

## Game Theory – More Than Just Games (Robert Aumann)

[...]

Suppose that your mother got you and your brother a tasty doughnut: vanilla-flavored dough covered with chocolate and candies. Unfortunately, she only got one – so you will need to share. What is the best way to split the doughnut?

One solution is for your mother to cut the doughnut in half and give one piece to each of you. But, as your mother probably knows all too well, this could easily result in one of you being unhappy and envious of the other. Regardless of how fairly your mother tries to split the doughnut, one of you will probably think that their piece is smaller, has less chocolate or candies, or has some other flaw. Letting you or your sibling split the doughnut is probably not a good idea either! So, how should the doughnut be split?

Game theory has an elegant solution. It suggests using the following procedure [...]

1. Your brother cuts the doughnut into two pieces, in any way he sees fit.
2. You choose one of the pieces for yourself.
3. Your brother gets the remaining piece.

[...]

Here is why with this procedure, neither you nor your brother have any cause for complaint or grumble.

*You* surely cannot complain, because you got to choose your piece. But what about your brother? Since you get to choose, is he not getting the lesser piece? The answer is no. Remember that he gets to cut the doughnut however he wants. When doing so, his reasoning should be as follows: “After I cut the doughnut in two, my sibling gets to choose their piece. If I create two uneven pieces, then my sibling will take the better piece, and I will get the lesser one. So it is best for me to split the doughnut into two *exactly even* parts. This guarantees that I get my fair share.”

In this way, both you and your brother get equally desirable shares, and neither of you can grumble! Is that not a clever solution? I frequently used it with my kids.

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