2.4.2 The Inverse Insight that leads to Statistical Method

How does one explain the radical difference in mentality: abstract vs. concrete, theoretical processes vs palpable results, correlations of variables vs frequencies, nothing is irrelevant in the data vs significant/random data? The answer - an inverse insight. Even Aristotle had this inverse insight, however he did not have the corresponding direct insight that would lead to a new science.

I. Affirming real randomness in frequencies in our world springs from an inverse insight. (Frequency: counting the number of events in a given class in a given area during a given interval of time.)
   a. Positive datum: randomness in frequencies
   b. Absence of intrinsic explanatory intelligibility in randomness
   c. This absence runs counter to the classical anticipations. Classical anticipations expect explanations to all data, even that identified as random (whether modern correlations or classical causal explanations).

II. What precisely is the basis of this defect of intelligibility? Can a fully general account of randomness be developed? Of course.
   a. Not of an event, but of an aggregate of events (events as "members of a group") (an event = an actualized intelligibility)
      i. Single events are not random, they may be fully deducible given enough time and knowledge. Likewise both systematic and non-systematic processes are deducible.
      ii. Hence, if events and processes are not random, then how can a group have such a defect of intelligibility?
   b. Answer: coincidental aggregates. Lonergan links statistics with non-systematic process. Earlier, to recall, he had linked non-systematic process with coincidental aggregates.
      i. A coincidental aggregate possesses a spatial and/or temporal unity of events, but no unity based on intelligible relation. To recall, non-systematic process possesses these same characteristics. (could one argue the same for parallel processes, even if they intersect?)
      ii. Therefore, differences between frequencies of groups of events can be random only if these events are not intelligibly related and thus form a coincidental aggregate.

III. Still the defect in intelligibility alone does not result in a whole new science. For a new science to emerge, a leap to a new kind of intelligibility is required, and this leap is going to result in the discovery of an intelligibility that covers a different region of the universe unexplored and incapable of being explored by classical intelligibility.
   a. Classical inquiry classifies and studies events and systematic processes but is not capable of dealing with non-systematic processes in the same general abstract manner that classical discovery is capable. Therefore, a different method would be needed if such processes can be studied scientifically.
   b. Statistical method discovers an intelligibility in what classical inquiry neglects. What is neglected is the coincidental manifold, what is discovered is the

probability, the ideal frequency. This follows the pattern of all inverse insights and the empirical residue in science. To recall:

The Higher Intelligibility	The ER
Scientific generalization	Individuality
Real #s, continuous f(x)s, infinitesimal calculus	Continuum
Inertia/special relativity	constant velocity
Probabilities	**coincidental aggregates**

Insight 2.4.3 The Nature of Probability

Definition: A **probability** is a **constant proper fraction**.

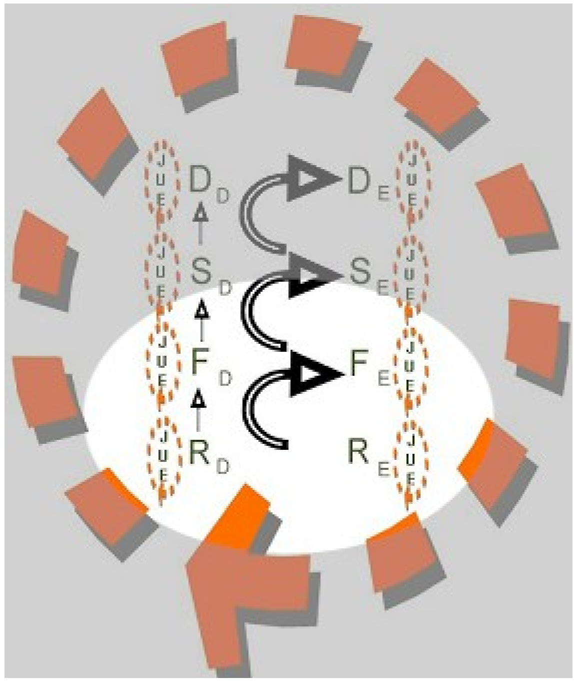
How does Lonergan get to this?

1. First, events need to be identified and defined. Lonergan specifies these events generically into classes of events, P, Q, R, …
2. In sequences of intervals, or occasions (remember temporal and/or spatial unity), these classes of events need to be counted. Hence in interval 1, these classes occur p_1, q_1, r_1,… times. In interval 2, these classes occur p_2, q_2, r_2,... times. In interval 3, these classes occur p_3, q_3, r_3,… times.
3. These frequencies of each class in each interval need to be put into relative actual frequencies. This is accomplished by dividing the number of actual frequencies of a class in an interval by the total number of events in that interval. Lonergan defined these total numbers of events in an interval (or occasion) as "n". Hence p_1/n_1, q_1/n_1, r_1/n_1,… ($n_1 = p_1 + q_1 + r_1$…) gives the relative actual frequencies of each class of events in the first interval. Likewise, p_2/n_2, q_2/n_2, $r_2/n_{2\ldots}$ ($n_2 = p_2 + q_2 + r_2$…) gives the relative actual frequencies of classes of events in the second interval. Finally, p_3/n, q_3/n_3, $r_3/n_{3\ldots}$ ($n_3 = p_3 + q_3 + r_3$…) gives the relative actual frequencies of each class of events in interval three. And one would continue this for all further intervals (or occasions).
4. Now for the insight. Then, one needs to compare p_1, p_2, p_3,… If the differences of frequencies of class p between each interval is truly random, then with enough intervals, one should begin to grasp a convergence upon an ideal frequencies. Notice how the more intervals or occasions that are counted, the more that the data will converge on some particular constant proper fractions, and ideal relative frequency (this is like a limit in math). This is how Lonergan defines probability. The same can be done for the other two classes and their intervals (or occasions) $q_1 q_2 q_3$, … and , r_1, r_2 $r_{3\ldots}$
5. One can go on to define a "state". The comparison of a relative actual frequency of a class of events with the ideal frequency gives one the state of an actual situation. (how close or how far it diverges from the ideal).

What does this insight solve?

General knowledge is reached regarding events in non-systematic processes.The use of "states" by-passes the problem of distinguishing and listing non-systematic processes.

INSIGHT 2.4.4 Analogy in Heuristic Structure



1. Unspecified heuristic concept
2. Pre-scientifically described object
3. Heuristic Theorem
4. Ideal of Scientific Explanation
5. Measurement
6. Mathematics provides general view of possibilities
7. Practical techniques that form the “image” (eg. Curve fitting)
8. Not only below upward movement, but above downward (E→U and U→E)
9. Leap of constructive intelligence (Insight): reaches a universal and constant and both abstract from the empirical residue (though different facets of it)
10. Verification needed.(though it has different meaning in each, which is also revealed in the meaning of “prediction” in each)