Indicative Conditionals

RSISE

13 October 2006
\[ Pr(p \text{ or } q) = Pr(p) + Pr(q) - Pr(p\&q) \]

\((p\&q)\) is true iff \(p\) is true and \(q\) is true

\((p \text{ or } q)\) is true iff \(p\) is true or \(q\) is true

\((p \rightarrow q)\) is true iff
• 'If it rains, the match will be cancelled'

'Either it won't rain, or it will and the match will be cancelled'

• \((p \rightarrow q) = (\neg p \text{ or } (p \& q)) = (\neg p \text{ or } q)\)

Equivalence theory

• If Hume was born in London, then Hume was born in Scotland

If Hume was born in Glasgow, then Hume was born in Scotland
Four responses

• Hold to equivalence theory and seek to explain away the counter-examples.

• Add a 'positive relevance' clause to equivalence theory

\[(p \rightarrow q) \text{ is true iff }\]
\[a) \ (\text{not-}p \text{ or } q) \ [= \text{not-}(p \& \text{not-}q)], \text{ and}\]
\[b) \ p \text{ is positively relevant to } q.\]

• Modify possible worlds treatment of subjunctive conditionals

• Hold that indicative conditionals lack truth conditions, have assertion conditions instead.
Problem for positive relevance theory

- A good way to say that $p$ doesn't matter for $q$ is to say that if $p$ then $q$, and if not-$p$ then $q$.
- 'If I have the operation, I'll die, and if I don't have the operation, I'll die'
- 'If the Kyoto protocols are followed, CO$_2$ levels will be much the same as they will be if they aren't followed'.
Warping across the possible worlds treatment of subjunctive conditionals to indicative conditionals

'p box → q' is true iff the closest p-world to the actual world is a q-world
Warping across the possible worlds treatment of subjunctive conditionals to indicative conditionals

- If Booth had not shot Lincoln on 14 April 1865, someone else would have on that day

If Booth did not shot Lincoln on 14 April 1865, someone else did on that day

- If HIV had not been the cause of AIDS, something else would have been

If HIV is not the cause of AIDS, something else is
Appealing to different similarity relations

• 'p box→q' is true iff the closest* p-world to the actual world is a q-world (where similarity* is right for subjunctives)
• 'p→q' is true iff the closest** p-world to the actual world is a q-world (where similarity** is right for indicatives)
Why this is misguided

• It is perfect sense and very likely true to assert 'If Booth had not shot Lincoln on 14 April 1865, things would have gone very differently from the way they actually did go'.

• It is a nonsense to say 'If Booth did not shot Lincoln on 14 April 1865, things went very differently from the way they actually did.'
The compelling intuition

- If you throw a dart at the board, how likely is it to land in the area marked $q$ if it lands in the area marked $p$?
  The $p\&q$ area as a fraction of the $p$ area.
- $\Pr(p\rightarrow q) = \Pr(p\&q)/\Pr(p) = \Pr(q/p)$
The big surprise

- There are very strong reasons to deny that the probability of a conditional equals the probability of consequent given antecedent.
Lewis and Hajek

• It is impossible to have $\Pr(p \rightarrow q) = \Pr(p \& q)/\Pr(p) = \Pr(q/p)$ remaining true consistent with plausible changes in $\Pr$.

• The 'not enough values' problem.

• Suppose we have only 4 worlds: $w_1, w_2, w_3, w_4$, each with probability $1/4$, what's the $\Pr$ of $((w_1 \text{ or } w_2 \text{ or } w_3) \rightarrow w_1)$?

• It cannot be $1/3$, as no set of worlds has $\Pr$ of $1/3$. 
The fall-back position

- the such-and-such of $(p \rightarrow q) = \text{Pr}(q/p)$
  $\text{Ass}(p \rightarrow q) = \text{Pr}(q/p)$
- $p \rightarrow q$
  $p$
  $\therefore q$
- Modus Ponens is useable to extent that $(p \rightarrow q)$ remains highly probable on learning $p$.
- If the equivalence theory is true, this holds to the extent that $\text{Pr}(\neg p \text{ or } q/p)$ is high, and $\text{Pr}(\neg p \text{ or } q/p) = \text{Pr}(q/p)$. 
Two troubles for supplemented equivalence theory

• Assertibility is arguably an on-off notion, not one that comes in degrees.
• Assertibility is settled by likely payoffs of assertion, not probability.
• No good replacing assertibility by acceptability.
• The troubles here apply with equal force to no-truth theories.
Illusion theory of conditionals

• We are in the grip of a linguistic illusion, namely, that the probability of \((p \rightarrow q) = \text{Pr}(q/p)\).

• IP \((p \rightarrow q) = \text{Pr}(q/p)\)

• It is a good illusion to be under because it ensures we use Modus Ponens correctly.