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Overcoming Erroneous Confirmation Bias

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Concept Paper
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This paper will explore strategy for overcoming erroneous confirmation bias within the context of generalist versus specialist function as described in the paper entitled "Information Fusion and Quantum Logic in Family Medicine". The problem of confirmation bias is, at its root, one of dealing with the evidence involved in the decision-making process. Evidence can be defined as facts used to support a position, and so the question about any fact being considered in a judgment is whether or not that fact supports or opposes that judgment. So a decision must be made about each fact as to its relevance and its validity with regard to the judgment to be made. In effect this means that there are multiple decisions/judgments about each piece of evidence that is involved in the overall big decision/judgment of concern. Each fact represents a decision point, and has an entropy (or uncertainty) factor that can be associated with it, and the overall entropy of the big decision to be made compounds exponentially with each decision point (or node) that is involved.

Each fact involved in the decision-making process will have a decision made about whether it is valid (i.e. true) and whether it is relevant to the big decision that is to be made. The validity point is not always as cut-and-dry as one might think, because it is possible that a fact being considered may not be true, either because of an honest mistake or because of willful deception. But consider that often times (such as in court) the same fact can be used to support either side of an argument. This is because of how the question of relevance is taken into account when considering a particular fact. At one level relevance can be seen as whether or not a particular fact has anything to do with the decision to be made, but at a different level the question of relevance becomes one that examines the <u>causality</u> involved in <u>how</u> that fact is true and also <u>how</u> that fact relates to the decision-making process. So the question of validity thus becomes one of the ordered process of each fact, and this is referred to by mathematicians as a "non-abelian" problem. In an abelian problem the order of the elements is not important, but in a non-abelian problem a different order of the elements will mean a different solution or outcome for the problem. For instance, it doesn't matter which way you set up a multiplication problem (which is abelian) because you will get the same answer no matter the order of which number gets multiplied by the other, but it does matter which way you set up a division problem (which is non-abelian) because the matters of which number is the divisor and which number is the dividend.

It is important to understand the causality involved in each fact involved in a decision-making process because the ordering of facts and their generation will ultimately determine how a particular fact is one that either supports a certain decision or opposes that decision. If one views a fact (i.e. a piece of evidence) strictly in a stochastic manner, then the entropy (or uncertainty) inherent in statistics begins to enter in to the decision-making process. The general method of organizing the evidence in decision-making (as was first espoused by Benjamin Franklin) is to list each piece of evidence in one of two columns which are either the "pro" column or the "con" column. So a particular fact may be thought of as being associated with the "pro" column because of a statistical relationship to the pro column, but unless how that data point was generated is taken into account then it may carry such entropy as to randomize the entire collection of evidence, or it may even have been placed in the wrong column and instead should have been placed in the “con” column. This is how sometimes the same fact can be used to support either side of an argument.

The mathematics involved in representing these concepts go beyond the conventional statistical analyses that always entail compounding entropy. Instead such problems are likely to be best represented via quantum knot/braid theory, where it has been shown that topological quantum logic is a fault-tolerant way of examining such non-abelian situations.