

## The Validity of Syllogisms

*Example. Felapton:*  $MeP, MaS \vdash SoP$

MeP: No intelligent person is on twitter.

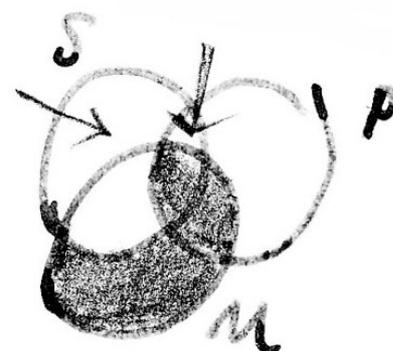
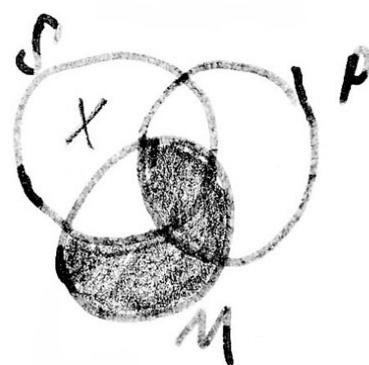
MaS: All intelligent persons are philosophers.

SoP: Therefore, some philosophers are not on twitter.

*Question.* Why is the conclusion not universal?

*Answer.* A syllogism is valid if the combined Venn diagram of the premises contains the Venn diagram of the conclusion.

- (1) *Major premise:* the intersection of M and P is empty, because no M is P (i.e. there are no intelligent twitterers).
- (2) *Minor premise:* the section of M that is not S is empty, because no M is not S (i.e. there are no intelligent non-philosophers).
- (3) *Conclusion:* the section of S that is not P is not empty (hence the cross). This is what SoP says. The syllogism is valid.
- (4) Suppose we inferred  $MeP, MaS \vdash SeP$ . Given the same premises, this conclusion does not follow, because a part of the intersection of S and P is *not* empty (vertical arrow). But for SeP to be true, the whole  $S \cap P$  must be empty (shaded). The inference is hence invalid (compare with *Cesare* below.)
- (5) Suppose we inferred  $MeP, MaS \vdash SaP$ . Given the same premises, this conclusion does not follow, because the area of S that is not also P (horizontal arrow) must be empty. The inference is hence also invalid.
- (6) Could the conclusion  $SiP$  be derived? The diagram allows this. But since the subject term would in that case be *undistributed* both in the premise and the conclusion, the syllogism  $MeP, MaS \vdash SiP$  is invalid after all.



On the left is the diagram for *Cesare* ( $PeM, SaM \vdash SeP$ ), which shows neatly that the conclusion is revealed by the two premises: (i)  $P \cap M$  is empty, (ii) the area of S that is not M is empty, hence (iii) the intersection  $S \cap P$  is empty too. The inference is therefore valid.