

Exercises, Part II

Keith Burgess-Jackson

The key to doing the exercises is understanding the definition of “validity.” By definition, there cannot be a valid argument with both true premises and a false conclusion. No argument, in other words, has *all* of the following characteristics:

----- is valid has true premises has a false conclusion -----

If you know that a particular argument has *two* of these characteristics, therefore, you know that it lacks the third. Here are the possibilities:

- If a **valid** argument has **true premises**, then it cannot have a **false conclusion** (i.e., it must have a true conclusion).
- If a **valid** argument has a **false conclusion**, then it cannot have **true premises** (i.e., it must have at least one false premise).
- If an argument has **true premises** and a **false conclusion**, then it cannot be **valid** (i.e., it must be invalid).

If you know that a particular argument has *one* of these characteristics, you know that it lacks at least one of the others (possibly both). Here are the possibilities:

- If an argument is **valid**, then *either* it has a **false premise** *or* it has a **true conclusion** (or both).
- If an argument has **true premises**, then *either* it is **invalid** *or* it has a **true conclusion** (or both).
- If an argument has a **false conclusion**, then *either* it is **invalid** *or* it has a **false premise** (or both).

1. Suppose argument X has a false conclusion; what else, if anything, do you know about it, and why? Be thorough. By definition, no valid argument has both true premises and a false conclusion, so, if X's conclusion is false, then *either* X is invalid *or* X has a false premise (or both). Also, since all sound arguments have true conclusions and X has a false conclusion, X is unsound.

2. X has a true conclusion. All sound arguments have true conclusions, but not all arguments with true conclusions are sound. So it is unknown whether X is sound. Both valid and invalid arguments can have true conclusions, so it is unknown whether X is valid. Nothing is known (can be inferred) about X's premises.

3. X has at least one false premise. A sound argument, by definition, has true premises, so X is unsound. Nothing further is known.

4. X has at least one true premise. If the implication is that X has at least one *false* premise, then X is unsound, since sound arguments, by definition, have true premises. If this is *not* being implied, then it is unknown whether X is sound. Nothing further is known.

5. X has true premises (i.e., all of X's premises are true). Either X is invalid or X has a true conclusion (or both). (See above: If an argument has **true premises**, then *either* it is **invalid** *or* it has a **true conclusion** [or both]). Nothing further is known.

6. X has false premises (i.e., all of X's premises are false). X is unsound (since a sound argument, by definition, has true premises).

7. X is sound. X is valid and has true premises (by definition). Also, X has a true conclusion (by inference).

8. X is unsound. Either X is invalid or X has at least one false premise (or both).

9. X is valid. Either X has a false premise or X has a true conclusion (or both). (See above: If an argument is **valid**, then *either* it has a **false premise** *or* it has a **true conclusion** [or both]). All sound arguments are valid, but not all valid arguments are sound, so it is un-

known whether X is sound.

10. X is invalid. X is unsound (since a sound argument, by definition, is valid).

11. X is valid and has true premises. X has a true conclusion. (See above: If a **valid** argument has **true premises**, then it cannot have a **false conclusion** [i.e., it must have a true conclusion]). Also, X is sound (by definition).

12. X is valid and has false premises. X is unsound (since a sound argument, by definition, has true premises). Nothing is known about X's conclusion.

13. X is valid and has a false conclusion. X has at least one false premise. (See above: If a **valid** argument has a **false conclusion**, then it cannot have **true premises** [i.e., it must have at least one false premise]). Also, X is unsound (since all sound arguments have true conclusions).

14. X is valid and has a true conclusion. Nothing is known about X's premises. There can be a valid argument with *true premises* and a true conclusion just as there can be a valid argument with *at least one false premise* and a true conclusion. Therefore, it is unknown whether X is sound.

15. X is invalid and has true premises. X is unsound (since a sound argument, by definition, is valid). Nothing is known about X's conclusion.

16. X is invalid and has at least one false premise. X is unsound (since a sound argument, by definition, is valid). Nothing is known about X's conclusion.

17. X has true premises and a false conclusion. X is invalid. (See above: If an argument has **true premises** and a **false conclusion**, then it cannot be **valid** [i.e., it must be invalid]). Also, X is unsound (since a sound argument, by definition, is valid).