Paradox of love and how religion seems to avoid it

Christina A. Carreon-Jimenez, Claire MacDonald, James Newson, Olga Kosheleva, and Vladik Kreinovich
University of Texas at El Paso, 500 W. University, El Paso, TX 79968, USA
cacarreonji@miners.utep.edu, cemacdonald2@miners.utep.edu, jnewson@miners.utep.edu, olgak@utep.edu, vladik@utep.edu

1. What is paradox of love

- The utility u_i of each person is determined both:
  - by this person's circumstances – we will denote this part by c_i – and
  - by the utilities u_j of others.
- In the first approximation, the dependence of u_i on u_j can be described by a linear function.
- The corresponding coefficients a_{ij} describing positive or negative empathy – i.e., in effect, degrees of love and hate: $u_i = c_i + \sum_j a_{ij} \cdot u_j$.
- In particular, perfect Romeo-and-Juliet-type love means that the person i cares about the person j more than they care about themselves:

$$a_{12} = a_{21} > 1.$$

- In this case, we have $u_1 = c_1 + a_{12} \cdot u_2$ and $u_2 = c_2 + a_{21} \cdot u_1$.

2. What is paradox of love (cont-d)

- Multiplying the second equation by a_{12} and plugging in the resulting expression for $a_{12} \cdot u_2$ into the first equation, we get

$$u_1 = c_1 + a_{12} \cdot c_2 + a_{12} \cdot a_{21} \cdot u_1.$$

- Hence $u_1 \cdot (1 - a_{12} \cdot a_{21}) = c_1 + a_{12} \cdot c_2$, and $u_1 = \dfrac{c_1 + a_{12} \cdot c_2}{1 - a_{12} \cdot a_{21}}$.
- Even when $c_i > 0$ – i.e., when circumstances are perfect – for $a_{12} = a_{21} > 1$, we get $u_1 = u_2 < 0$ – i.e., both are unhappy.
- And when $a_{12} = a_{21} \approx 1$, this unhappiness can be as large as possible.
- This is not just a mathematical trick.
- Romeo and Juliet are just one of the many examples of how great love can leads to tragic unhappiness.

3. What is paradox of love (cont-d)

- The situation is even worse if we consider n people feeling good each other, with some $a_{ij} = a > 0$.
- If circumstances are similar, i.e., if $c_1 = \ldots = c_n = c$, then, due to symmetry, all utilities are the same $u_i = u$.
- So, the equation becomes $u = c + a \cdot (n-1) \cdot u$, hence

$$u = \frac{c}{1 - a \cdot (n-1)}.$$

- So, for $a > 1/(n-1)$, everyone in this group is unhappy.
- For large n, this is true already for small a.
- So even small good feelings towards each other make the whole community unhappy.

4. How to avoid this paradox?

- For two people, a natural solution to this paradox seems to be limiting one's emotions, letting reason to be more in control of one's behavior.
- A natural solution for large n is to focus more on families (and other small groups) than on humanity as a whole.
- However, somehow, religious communities:
  - seem to avoid this paradox – and resulting unhappiness,
  - without limiting their emotions and without limiting the focus to a family.
- What they seem to do is to focus positive feelings on the divine being (D) – who, in n turn, has positive feelings towards human beings.
- In this talk, we explain how this focus helps to avoid the negative feelings associated with the paradox of love.

5. Analysis of the problem and the resulting explanation

- In the first approximation, let us consider n people with:
  - similar circumstances c_H,
  - similar level of love-to-Divine-Being a_{HD}, and
  - similar levels of love-from-Divine-Being a_{DH}.
- In this case, since we ignored the differences between human beings, the utility of all human beings will be the same u_H.
- So, the above equations for determining utilities u_H and u_D take the following form:

$$u_H = c_H + a_{HD} \cdot u_D \text{ and } u_D = c_D + n \cdot a_{DH} \cdot u_H.$$

- If we multiply the second equation by a_{HD} and replace the term $a_{HD} \cdot u_D$ with the resulting expression, we conclude that

$$u_H = c_H + a_{HD} \cdot c_D + a_{HD} \cdot n \cdot a_{DH} \cdot u_H.$$

6. Analysis and the resulting explanation (cont-d)

- If we move all the terms containing the unknown u_H to the left side, we get $u_H \cdot (1 - a_{HD} \cdot n \cdot a_{DH}) = c_H + a_{HD} \cdot c_D$, so

$$u_H = \frac{c_H + a_{HD} \cdot c_D}{1 - a_{HD} \cdot n \cdot a_{DH}}.$$

- For an appropriately selected a_{DH}, the denominator of this expression will be positive and close to 0 – which will lead to high happiness.
- Commonsense explanation:
  - *we* often *cannot* control our emotions well, but
  - *D can* select an appropriate a_{DH} that makes everyone happy.

7. Acknowledgments

This work was supported in part:

- by the US National Science Foundation grants:
  - 1623190 (A Model of Change for Preparing a New Generation for Professional Practice in Computer Science),
  - HRD-1834620 and HRD-2034030 (CAHSI Includes),
  - EAR-2225395 (Center for Collective Impact in Earthquake Science C-CIES),
- by the AT&T Fellowship in Information Technology, and
- by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) Focus Program SPP 100+ 2388, Grant Nr. 501624329,