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The schizotype as a dispersal phenotype: support from the theory of "variability selection".

In our book "Evolutionary Psychiatry" (1) Anthony Stevens and I put forward the hypothesis that the genetic tendency to schizophrenia and schizotypy (called schizotaxia by Paul Meehl) had evolved because it also predisposed to the mental reorganisation ("mazeway resynthesis") which occurs in prophets and cult leaders, and gives them the unshakeable conviction in a new dogma which enables them to develop charisma and lead a group of colonists into a "promised land". When the mazeway resynthesis doesn't happen, for any reason, the individuals are recognised as schizotypes; when it happens and goes wrong, they are recognised as schizophrenics, with lowered fertility, but these lost genes are balanced by the increased reproduction of cult leaders, both within the cult due to increased reproductive opportunity (as, for example with David Koresh, whom God instructed to impregnate personally all the women in his cult), and of the cult as a whole when it expands into an adaptive radiation in the new habitat (2,3).

This idea was received with incredulity by our friends, colleagues and reviewers. Now a new theory from Richard Potts, the director of the Smithsonian Institute's Human Origins Program (4,5), has provided what I think is some support for our own hypothesis. I will discuss this new theory of "variability selection", but first I will give a brief summary of our latest thinking, in the form of an abstract for the ASCAP meeting in Hamburg.

The schizotype as a dispersal phenotype

One can discern in schizophrenia and the schizotypal personality a "dispersal phenotype" ; that is, an evolved strategy which in the past has served to disperse the organism around the full range of its potential habitat; it is an alternative to the "maintenance phenotype" which is optimally adapted to the existing habitat (6). In the schizophrenic process, we can discern a vector influencing the individual to leave the natal group (into which he or she has been born and indoctrinated) and to disperse into uncharted terrain. Both attractive and repulsive forces promote this vector. On the one hand, the patient is drawn to some destination which is often conceptualised as a "promised land", and goes there under the influence of messianic delusion, hopefully with a following of disciples to take care of the more practical aspects of life and performing much the same function as psychiatric nurses. On the other hand, the patient is driven from the natal area by paranoid delusions of persecution, often accompanied by hostile voices. The end result is a new community, with a new world view, incompatible with the natal group. Unfortunately, the process often goes astray, and the patients end up, not in a promised land, but in a shop doorway or a psychiatric ward. Or there may be a more benign outcome, and they may remain in the natal group as shamans, mystics and holy men.

Variability selection

Richard Potts has drawn attention to the extreme climatic variability of the last six million years on earth, and especially the last 700,000 years. There have been many cycles in which climate has varied from extreme heat to extreme cold, culminating in the ice ages and their tropical intervals. The oscillations have been much greater than those of the preceding 60 million years. Many species and races of hominids and other animals probably went extinct, either in the cold phases or in the hot phases; for instance, it is thought that the cold-adapted Neanderthals went extinct during one of the warm periods. Potts argues that this winnowing of genes has been an important factor in human evolution, and has led to the evolution of climatic adaptability, so that selection has not been for fitness in a particular habitat, but for the capacity to change one's physiology and behaviour to suit a variety of extreme habitats. These ideas have been taken up and expanded by Michael Davies and his colleagues in their book "Humankind the Gatherer/Hunter" (7) and more recently in this newsletter.

Now, I think it is difficult to imagine selection for temporal variation in climate. I cannot do the mathematics, but I would think that there would not be sufficient time for races and species to develop the necessary characteristics, on a trial and error basis, to deal with oscillations of several thousand years, even if facilitated by prior adaptation to shorter temporal cycles. Unless, that is, there was a pre-adaptation to spatial variation in the form of simultaneous adaptation to a variety of geographical extremes of habitat. If, at one and the same time, man is adapted both to the freezing conditions of

Lapland, and to the tropical heat of the African rainforest, it would not matter if the climate see-sawed over time from one extreme to the other. In the super-hot times, the Africans would be burnt or dehydrated to extinction, and most of the laplanders would die of heat, but there would be a proportion of Laplanders who were adapted to the African rainforest and would survive a tropical Lapland. Likewise, when the Laplanders froze solid, and most of the Africans died of unaccustomed cold, there would be a small proportion of Africans who were adapted to the Lapland climate, and would survive an arctic form of Africa. We might expect a recursive interaction between temporal and spatial versatility: Potts points out that selection for temporal versatility "may encourage the spread into diverse habitats" (5) and the capacity for this spatial versatility would, in return, facilitate the evolution of temporal versatility.

This scenario of the EEA requires a far greater migration of humanity than is currently envisaged. Not only must there be a continuous movement of people out of Africa into Europe and Asia, there must also be a return movement of people back into Africa, so that the southern part of Europe would be a sort of dual carriageway providing passage back and forth (see figure 1). We don't know how the trip was made. Perhaps there was a move of about a hundred miles in each generation, with a sub-group splitting off and going just that bit further, leaving the rump on the route; in which case the return journey might take some thousands of years. But this would be quick enough to provide the gene mix at both ends of the dual carriageway.

If this happened, the importance of group splitting is greatly enhanced. In order to provide the gene mix, each of the migrating populations would have to split at least every generation. There may have been many ways that the groups split. In order to clarify thinking about this matter, we can offer a classification of splitting into homopistic fission and heteropistic fission. The word homopistic is derived from the greek for "same" and "belief" whereas heteropistic means "other belief". Many types of splitting occur when a group gets too big. The split may be amicable, and then two peaceful tribes live side by side, sharing the same customs and beliefs; or it may be antagonistic, due to some quarrel between families, and then one gets the kind of splitting described by Chagnon in the Yanomamo; but even in the antagonistic case, the two sub-groups are likely to share customs and beliefs - there has been homopistic fission.

In contrast to this homopistic fission, we have the accelerated, forced splitting when a cult develops a new vision of reality, and develops paranoid ideas about the existing group and also messianic ideas about moving to a promised land. This is heteropistic fission. The group is on a vector, fuelled by new ideas - ideas which seem revelatory to the members of the new group, and delusional to members of the old group - ideas which repel the new cult from its parent group , and at the same time attract it to a destination at some remove from the parent group. There may well be an underlying migration myth, setting the promised land at some point of the compass. For instance, the Aryan myth about "lebensraum" to the east, and the American myth of "Go West, young man"; or the precolonial Brazilian myth of the "land without evil" beyond the mountains. In each generation a prophet might arise to personify this myth, and to take a sub-group with him one further stage in the long progression from Lapland to Africa, and back again.

Bird and fish migration

It is interesting to consider bird and fish migration in this context (8-12). It appears that in some species all the population migrates, and this may be because they are not adapted to both the winter and the summer habitat. In this case, migration would make them sensitive to climatic change, and they would not survive the sort of fluctuations Potts is talking about. But some species are partial migrators, such as the robin. In these species, after an autumnal battle for territories, the territory holders stay put, and those who do not win territories migrate. The species is therefore adapted to survive both northern and southern climates during winter. Possibly some individuals do not migrate back in the spring, but stay and breed in the south - I do not think there is sufficient evidence either to establish or refute this idea. If that were the case, there would be a few individuals in the robin population who would survive either an ice-age or a severe thaw. And maybe if they looked closely, ornithologists might find a few one-off "crazy" individuals who failed to migrate even in those species who are thought to be total migrators. (I am thinking, of course, of the swallow in Oscar Wilde's story of the Happy Prince - the swallow did not really stay in order to care for the prince, he was a genetic stayer, and the myth of looking after the prince was a rationalisation to explain his bizarre conduct.)

In both migrating and failing to migrate, the robin would be doing every year what we suggest the human ancestor was doing every thousand years. Perhaps this is the reason why migration is so common in birds and fish. The non-migrating species were killed off by the sort of fluctuations described by Potts. This does not, of course, explain why birds migrate, because migration was a pre-adaptation, and evolved for reasons other than coping

with temporal climatic variability. But when the climate started to oscillate so wildly, it explains why there was differential survival of the birds and fish which had already evolved the system of bidirectional partial migration.

The importance of religion

Religion is a universal feature of the societies of mankind (13). It has been thought that its ubiquity is due to the fact that it binds a group together, legitimates leadership and hierarchy, and deflects onto the godhead the aggression which would other wise be directed at the group leader when things go wrong.

But it also has a great capacity for bringing about group splitting. This we can see from the history of almost any sect. In many cases the difference of dogma or ritual may be slight, and be dependent on clashes between powerful personalities in the sect. This might be called the gradual or conservative form of heteropistic fission. But there is also the radical form of cult formation, and it is of course this form that we think is important for the evolution of schizophrenia.

Religions are remarkable because their array of arbitrary beliefs about the gods, the world, the origin of man and so forth, give a wide choice of incompatible belief options which may be used to separate groups, without changing their beliefs about important things like foodstuffs, medicines, animals and cultural knowledge which are necessary for survival. So that an entire belief system can be radically altered without altering the group's capacity to control the environment. The sacred varies, while the profane endures.

Conclusion

We originally put forward our group splitting hypothesis thinking it might have an important role in group selection. Then it was pointed out to us (correctly) by anti-group-selectionist referees that it might be advantageous to an individual to leave the group with a band of devoted followers, and our hypothesis could be justified on the grounds of individual selection, without invoking the controversial subject of group selection. Now there is an additional evolutionary reason for the survival of group fissioning mechanisms. Groups which did not divide quickly enough to maintain adaptation to both Lapland and Africa were killed off in one or other of the climatic extremes described by Potts, just like those species of birds and fish which had not evolved bidirectional partial migration.

More attention needs to be paid to both human migration and human group splitting, both by experimental social psychologists and by social anthropologists. We do not know of a single monograph devoted to the fissioning of human groups; please let us know if we are ill-informed.

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