information with each other. Finally, they made private, revised judgments of badness.

Results are shown in **Figure 5**. The left side shows the initial blame judgments, separately for wives and husbands. The parallelism of the three curves supports an adding-type law.

$$\text{Blame} = \text{Damage} + \text{Intent}$$

The right side shows the private revised judgments, somewhat lower because the main information added in the wife-husband discussion was extenuating. Both spouses again show parallel curves, further support for the blame law.

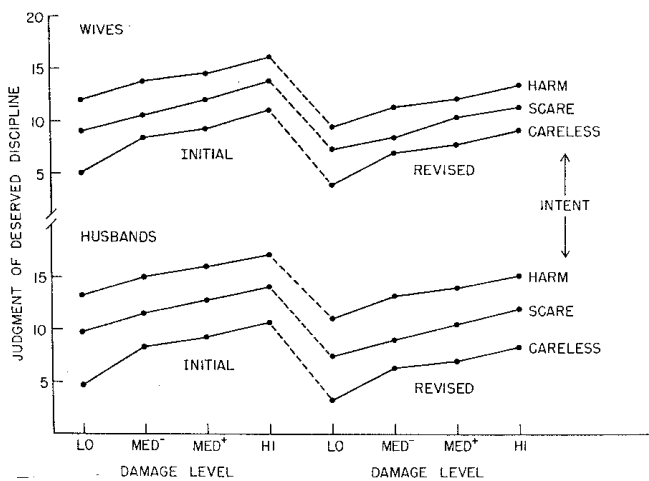


Figure 5. Independent judgments of blame by husbands and wives. Initial judgments based on information about intent (curve parameter) and damage (horizontal axis). Revised judgments based on additional information presented by spouse. Lo, Med⁻, Med⁺, and Hi represent graded levels of damage

The wife-husband interaction thus acted as a *cognitive unit* for each separate spouse even though it was very complicated, beyond detailed analysis. Hence, it could be numerically measured separately for each spouse.

Cognitive unitization has also been demonstrated in other experiments, for example, with judged statesmanship of U.S. presidents described by biographical paragraphs and with witness testimony in a jury trial. Cognitive unitization is invaluable because it allows exact analysis of complicated mental processing.

Measuring the Nonconscious. Much cognitive processing is nonconscious or semiconscious. It can

be exactly measured, however, by using integration experiments. A simple example from psychophysics is the size-weight illusion of **Figure 6**. The top curve in each panel shows the judged heaviness of a lifted 250-gram cubical block of five different sizes. The upward slope of the curve shows that the same 250-gram weight feels substantially heavier in a smaller size. (Use an ounce of white feathers and an ounce of lead for a sure-fire class demonstration.) The parallelism of the three curves supports an adding-type model.

$$\text{Heaviness} = \text{Size} + \text{Weight}$$

But people are hardly aware that their conscious experience is influenced by the irrelevant size, much less that it can be exactly measured.

The integration laws thus provide a foundation for science of nonconscious cognition

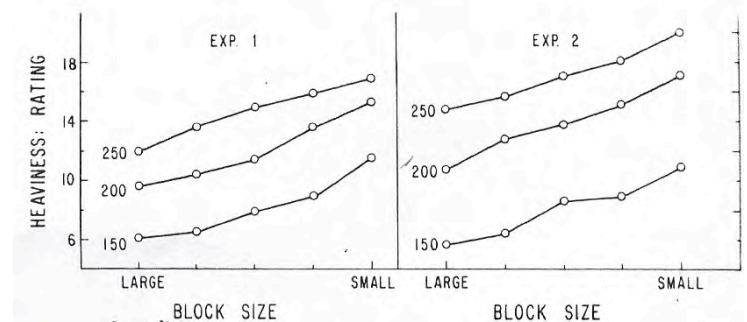


Figure 6. Parallelism supports adding-type rule for size-weight illusion. Subjects lift and judge heaviness of cubical blocks in 3 × 5, Gram Weight × Block Size design. Verbal rating in left panel, graphic rating in right panel. The slope of the curves provides a true linear measure of the nonconscious heaviness effect of visual size.

MULTIPLYING LAWS: LINEAR FAN THEOREM

Multiplying laws follow a linear fan theorem, similar to the parallelism theorem. This application of functional measurement successfully solved the long-standing conjecture.

$$\text{Subjective expected value} = \text{Subjective probability} \times \text{Subjective value.}$$

Multiplying laws have also been found in many areas: poker betting, snake phobias, and psycholinguistics. Multiplicative integration appears to be a natural mode of stimulus integration.

AVERAGE LAW

The averaging law represents the integrated response as a weighted average of stimulus ψ - values where

weight represents importance, distinct from polarity *value*. With *equal weighting* of stimuli within each separate variable, the averaging law obeys the parallelism theorem.

But with unequal weights, the integration is nonlinear and this integration graph will be nonparallel. This was a blessing in disguise. One advantage is that it allows true measurement of *importance*, separate from polarity *value* (a popular pitfall). The negativity effect—greater importance of more negative information, was discovered in this way.

UNIFIED SCIENCE OF PSYCHOLOGY

Many experiments by many investigators have verified the three integration laws in Europe, Latin America, the near East, Africa, and Taiwan China. Certain obstacles arose but all were neatly overcome (see *Twelve theoretical issues*, Chapter 3 in 2008 book). One obstacle arose with judgments of persons described by personality traits as in **Figure 4**. Subjects in this task strongly claim that the trait adjectives interact to change one another's meanings. Such interaction would of course violate the additive law and destroy the parallelism. But this claim of interaction was found to be untrue; people's verbal reports cannot be trusted. The algebraic laws go below the verbal reports to measure each person's actual values and reveal the actual cognitive processes. These laws open a new horizon for psychological science.

The three laws have been established in most areas of human psychology: person cognition, social attitudes, moral judgment, emotion, legal psychology, judgment–decision, psycholinguistics, learning/memory, psychophysics, child development, and others. These same laws hold for different persons with due allowance for different personal values—fundamental capability for psychological science.

This brief overview of Information Integration Theory gives essential ideas. The unexpected wide success of the integration laws provides a foundation for unification of psychology as science. Further material is given in the following books:

Foundations of information integration (1981)

Methods of information integration theory (1982)

A functional theory of cognition (1996)

Unified social cognition (2008)

*Moral science (in press:
functionalmeasurement.vub.ac.be)*

I wish to express my deepest appreciation to my fellow workers in many nations who have done so much dedicated work on problems of information integration.



Professor Anderson initiated his career at UCLA in 1958 but in 1965 became a founding member of UCSD's faculty and department of psychology when the campus opened as a general campus of the University. He is an experimental psychologist whose contributions over a long and distinguished career are best known in the areas of social psychology, cognition, and development of information integration theory. He has published four books since his retirement in 1992 and has continued post-retirement work for his department and discipline, especially his mentorship and support of graduate students.

Making Social Sciences More Scientific

By Rein Taagepera

University of California, Irvine and University of Tartu

The Council of the University of California Emeriti Associations graciously awarded me the 2014 Constantine Panunzio Distinguished Emeriti Award. What have I done in my life, and during my so-called retirement in particular, to be considered for such an honor? My life course has been unpredictable. It started with herding cows in Estonia, completing Estonian-language elementary school at a refugee camp in post-WWII Germany and then French-language *lycée* in Marrakech. I tried various jobs in Toronto and ended up with a degree in nuclear engineering. Marriage to Mare took me to Delaware and a PhD in physics. Mare got hers in chemistry, and we had three children.

While working as an industrial physicist I took evening courses in political science, trying to understand what hit my country and my family during WWII. This step took our family to California. Namely, I noted how little political science used quantitative approaches beyond statistical data fitting. I discovered some interesting relationships and let 120 universities know I could turn "politology" (as they call it in Europe) into a real science. Only UC Irvine showed interest. In 1970, they hired this physicist to teach social science. In 2008 I received the Johan Skytte Prize, the highest in political science.

The Soviet debacle enabled me to revisit my homeland, where I got involved in actual politics. Upon Estonia's return to independence, I was asked to run for president. I finished 6 percentage points behind the eventual winner. Meanwhile, I also started a western-style School of Social Sciences at the University of Tartu (which is 4 years older than Harvard). My initial monthly salary was 50 dollars. So, at 61, I grasped at a UCI offer of early retirement when my sabbatical leaves ran out. As an emeritus for 20 years, I have published three scholarly books and 50 research articles, plus memoirs. My life has been saddened by the death of Mare, who left her own mark on science teaching at UCI. But I keep teaching at both universities.

The Skytte Prize cited my "profound analysis of the function of electoral systems in representative democracy". What does this mean? As examples, I



Professor Taagepera is an internationally renowned expert in political parties and systems. He is the recipient of the Johan Skytte Prize, often considered Political Science's equivalent to the Nobel Prize. His career has had three paths, first as a physicist, second since 1970 at UC Irvine as an innovator in political science, and third as founder and sponsor of modern political science at Tartu University in post-Soviet Estonia. These paths have comingled to great advantage as his article reveals.

highlight three relationships that qualify as laws in the strongest scientific sense. They do so because they offer a logically based model plus agreement with data. This gives them broad predictive ability.

Three laws of social nature

The first one is the *cube root law of assembly sizes*. The number of seats (S) in a representative assembly tends to be chosen so as to be close to the cube root of population (P):

$$S = P^{1/3}.$$

Why is this so? This size minimizes the number of communication channels a representative faces, and hence it maximizes efficiency. By trial-and-error, countries stumble towards more efficiency. When a young democracy has to decide on the size of their national assembly, they could save time by considering the cube root of the population. If, instead, they choose to haggle it out on other grounds, they most likely end up close to the cube root anyway. The US started out with a much smaller House but then roughly caught up with the cube root after each census. Around 1910, however, the House size was frozen at 435, even though population continued to expand. By now, 680 representatives would be needed so as to fit the logical model, the world average practice – and the US own past practice.

The second law is the *inverse square law of cabinet duration*. Suppose the number of parties (N) doubles. Then the average duration of governmental cabinets (C) becomes 4 times shorter, according to the following law:

$$C = 42 \text{ years} / N^2.$$

Why is this so? Potential conflict channels among parties put stress on the cabinet. And the number of

such channels increases roughly as the square of the number of parties. Where does “42 years” come from? With this constant, the law fits worldwide data. The N stands for the widely used Laakso-Taagepera *effective* number of parties, which undercounts small parties. For instance, when the seat shares of parties are 40-30-20-10, then $N=3.33$. This is obtained by taking the inverse of the sum of squared fractional shares.

Individual cabinets can fall quickly or last very long. What the law predicts is their mean duration over several decades. Actual cases show wide scatter around this average, because other factors enter. If we wanted to have longer lasting cabinets, what could we do? One cannot dictate the number of parties in a country. Well, one cannot do so directly, but one can alter the electoral rules. It can be shown that, on the average, the effective number of parties depends on the number of seats in the assembly (S) and in the average electoral district (M):

$$N=(MS)^{1/6}.$$

Then we can express the average cabinet duration as

$$C=42 \text{ years}/(MS)^{1/3}.$$

The inverse *square* law in terms of parties thus becomes an *inverse cube root* law in terms of the number of seats in the assembly and in the average electoral district. We cannot easily alter S – it’s tied to the cube root of population. But M could be adjusted, so as to change the number of parties and thereby cabinet duration. Actual cases scatter widely around this average, because other factors enter, besides M and S . Still, this law would help in designing electoral rules so as to alter the *average* cabinet duration by a specified amount.

The third example of my work is the *law of minority attrition*. Its format is more complex, but it also covers wider ground. When a party obtains a small share of votes, it wins an even smaller share of the seats (if plurality rule is used in one-seat districts, as is the case in the US). When women are a small percentage among the entire faculty, they are an even smaller percentage among full professors. When a volleyball team loses by just a few total points, it most often loses most of the sets. The common feature of these disparate phenomena is that the total number of desirable items goes down, from votes/faculty/points, to seats/full professorships/sets. And when this total number goes down, so does the share of the minority. This statement expresses a *direction*: The fewer the available positions, the smaller the share of a

minority. But developed science needs a quantitative answer: *By how much* is the minority whittled down?

Let f and m stand for the numbers of female and male full professors (a restricted category), while F and M stand for the numbers of female and male faculty members (a broader category). The logically deduced *law of minority attrition* is

$$f/m=(F/M)^n, \text{ where } n=\log(F+M)/\log(f+m).$$

Here $F+M$ is simply the total faculty and $f+m$ is the total number of full professors. Instead, we could also use votes and seats, or points and sets. The law fits well for volleyball, because few extraneous factors enter. The scatter is wider for seats and votes, and even wider for females and males in various academic and public positions. By recognizing a natural tendency, this law could be of help in finding ways to counterbalance it, if this were desired. To build airplanes, one has to know the laws of gravity.

Almost the same format expresses the opposite process of *minority enhancement* in the European Parliament. Here the smaller states are overrepresented, relative to their population. Remarkably, the European Union allocated the seats in its Parliament almost exactly according to this formula, over 40 years, without being aware of it. In the future, expressly applying this formula could save lots of haggling about seat distribution among member states.

My book on *Predicting Party Sizes: The Logic of Simple Electoral Systems* (2007) includes the three laws described here. Note that they are interconnected, as they all involve the total number of seats (or positions, for women and men). This is the hallmark of developed sciences: We have connections among individual factors, but then these connections themselves interlock.

Why didn’t someone else discover these laws of social nature before I did? Because of my physics background, my approach to social sciences differs from that of most social scientists. Social sciences have made great progress in qualitative understanding of society, and some progress in deducing empirical regularities through statistical analysis of data. But the three laws described here could not have been deduced merely from statistical analysis. A more active kind of quantitative thinking was needed, as explained in my book on *Making Social Sciences More Scientific: the Need for Predictive Models*

(2008). What do I mean by “predictive models”? Let us have a simple example of logical model building.

A simple guessing game

Suppose a representative assembly has one hundred seats, and they are allocated nationwide, using some proportional representation rule. This means that even a party with only 1 % votes is assured a seat. The question is: How many parties would we expect to gain access to the assembly, on the average? Should we guess at 2 parties, 5, 10, 20, or 50 parties? To put it differently: How many seats would a party have, on the average? Visibly, these questions are the two faces of the same coin.

One may refuse to guess, saying there isn't enough information. One would wish to know how many parties run, and how the *votes* are distributed among them. If this were the way you think, you would be in good company. For decades, I was stuck at this point.

Now suppose I told you 200 parties would get seats. You'd protest that this couldn't be, if only one hundred seats are available. Fair enough, so what is the *upper limit* that is still logically possible? One hundred. This is not likely, but in principle, 100 parties could win one seat each. What is the *lower limit*? It is 1. This is not likely either, but in principle, one party could win all 100 seats. So we did have some information, after all – we knew the lower and upper limits, beyond which the answer could not be on logical grounds.

When such limits are known, our best guess would be the mean of the limits. In the absence of any further information, nothing else would be justified. There are many kinds of means. The good old arithmetic mean of 1 and 100 is roughly 50. This will not do. We would guess at 50 parties winning seats and also at a party having, on the average, 50 seats. This multiplies to 2500 seats, not 100. Actually, the *geometric mean* should be used when only positive values are logically possible, for reasons given in *Making Social Sciences More Scientific*. The geometric mean of 1 and 100 is 10, given that 1 times 100 equals 10 times 10. Hence, I would guess at 10 parties to win an average of 10 seats each.

This is what I call an “*ignorance-based logical model*”. It is based on nearly complete ignorance. All we know is the conceptual limits, 1 and 100. Do we have data to test this model? Yes, The Netherlands had a first chamber of 100 seats, from 1918 to 1952, and the

seats were allocated on the basis of nationwide vote shares, with few restrictions. Over these 9 elections, the number of seat-winning parties ranged widely, from 8 up to as many as 17. But the geometric mean was 10.3 parties, with an average of 9.7 seats per party. This is pretty close to 10 parties with an average of 10 seats each. We could predict with much less information than one might have thought necessary!

Why have I dwelled on this simple guessing game? Solving this puzzle opened the way to my receiving the Skytte Prize. Indeed, the breakthrough moment came 18 years earlier, when I told myself: Simply consider the mean of the extremes. Using this approach repeatedly, I could calculate the number of parties in all those countries that allocate assembly seats in a simple way. All I needed was assembly size and the number of seats allocated in the average electoral district. This is how the previous model for the number of parties, $N=(MS)^{1/6}$, came about. Combined with the number of communication channels among actors, the average cabinet duration could be deduced from the electoral system.

I have also modeled growth of empire sizes over 5000 years, and trade/GNP ratio for large and small countries. Here the models have the form of differential equations. A recent (2014) article presents a model that fits world population growth over 2000 years. It projects to a leveling off at 10.2 billion by 2100.

Some of the greatest truths in life and science are simple. Indeed, they are so simple that we may overlook them. And even when pointed out to us, we may still refuse to accept them, saying: It cannot be that simple. This does not mean that it is simple to find simple truths. All simple statements are not true. Moreover, combining simple building blocks can quickly lead to quite complex constructs.

Science walks on two legs, but social sciences try to hop on one

Science walks on two legs. One leg deals with the question: How things *are*? This leads to careful observation, measurement, and statistical analysis. The other leg deals with the question: How things *should be*, on logical grounds? This is the question asked in our guessing game. That question guides the first one. The question “How things are?” assumes that

we already know which aspects are worth paying attention to. But we largely see only what we look for. It's the question "How things *should be*?" that tells us what to look for.

I would say that science largely consists of logical models that are tested with data, using means that include statistics. Social sciences, however, all too often miss out on the question of how things should be. Rather than devising logically based models and then testing them, social sciences often fall into the trap of fitting raw data with a straight line or some other format chosen on purely statistical grounds. These so-called "empirical models" blur the very idea of model testing. Some degree of fit always results, but the predictive ability is minimal, and the resulting relationships do not interconnect. These claims need elaboration.

In science the proper task of statistics is to test logically based quantitative models. To do this, raw data most often must be transformed in the light of the model. For instance, to test the dependence of cabinet duration on the number of seats in assembly and average district, we must first replace C , S and M by their logarithms, before multivariable linear regression could be applied. Failure to do so not only would lead to a lower correlation coefficient (more apparent scatter) but, more seriously, the output would fail to express the process through which these factors interact. Understanding how things are connected would be downgraded to a push-button exercise.

The excuse sometimes made for the "empirical models" is that they actually do test logical propositions of a directional nature: When some quantity x goes up, some other quantity y goes down. This is not good enough. Every toddler in Galileo's time knew the direction in which things fall - but Galileo felt the need to predict more than direction. It does not suffice to predict that more parties will reduce the duration of cabinet coalition. One must specify *how many* parties are expected to lead to *how long* duration. Models should predict not merely the direction of processes but also their quantitative extent.

Logical models ideally not only connect individual factors but also establish connections among these connections. In contrast, empirical statistical analysis can produce only disconnected relationships,

piecemeal knowledge. For broader interlocking knowledge, one must ask: How things *should be* connected? This may lead to equations that are used over and over. In contrast, empirical regression coefficients, once published, are hardly ever used in any further work.

One doesn't hop very far on one leg. Sooner or later, social sciences will have to reinforce the second leg on which science walks. They must strive to replace the "empirical models", so easy to grind out with canned computer programs, by genuine logical models that can then be tested by statistical and other means. Quantitatively predictive logical models need not involve heavy mathematics, but they certainly need active thinking that cannot be abdicated to computers. To develop such skills, I have composed a hands-on textbook, *Logical Models and Basic Numeracy in Social Sciences*, available at http://www.psych.ut.ee/stk/Beginners_Logical_Models.pdf. This is what I use, be it with bachelors or doctoral students.

Social sciences have made great progress in qualitative understanding of society. But it is high time to complement statistical data analysis with logical models. This is what *Making Social Sciences More Scientific* and *Logical Models and Basic Numeracy* are about. They try to change the methodological emphasis in social sciences in a major way. I do not expect success in my lifetime. But I keep trying.

News Items



Charles Hess receives the UC Davis Medal

We proudly note that our CUCEA colleague and past Chair Charley Hess has received UC Davis's highest honor, the 2014 UC Davis

Medal. The award recognizes the very highest levels of distinction, personal achievement and contributions to the ideals of higher education. Congratulations Charley!

Letter From The Chair

Roger
Anderson
(UCSC)



This is the first letter that I am writing to you as Chair of

CUCEA, and I will first provide some introduction and then comment about the state of the organization. I am a relatively recent Emeritus (2011), but I have been retired long enough to no longer have stress nightmares about meeting classes and I have to look up the start and stop dates for instruction. Thus far my only involvement with the UCSC Emeriti Association is that of Web Master. A year ago, after the untimely passing of John Marcum, I got a phone call from your previous Chair, Doug Morgan, asking if I would assume the Chair elect position. I said yes really not knowing anything about the rich history of CUCEA except that it had representation on UCFW. But before you think that I am totally inexperienced, I have been chair of UCFW and the Santa Cruz Division. Furthermore I have served on UCFW for many meetings during the past 13 years. However, there is still much for me to learn about the mission and history of CUCEA and its big brother organization CUCRA (Council of University of California Retiree Associations). Fortunately expert leaders of both organizations (Louise Taylor, Lee Duffus, Doug Morgan, Adrian Harris, Marjorie Caserio, among others) have been helping me catch up. As I see it, I face two challenges: Lots of history to learn and apply; and an entirely new cast of UCOP leaders. My previous experience was with Richard Atkinson, Jud King, Larry Hershman, Judy Boyette, and others such as MRC Greenwood and Larry Pitts in different contexts. In both challenges I am certain that your other officers will help me become a successful Chair as I attempt to master more of the CUCEA lore and introduce myself and the CUCEA officers to the current leadership of UC.

As you will learn at the bi-annual meeting and in this newsletter, there is disturbing news about CUCEA finances, but good news about the Joint Benefits

Committee and UC investment performance. We will also introduce this year's open enrollment.

The problem with CUCEA finances is that we are spending too much for too little income. The excellent article in this newsletter discusses the situation, and some possible ways to increase our revenues. However even if we can obtain \$2000 per year from the Academic Council and increase the CUCEA dues to \$3 per present member, we will still need to decrease our travel reimbursements. Perhaps we can increase the size of our membership and/or obtain sponsorships for our meetings.

CUCEA members attending the Joint conference this October will note that there will be no written Joint Benefits Committee report. This is good news, because it indicates that the benefits office at UCOP is paying attention to the needs of Emeriti and Retirees. Fortunately, no new issues have been brought to our attention that warranted a meeting of the JBC, and the University is not making any major changes in our health benefits. Although it is almost certain that reports will be written in the future, the present situation is an encouraging sign.

The open enrollment brochure is almost ready for publication. Several members of CUCEA and CUCRA have reviewed the draft, and many of the corrections help make the brochure's content accessible to people with some visual impairment and people who find computers less than friendly. However we still do not know the premiums for 2015. We do expect that both Vision and Legal plans will be open for new enrollment.

The investment yield for the UCRP fund from July 1, 2013 to June 30, 2014 was very high at 17.42% after expenses. This brings the Annualized Total Return over the past 10 years to 6.91% that is getting close to the 7.5% assumed in projections of the future health of the UC retirement system. The net return for the General Endowment Pool was 18.72%. Only the University of Minnesota among public Universities had a higher return on its Endowment. Although the investment returns for the 2014-15 fiscal year are likely to be lower than those for last year, the investment staff at UC must be complemented for their excellent work.

I am looking forward to seeing many of you at the October meeting. *Roger*

In the Wake of the Master Plan

A few relevant education issues

Nonresident Enrollments. Dead though it is, the California Master Plan for Higher Education proved greatly beneficial for California, both educationally and economically. It was born in 1960 during the administration of Governor Edmund G. Brown but was dead by 2010 during the administration of his son, Governor Jerry Brown. There are many reasons why the 1960 Master Plan is no longer viable today but the obvious reason is financial. A succession of economic recessions has made it impossible for the state to continue its support for public higher education at a level necessary to maintain it as an affordable, accessible, and quality resource for California citizens. For UC to survive as a *quality* educational system, alternative sources of revenue have to be found. As we all know, the immediate solution was to raise student fees (finally acknowledged as tuition) and increase student financial aid, ostensibly to preserve the three tenets of the Master Plan, *quality, affordability and accessibility*. In effect, those who pay the higher fees subsidize those who cannot. Nevertheless, the frequency and steep increase in fees imposed unanticipated hardships on middle-income families and students part-way through their degree programs. Public and Legislative opposition pressured the Regents to impose a moratorium on further fee increases. The tuition freeze propelled the campuses to seek other ways to increase revenues. The decision was made (with Regental approval) to increase enrollment of non-resident students who would have to pay a costly supplement (\$23K above the in-state tuition of some \$12K). Several campuses pursued this option vigorously and with such success that the student composition of the 2014 freshman class is apparently one fifth non-resident (US and non-US). The campuses with the highest nonresident enrollments are Berkeley, Los Angeles, and San Diego, but it can be said that all campuses now recognize the benefit of nonresident enrollments, partly because of the needed additional revenue but also because the cultural and geographic diversity these students bring enriches the educational experience for all students.

The naysayers have responded to the nonresident initiative. Most of the noise comes from disapproving state senators (*Sacramento Bee*, August 23, 2014). One described UC as “arrogant” and “That arrogance needs to be tempered a little bit” if more funds from the state are expected. Others expressed concern that access to UC for California residents would be reduced; that admitting more nonresident students “just to get money is a

disgrace;” and, the practice could be a security risk and drive US jobs abroad.

It is fair to question the worth of a new policy but it is also fair to give the policy a chance to prove its worth. One thing is already clear – judging from the strong numbers of nonresident admissions for 2014, a UC education is highly valued well beyond the state borders. It must be so for California residents as well, so it should be a priority for the state to keep it that way. Apparently, President Napolitano is preparing to examine enrollment levels of nonresident students. She has said that if the state wants more California students admitted, then money to pay for that has to be found. In fact, the Regents will no doubt discuss a possible tuition increase at their November meeting.

Community College Baccalaureate Degrees.

The Little Hoover Commission produced a report (October 14, 2013) that called for a new California Master Plan for higher education (<http://www.lhc.ca.gov/studies/218/Report%20218.pdf>).

Whether further action on this recommendation has occurred is not clear, but the report was a thoughtful study of the need to construct a new plan. A recent education bill, SB850, is relevant to this argument. The bill in question was approved by the California Assembly and Senate in August 2014 and presented to Governor Brown for action on August 28, 2014. The bill authorizes a select number (up to 15) Community College districts to offer a four-year baccalaureate degree program. On the face of it, this bill over-rides the intent of the 1960 California Master Plan for Higher Education which reserves responsibility for 4-yr undergraduate degrees to the California State Universities and the University of California system, and restricts the Community College system to the 2-yr Associate Degree. Why should this be changed?

The *explicit* argument supporting SB850 is that the CSU and UC systems combined do not produce enough baccalaureate graduates to meet the demand. The need for a skilled, educated workforce has escalated in recent years and cannot be met by CSU and UC resources alone. Furthermore, some of the emerging medical and technical skills needed in today’s workforce are not offered through CSU and UC programs. *Implicit* in the argument is that program costs and student fees can be controlled and made affordable through a CC baccalaureate program, contrary to the high cost of a CSU and UC education. Supporters also comment that Community Colleges in 21 other states offer 4-yr degrees so California should do likewise.

There are some key restrictions written into the Bill. It is being sold as a *pilot* program and will be inoperative by 2023. In other words, the pilot program has 8 years to prove itself. The pilot allows only 15 CC districts to participate, each with no more than *one* 4-yr degree program. And, none of these programs may duplicate a program currently offered by either the CSU or UC system.

SB850 would seem to be justified by the need to complement current CSU and UC undergraduate degree programs. However, the pilot, with a limit of 15 programs, is unlikely to make a dent in the need for a more highly skilled workforce. Also, what assurance is there that the CC's can do this successfully? The system has been severely criticized recently for its low graduation rates for the 2-yr AS degree. The disparity in the performance among the Community College districts is also a concern, as is the alarming number of students who enroll for coursework that they either do not complete, take years doing so, or which too often lead to no useful outcome. So the question is whether it is wise to add responsibility for a 4-yr degree program when the system has trouble fulfilling its current role. Maybe it would be better to re-evaluate the effectiveness of its mission rather than add to it piecemeal through *ad hoc* state measures such as SB850. Anyway, Governor Brown has decided the fate of SB850 by approving it with his signature on September 28, 2014. In almost the same pen-stroke he vetoed funds for UC and CSU for long-overdue deferred maintenance needs. Evidently, he gives a higher priority to growing little acorns than preserving mighty oaks. Bottom line is: *you need both!*

Online Education. The Little Hoover Commission's report calling for a new Master Plan (see above) includes a strong recommendation for integrating online education into degree programs. It opines that online education is moving slower than it should because of faculty opposition and/or general inertia. In this context, an overview of UC's recent efforts to jumpstart online undergraduate education is presented in an article by Carl Straumsheim in the web publication *InsideHigherEd.com* (August 13, 2014). The emphasis is on online courses open to enrolled students from any UC campus that allows the student to earn degree credit regardless from which UC campus the course originates. The article, appropriately entitled "*It Takes Time*," comments that an improving economy and increasing education budgets have reduced the pressure on UC to adopt online formats for undergraduate education. What remains is a unique effort by the UC administration to engage nine campuses in a cooperative venture with faculty and campus senates to offer select high-enrollment required courses online.

This "*Takes Time*" because cross-campus enrollment needs to be simplified to be effective, and cross-campus credit for courses remains a complicated issue. Apart from having nine different academic senate educational policy groups weigh in on intercampus course credit, there are obstacles such as communication voids and logistical problems as to when and in what sequence courses are offered. There is a pertinent quote from UCSC math professor Anthony Tromba regarding online coursework who states "It will live or die or flourish depending on how good it is and how people respond to it. Whether you like or do not like online education is irrelevant."

While the pros and cons of online courses continues to evolve, the next argument to be addressed is whether UC could, should, or will offer online baccalaureate degree programs in the foreseeable future.

Marjorie C. Caserio (Editor)

CUCEA Financing – Then and Now

The concept of a Council of University of California Emeriti Associations (CUCEA) evolved in the 1980s as emeriti numbers increased and each of the existing UC campuses established its own emeriti association. An entity was needed to network the emeriti associations and to represent the interests of *all UC emeriti*. That entity became CUCEA, formally established in 1987 following several years of planning its composition and role. Immediately, a sustainable budget was needed for the Council to function. Although the Council's expenses were projected to be modest they would not be insignificant. The major cost would be travel of CUCEA officers and campus representatives to attend meetings. Two were planned each year, alternating between northern and southern campus locations. Additional travel expense soon surfaced as the CUCEA leadership attended university meetings where the interests of active and retired UC personnel are involved (UCFW, UCRS). Reading the minutes of those early CUCEA meetings, it is clear that securing stable funding for CUCEA's operation was difficult.

The Council argued that because UC emeriti are also members of the UC Academic Senate, CUCEA was in effect an adjunct of the Academic Senate. Based on this tenuous relationship – tenuous because neither CUCEA nor the emeriti associations had any official status within UC – the Council Chair (Claude Fawcett of UCLA) appealed to the Academic Council for initial

support to get CUCEA started. Records show a reluctance to fund CUCEA, yet the Academic Council eventually did so, awarding the sum of \$5000 as a one-time grant to launch CUCEA. This was indeed the seed funding CUCEA needed. There was no commitment by the Academic Council to fund CUCEA's operation on a long term basis, yet it granted CUCEA some measure of financial support annually at CUCEA's request until recently (\$1700 in 1988 and falling to \$1500 by 2010, and sadly to zero by 2014).

Academic Council support has been invaluable, but additional revenue sources were needed to cover expenses. The campuses were an obvious source. In fact, campus Chancellors, then and now, were and are willing to provide campus space for CUCEA meetings and to cover the costs of lunch and local travel. The campus emeriti associations also have been willing to help fund CUCEA, primarily by paying the costs of their representatives to attend CUCEA meetings, and by taxing emeriti association dues \$1.00 per emeriti member per year (now at \$2.00).

For several years, CUCEA's expenses were within budget and even allowed for the accumulation of a small reserve. The hope that revenues from the campus emeriti associations would increase as the number of emeriti increased was dulled when fewer new emeriti joined their emeriti association. The reasons are unclear, but the most severe blow fell in 2011 when the Academic Council withdrew its annual support for CUCEA. The disastrous cuts imposed by the state on UC's budget caused the Academic Council to take this action. A brief reprieve added \$500 to CUCEA's 2013 budget, but it is back to zero support from the Academic Council at this time. The budget problem is exacerbated by the escalation in travel costs. CUCEA has also expanded its activities, and its costs, through the production of the emeriti Biobibliographic Survey, a website and a newsletter. Revenues have declined while costs have risen, and the modest reserve is depleting rapidly.

There is little room to cut costs. Eliminating one of the two annual meetings or using phone conferencing is not a practical option. Part of each of the annual meetings is now joint with CUCRA (the staff retiree counterpart to CUCEA). Important agenda topics are common to both groups, and joint meetings with key Office of the President staff facilitate discussion of these topics (primarily health and retirement benefits). Attendance normally involves 50 to 60 people – a number difficult to stage as a conference call or condense to a single meeting per year.

The best option is to restore the Academic Council's annual support for CUCEA. This becomes feasible as the California economy improves and if state support for higher education increases. Action by former President Yudof in 2012 recognizing CUCEA, campus emeriti and retiree associations and retirement centers as official UC – Affiliates, similar to UC alumni associations, will help legitimize CUCEA for the Academic Council. But the real issue is whether the university sees value in CUCEA's role. An important point often overlooked is that CUCEA impacts active as well as UC retirees. An important example is the Health Care Facilitator Program. This program benefits both active and retired members yet originated through the combined efforts of CUCEA and the Berkeley Retirement Center (*CUCEA Newsletter April 2014*). Also, CUCEA representation adds a valuable voice to standing committees of the senate (UCFW), the university (UCRS), and task forces dealing with health and retirement issues for all employees. The CUCEA emeriti biobib surveys have also brought to light the remarkable contributions many UC emeriti continue to make post-retirement to UC's mission through teaching, research, service and philanthropy. These are some of the reciprocal benefits to sustaining a strong relationship between the university and its community of emeriti and retirees. May it long continue.

We gratefully acknowledge CUCEA Archivist and Historian, Ralph Johnston, for the records of the early history of CUCEA financing.

Edward A. Dickson Emeriti Professorships. A Bit of Background History

Edward A. Dickson is a legendary figure at UC for several reasons. He is the longest serving Regent in the history of the University, having served from 1913 to 1946. His vision is credited with helping the Los Angeles campus become a reality and, in 1955 he presented the University with an endowment for awards that we know and value as the **Dickson Emeriti Professorships**. It was his wish that the income from the endowment be used to support and maintain special annual fellowships awarded to retired faculty members for exemplary contributions to the University post-retirement in teaching, research, or service.

Just how the endowment was administered in its early years is a mystery, but a June 24, 2003 letter to all Chancellors from Provost Judson King mentions reviews of the endowment in the 1970's and in 1993 that showed the payout from the fund had fallen into disuse at all campuses. The Regents took action in 1993 by recalling the unused accumulated payouts and "reinstating" them as a second endowment, the income from which was to be distributed annually and equally to each of the nine campuses. The funds were to be administered under the authority of the Chancellors for the award of the Dickson Professorships.

However, a 2003 review of the endowment showed that the campus funds had again fallen into disuse. No awards had been made as far as we know. Provost King's letter announced the recall of the unused funds, which were added to the endowment principal and then reallocated as ten separate and equal endowments, one for each of (now) ten campuses. The annual payout per campus (approximately \$10,000 in 2003) was to be spent in the calendar year according to the donor's terms and, this time, administered *by the Executive Vice Chancellor or the chief academic officer*. Each campus was given a separate fund number for the payout funds from the campus endowment.

The first documented awards were made in 2004 by the Irvine and Santa Barbara campuses, followed sporadically by other campuses (Davis, in 2006; Los Angeles and Santa Cruz in 2007; Berkeley and San Diego in 2008). An inquiry in 2006 by Jack Fisher (UCSD/CUCEA representative) confirmed that the fund at San Diego existed but was either unknown to academic affairs or lacked any organized effort to administer it – a situation that apparently prevailed on other campuses as well. Furthermore, it was discovered that unused payout funds had been recalled by the Office of the President, presumably to be added to the endowment principal or possibly reallocated later to the campus. Anyway, the revelation must have alerted campuses to monitor their own Dickson endowments because more campuses (except Merced which as yet has no emeriti) began to make one or more awards. A complete tabulation of awards is posted on the website at <http://cucea.ucsd.edu/awards/edicksonprofessorship.shtml>.

There are few rules as to how the awards are administered, although the funds may not be used for any purpose other than as emeriti faculty professorships, as intended by the donor, Edmund Dickson. Each campus chooses its own method of nomination and selection, but

the ultimate recommendation and funding has to be approved by the Executive Vice Chancellor, or the chief academic officer. But there are still some puzzling outcomes. Why for example are there wide campus variations in the number and frequency of awards when the endowments and payouts should be nearly equal? The current tally of awards since 2004 has Berkeley 7, Davis 18, Irvine 8, Los Angeles 19, Merced 0, Riverside 7, Santa Barbara 11, Santa Cruz 5, San Diego 8, and San Francisco 5. Possibly, campuses making multiple awards annually may be able to supplement the funds in order to maintain each award at the recommended level of \$10,000. But in view of the checkered management history of the funds over many years, another review of the funding practices might be worthwhile.

Because there is no central administrative tracking of individual campus Dickson awards, we are not sure that the listing of awardees posted on the <http://cucea.ucsd.edu/awards/> is complete or correct. However, we are pleased to recognize and congratulate the recipients of the **2014 Dickson Emeriti Professorships**.

Berkeley

Alan H. Nelson English

Joseph W. Wolf Mathematics

Los Angeles

Eric Fonkelsrud Pediatric Surgery

Howard Suber Film, Theater and Television

Santa Barbara

Eduardo Orias Ecology, Evolution, and Molecular Biology

San Francisco

Michael Thaler Educator, Scientist. Physician, Historian

On the Lighter Side

Here is a piece called "*Newspapers Explained*." We know not from whence it came but it is an easy guide to keeping **political news** in perspective. Just consider the readership.

1. *The Wall Street Journal* is read by the people who run the country.
2. *The Washington Post* is read by people who think they run the country.
3. *The New York Times* is read by people who think they run the country, and are very good at crossword puzzles.

4. *The Los Angeles Times* is read by people who wouldn't mind running the country if they could find the time and if they didn't have to leave Southern California to do it.
5. *The Boston Globe* is read by people whose parents used to run the country and did a poor job of it, thank you very much.
6. *The New York Daily News* is read by people who aren't too sure who's running the country and don't really care as long as they can get a seat on the train.
7. *The New York Post* is read by people who don't care who is running the country as long as they do something really scandalous, preferably while intoxicated.
8. *The Miami Herald* is read by people who are running another country, but need the baseball scores.
9. *The San Francisco Chronicle* is read by people who aren't sure if there is a country or that anyone is running it; but if so, they oppose them, unless they are gay, handicapped, minority, feminist, atheist, illegal aliens (country or galaxy), provided of course they are not Republicans,
10. *The National Enquirer* is read by people trapped in line at the grocery store.
11. *The Seattle Times* is read by people who have recently caught a fish and need something to wrap it in.
12. *The San Diego Union Tribune* is read by people who do not want to spend an extra 25 cents to read the *Los Angeles Times*.
13. *The Sacramento Bee* was not listed. Perhaps nobody reads it.



News Item

October 27 is the 48th anniversary of the Great Pumpkin

CUCEA Officers 2014-15

Roger Anderson (SC) Chair (2014-16)
 Richard Attiyeh (SD) Chair Elect (2014-15)
 Doug Morgan (D) Past Chair (2012-14)
 Ernest Newbrun (SF) Past Chair (2010-11)
 Charles Hess (D) Past Chair (2008-2010)
 Lyman W. Porter (I) Treasurer (2012-14)
 Louise Taylor (B) Information Officer (2012-14)
 Marjorie Caserio (SD) Web Manager and Newsletter Editor (2012-14)
 William Ashby (SB) Secretary (2012-14)
 Ralph Johnson (LA) Archivist, Historian (2012-14)
 Charles Berst (LA) Co-Chair Biobib Survey,
 John Vohs (D) Co-Chair Biobib Survey
 Adrian Harris (LA) Chair Joint Benefits

We Are On The Web.
 Go to <http://cucea.ucsd.edu>
 for CUCEA information,
 current and previous
 newsletters