The Square of Opposition

- The Square of Opposition shows the oppositions between propositions with the same subject and predicate but different logical form
  - A & E are contraries
    - “All dogs are brown” & “No dogs are brown”
  - A & O as well as E & I are contradictories
    - “All dogs are brown” & “Some dogs are not brown”
    - “No dogs are brown” & “Some dogs are brown”
- It also shows the relation between
  - I & O, which are not contrary as they can both be true
    - “Some dogs are brown” & “Some dogs are not brown”
  - A & I as well as E & O
    - “All dogs are brown” & “Some dogs are brown”
    - “No dogs are brown” & “Some dogs are not brown”

Contradictory Opposition

- Definition
  - Contradictory opposites are a pair of propositions that (as a matter of logical necessity given their relation to one another) have opposite truth value.
- Place on the Square of Opposition
  - Propositions with the same subject & predicate, but different quantity & quality are contradictory opposites.
- Examples
  - The statements in the left & right column are equivalent.

<table>
<thead>
<tr>
<th>All horses are hoofed.</th>
<th>It’s false that some horses aren’t hoofed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No horses are fish.</td>
<td>It’s false that some horses are fish.</td>
</tr>
<tr>
<td>Some horses are black</td>
<td>It’s false that no horses are black.</td>
</tr>
<tr>
<td>Some horses aren’t black</td>
<td>It’s false that all horses are black.</td>
</tr>
</tbody>
</table>

Contrary Opposition

- Definition
  - Contrary opposites are a pair of propositions that (as a matter of logical necessity given their relation to one another) cannot both be true, but can both be false.
- Place on the Square of Opposition
  - Universal propositions with the same subject & predicate, but different quality are contrary opposites.
- Examples
  - The statements in the left column imply the statement in the right.
  - But those in the right do not imply those in the left.
Subcontrary Propositions

- Subcontrary propositions are not really opposed to one another at all.
  - They differ in quality, but they can both be true.
- Definition (by place on the Square)
  - Subcontrary propositions are a pair of particular propositions with the same subject & predicate, but opposite quality.
- Logical Rule
  - Subcontrary propositions cannot both be false.
- Examples
  - The statements in the left column imply the statement in the right.
  - But those in the right do not imply those in the left.

<table>
<thead>
<tr>
<th>It’s false that</th>
<th>Some horses are blue.</th>
<th>Some horses are not blue.</th>
</tr>
</thead>
<tbody>
<tr>
<td>It’s false that</td>
<td>Some horses are not mammals.</td>
<td>Some horses are mammals.</td>
</tr>
</tbody>
</table>

Subalternation

- This is even less a matter of opposition than was sub-contrariety.
- Weakening
  - If a universal proposition is true, the particular proposition of the same quality with the same subject & predicate is also true.
    - Example
      - All dogs are mammals.
      - So, Some dogs are mammals.
  - Some people doubt this
    - But that is because they confuse two different things:
      - Logical implication, in which ASp implies Isp
      - Conversational implicature, in which one infers ~A_sp from the fact that someone said I_sp.
    - Presumably, if A_sp had been true, the speaker would have said so.
  - But that presumption can be defeated.
- Another inference
  - If a particular proposition is false, the universal proposition of the same quality with the same subject & predicate is also false.
    - Example
      - It’s false that some dogs are blue.
      - So, It’s false that all dogs are blue.