Is delusion a species of overconfidence? Comment on Valentina Petrolini, 'Varieties of overconfidence'

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Grandiosity delusions $\Rightarrow$ schizophrenia

Grandiose delusions are particularly common among people affected by schizophrenia and bipolar disorder. They usually center on the belief of possessing special powers or abilities and of being otherwise special in some sense or other. At times grandiose delusions take on a specific religious connotation, as when schizophrenic individuals claim that they have been chosen by God to undertake a certain mission.

Is overconfidence a causal component in schizophrenia? And how to operationalize overconfidence in this context? We will narrow this question down to a hypothesis on probabilistic reasoning testable by experiment.

Ways of measuring overconfidence in neurotypicals: calibration of probabilities

"Judgments whose accuracy approximately equals their makers' confidence at each level are said to be well calibrated. If one's judgments are well calibrated, then about 80 percent of the predictions that one makes with 80 percent confidence will be correct; as will 60 percent of the predictions made with 60 percent confidence, and 99 percent of the predictions made with 99 percent confidence."

(Is attaching confidence to a prediction everyone's cognitive endowment, or is it mostly restricted to experts?)

Quotes on this and next slide taken from: Steven Rieber (2004) Intelligence Analysis and Judgmental Calibration, International Journal of Intelligence and CounterIntelligence, 17:1, 97-112, DOI: 10.1080/08850600490273431

Overconfidence is no *adjuvans* to the placebo effect

"Low calibration was found in emergency-room doctors' estimates of survival. A recent study conducted at three hospitals looked at doctors' survival estimates for patients admitted with congestive heart failure. It found that, among the 74 patients given a 10 percent or smaller chance of surviving one year, the actual rate of survival was 34 percent."

"Doctors receive abundant feedback about *outcomes*, but this doesn't improve their calibration. Perhaps what is needed is systematic feedback about one's own *calibration*."

What is at issue here is the ability to process long sequences of data

A putative inference style in schizophrenics: 'jumping to conclusions'

Logic: the von Domarus principle, which is an explanation of schizophrenic thinking based on the concept that the individual perceives two things as identical merely because they have identical predicates or properties. [developed by Eilhard von Domarus, 20th century German-American psychiatrist]

Clinicians recognize this, but extended surveys are lacking.

A more fertile ground for testing seems probabilistic reasoning:

Probabilistic Judgements in Deluded and Non-Deluded Subjects (Huq, Garety, Hemsley *QJEP* 1988)

Three subject groups: normals (N; 15), non-deluded psychiatric patients (ND; 10), actively delusional schizophrenics (DS; 15)

Eight jam jars, each containing 100 coloured beads, constituted the stimulus material. There were four pairs of jars; in every pair there were, in each jar, two sets of coloured beads in equal and opposite proportions; for example:
Jar X contained pink and green beads, in the ratio 85 pink and 15 green beads;
Jar Y contained green and pink beads, in the ratio 85 green and 15 pink beads.
The other sets were identical, except that they contained beads of different colours. The proportions were always 85:15.

Experimental conditions

Condition I: A YES-NO response mode was used in this condition. Subjects were asked to indicate whether or not they required more draws before they came to a decision .... When subjects indicated they didn't require more draws, they were asked to say which jar they thought the draw/draws came from.

[. . .]

Condition 3: A probabilistic response mode was used in this condition. After each draw, subjects were required to indicate the relative probabilities that they attached to the draw having come from each of the two jars. No estimations about individual colours (events) were required.

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- note that all sequences start off with AA

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- the ND psychiatric group needed at least 5 draws
- (in a different experiment with people suffering from OCD, the subjects required on average 9 draws!)(P. Volans, 'Styles of decision-making and probability appraisal in selected obsessional and phobic patients', Br J Soc Clin Psychol. 1976 Sep;15(3):305-17.)

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- the normal group was only satisfied with level of certainty 0,995 – which seems rather conservative as compared to the DS group; so far no good argument for labelling DS 'overconfident'

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  would the DS group have gone for the other jar, thrilled by the opening BB configuration?
- DS subjects may adhere to the (fallacious) Cournot principle: 'events of low probability don't happen at the first trial'

Conclusion

All subject groups appear to be guided by the 'law of small numbers', i.e. they have no clue about the effects of randomness and this causes overconfidence

It seems plausible that delusional schizophrenics have special difficulties with grasping randomness, which consists of 'meaningless succession' – but the work of Maya Bar-Hillel has shown that neurotypicals also inject far too much regularity in randomly generated sequences

The experimental paradigm outlined above is often interpreted as throwing cold water on the idea that there is a distinctive reasoning style – jumping to conclusions – employed by delusional schizophrenics. It is true that neurotypicals also employ this reasoning style. But the experimental paradigm, properly interpreted, shows that the disregard of randomness effects is most prominent among delusional schizophrenics.