Why Attitudes Are Usually Mutual: A Possible Mathematical Explanation

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Abstract In this paper, we provide a possible mathematical explanation of why people's attitude to each other is usually mutual: we usually have good attitude who those who have good feelings towards us, and we usually have negative attitudes towards those who have negative feelings towards, Several mathematical explanations of this mutuality have been proposed, but they are based on specific approximate mathematical models of human (and animal) interaction. It is desirable to have a solid mathematical explanation that would not depend on such approximate models. In this paper, we show that a recent mathematical result about relation algebras can lead to such an explanation.

1 Formulation of the Problem

Attitudes are usually mutual. In most cases, our attitudes to each other are mutual:

- we feel good towards those who have good feeling towards us, and
- we feel negatively towards those who are negative towards us: who humiliate us, who hate us, who want to do us some harm, etc.

The degrees of these feelings may be different. For example:

- parents usually passionately love their children, while
- children's attitude towards their parents, while usually reasonable reasonably positive, is typically much more reserved.

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However, the “sign” of this attitude – positive or negative – is usually symmetric.

There are exceptions. Of course, the word “usually” is there on purpose: there are exceptions. However, as will see, the very rarity of such exceptions confirms that mutuality of attitudes is really a typical case:

- There are people who have very negative feeling even towards those who have good attitudes towards them, who even sometimes cause harm to these good-attitude folks. These negative people are known as *sociopaths*, and it is well known – and good for all of us – that such people are very rare.
- On the other hand, there are people who have positive feelings and attitude towards everyone, in particular even towards those who have who hate them and towards those who do them harm. Such positive people are called *saints*. It would be great for all of us if a significant portion of the population were saints, but, unfortunately, saints are also very rare.

Most people are neither sociopaths nor saints:

- they do have positive attitude towards those who are positive towards them, and
- they do have negative attitudes towards those who are negative towards them.

But why? From the biological viewpoint, every individual – animal or human – struggles for survival. If someone has a positive attitude towards you, it helps you survive, but, from this purely egotistic viewpoint, you do not need to do anything good to them in return. Yes, parents brought you up and helped you when you were a kid, but when they are old and not capable of helping you any more, why help them? Not helping them sounds awful, contrary to all accepted social and ethical norms, but this is exactly the question we ask: why?

There are many people struggling in the world. It would be nice to help all of them, but somehow:

- if a person does not help poor people in Africa this may be not perfect, but it does not violate our social norms, while
- if a person does not take care of his poor parents this is viewed as an abomination.

How this mutuality is usually explained, and what are the limitations of these explanations. There are evolutionary explanations for mutuality of attitude: that mutual support helps groups survive, etc. On the commonsense level, this is clear, and there are even mathematical formulations of this explanation. However, these mathematical explanations are based on specific – very approximate – models of people’s (and animals) behavior; see, e.g., [2] and references therein.

It is desirable to come up with a general explanation that is mathematically solid and at the same time does not depend on the specific features of the used approximate mathematical model.

What we do in this paper. In this paper, we propose such an explanation.

2 Our Explanation

Related mathematical result. Our explanation is based on the following recent mathematical result [1]: that our of all possible relations, most of them are symmetric (this result is Corollary 23 from this paper).

To be more precise, this result is not about *individual* relations, it is about *algebras* of relations – and it states that in "almost all" such algebras, all relations are symmetric. Here, "almost all" is understood in the following sense.

We are interested in relations on a finite set – e.g., the set of all individuals. On a given finite set, we can only have finitely many possible relations, and thus, we can only have finitely many relations in the corresponding algebra of relations. From this viewpoint, it makes sense to only consider relation algebras that have finitely many elements.

Among all algebras with n elements, we consider the proportion p_n of algebras in which all relations are symmetric. "Almost all" means that as n increases, this proportion tends to 1.

How this explains mutuality of attitudes. Mutuality is a "usual" phenomenon:

- As we have mentioned, there may be individual families – or other *small* groups – in which mutuality is violated.
- However, if we consider groups of *sufficiently large* size, then we expect mutuality to be ubiquitous.

Large size means, in effect, that size n of the corresponding algebra of possible relations is also large. By the meaning of limit, the above-mentioned "almost all" result means that when n is large, the proportion p_n is close to 1. Thus, in most such large populations, we expect the attitude relation to be symmetric – which is exactly what is observed.

What all this means. The "almost all" result means, in effect, that if we pick a *random* relation, this relation will, with high probability, be symmetric (or at least almost symmetric). This does not mean that biological explanations are not needed:

- it is one thing to state what will happen if we start with a random state, but
- it is another thing to check whether this random configuration survives in competition with other groups.

So:

- What our explanation does it shows that the symmetry naturally appears.
- What biological explanations show is that this symmetry helps the population survive – and thus, persists during the evolutionary changes.

This may be related to the general controversy about creationism: many biological systems are so finely tuned that some people find it difficult to believe that they naturally emerged from the random and blind survival-of-the-fittest evolution. Good news is that there is no such mystery here:

- as the cited mathematical result shows, a simple random relation already shows mutuality, we do not need to explain how it *originated*,
- all we need to explain is why mutuality *survives*, and this is what the biological explanation does.

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