

## Reason and Critical Thinking PART TWO

**February 26, 2013**

### Rational Decision Making

Conceptual parts of rational decision-making: 1) choice and 2) the fact that it is usually the case that of the choices we can make, some are better than others

1) To make choices, we need to consider options (aka. "Possibilities" for action or inaction)

The possibilities can be **exhaustive and exclusive**

-A list of possibilities is exhaustive if and only if all possible choices of the agent have been considered. There is no possibility for choice the agent can make that has not been considered.

-A list of possibilities is exclusive if and only if the agent can choose one and only one option

-Options which depend on earlier decisions can either be treated as further choices, or wrapped into one choice

### Decisions Under Uncertainty

-Rhonda \$25,000 over 10 years, wants to get money from starting accounting business

-Lou \$25,000 over 10 years, want to get money from lotto

Has Lou or Rhonda made better choices, given that they have the same starting point and the same goal?

Distinguish decision under uncertainty from decisions under certainty

### Probability

$P(E1)$

Probability of Events (outcome of the choices we make)

Event 1=  $E1$ = coin coming up heads

Event 2=  $E2$ = coin coming up tails

$P(E1) = .5 = 1/2 = 50\%$

$P(E2) = .5 = 1/2 = 50\%$

These are exhaustive and exclusive

All probability subjective

$P(E|H)$

|= Conditional upon given

H= Background (always with judgments, but they drop out/ don't matter)

Anne knows that it is more likely to come up tails because head side is slightly heavier so she may say...

$$P(E1|H)=41\%$$

$$P(E2|H)=51\%$$

Clint thinks heads is his lucky side of the coin- his judgments off the mark

$$P(E1|H)=75\%$$

$$P(E2|H)=25\%$$

### Combining Probabilities

Sometimes we combine the probability judgments of different event in different ways

These combinations seem to be backed up by rules of rationality

- It is irrational to believe that one has a better chance of studying for the exam, going to the concert, and getting a full night's sleep than doing each individually
- The odds favor accomplishing only one

We can generalize from the particulars to see that, generally, the combination of getting three outcomes is less likely than each on its own

### First Law of Probability

$$P(E1 \text{ or } E2) = P(E1) + P(E2)$$

(Since H's are the same they cancel out and you don't need them as long as same person is making the judgments.)

Probability of this or that happening

$$\text{Event 1} = E1 = \text{coming up 3} = 1/6$$

$$\text{Event 2} = E2 = \text{coming up 4} = 1/6$$

$$P(3 \text{ or } 4) = (1/6) + (1/6) = (2/6) = (1/3)$$

Probability of an event not happening

$$P(\sim E1) = 1 - P(E1)$$

### Second Law of Probability

$$P(E1 \text{ and } E2) = P(E1) \times P(E2|E1)$$

$$P(3 \text{ and } 4) = (1/6) \times (1/6) = (1/36)$$

Always less than or equal to the probability of just one of the events

Jar of Marbles

3 Red, 3 Green

E1= pulling out a red marble

E2= pulling out a second red marble

$$P(E1 \text{ and } E2) = (1/2) \times (2/5) = (2/10) = (1/5)$$

### Third Law of Probability

E1= Studying for the exam

A= Getting an A on the Exam

$$P(A) = P(A|E) \times P(E) + P(A|\sim E) \times P(\sim E)$$

$$P(A) = (2/3) \times (1/2) + (1/3) \times (1/2)$$

$$P(A) = (2/6) + (1/6) = (3/6) = (1/2)$$

### **February 28, 2013**

-Important to keep long term decisions in mind, little and big decisions both matter

#### Value

**Intrinsic value**- something has intrinsic value when it is "valuable in itself," it is not valuable as a means to some other value (example happiness)

**Instrumental value**- something has instrumental value when it is useful to obtaining something else that is of value

Some things can be both intrinsically and instrumentally valuable

For instance, suppose you want to make a lot of money- this makes sense if that is what you really want, but also philosophers can grant that money can help you get other things, which are of intrinsic value. So everyone can agree that it is rational to want more money.

#### Expected Utility

**Rational decision-making**: making the choices based on achieving your goals, or getting the most value

Dependent upon probabilities, because the future is uncertain but probabilities are not all, the benefits and costs can be of varying magnitudes or sizes.

Consider two different lotteries. You can only play one. With the first, you have a 50% of winning 10,000. In the second, you have a 70% of winning \$100.

Which to take? Probabilities favor lottery 2, but it seems like lottery 1 is more rational in some sense.

We can compare something very probable but having small value with something very valuable but unlikely to happen, and all other sorts of combinations.

We need a measure of this magnitude in the value that is somehow related to the rationality of the decision.

**Utility**- that which represents a person's preferences (Broome, p.21)

Mathematical function, which serves as a measure of preferential strength

The traditional view of rational decision-making takes utility to be either equivalent or virtually perfectly correlated with one's good