Improving Students' "Dialectic Tracking" Skills
(Diagramming Complex Arguments)

Cathal Woods
for 2010 AAPT Meeting.

My e-mail: cathalwoods at gmail dot com . Contact for a copy of my logic book, or go to
http://facultystaff.vwc.edu/~rwoods/methodsoflogic.htm

Students and of read one sentence, perhaps one paragraph, at a time. By contrast, in philosophy courses we often mention the ability to "follow the dialectic"—to keep track of claims, reasons, objections (and rebuttals to those objections) which might stretch over pages of text. We lack a systematic way of developing this skill in our students.

In this session, I'll share an expanded system of diagramming and have you review graduated exercises in "dialectic tracking" which culminate in tackling newspaper editorials.
I invite others to share their experiences and to help apply, expand and improve the exercises.

You might think that critical reasoning or logic books and courses would cover this, but the treatments are very *rudimentary*.

The basic options are standard form and diagrams. I'll focus on diagrams because standard form is useful only for short passages.

In a diagram, numbers are given to the propositions involved, and arrows are used. Additionally, there can be a plus sign (+) and parentheses or braces.

Text-books will usually cover these reasoning structures:
single-premise, single-conclusion
multiple-premise, single conclusion
extended arguments

Among multiple-premise arguments, a distinction is made between *dependent* and *independent* premises.

Note: there are various other names.

And part of the reason that there are different names is that the concepts are confused.

The confusion is between

Premises working together to give *their* (possibly non-sufficient) support to the conclusion (or: lends *some* support)

And

Premises working together to give *the* (i.e. sufficient) support to the conclusion (or: are *the* support)

In short: does the arrow mean "supports" or "therefore"?

Examples of simple deductive arguments (e.g. AA, CC and DS) are often used to illustrate dependent premises. In such cases, the premises are dependent and sufficient. Such an argument is diagrammed with a single arrow and a plus-sign.

I have no problem with this, except that it suggests that the dependent premises will be specific and general, whereas two pieces of specific information might be dependent. Also, for reasons that will become apparent, I additionally use parentheses, as follows, to indicate a single line of support:

(1 + 2)

↓

3

Then, in contrast, an argument with a number of lines of support is given. E.g. reasons to buy a dog.

Such an argument is diagrammed with a number of arrows, *each* pointing at the conclusion.

This is a mistake. I have two objections (really two versions of the same thing):

1. There is only one argument, and so only one arrow. However, it's often true that the speaker is simply piling on reasons and so, that a subset of the reasons will be sufficient.

2. If we are to diagram passages with objections and rebuttals, we cannot have these multiple arrows. Here's why:

objections are either to the truth of the premises or to the strength of the inference …

(btw: no existing text has a diagramming system that allows this difference to be diagrammed)

… but, in a multiple reasons argument, how could we diagram an objection to the inference which says, "these reasons, together, do not make the conclusion likely"?

Consider a cluster of premises (5-9) which support proposition (2). Imagine an objection to the effect that, even granting the truth of all of these, (2) does not securely follow. At what would we point the challenging arrow? We can't neatly draw it against all of (5) through (9).

```
9    8   7   6   5
 \   |   |   /   /
  \  |   |  /   /
   ↘ ↓ ↓ ↓ ↓
        2
```
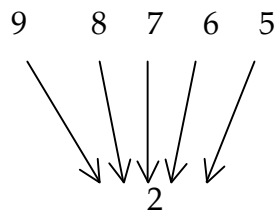
I solve this problem by allowing an objection-arrow to point either at the number representing the premise, or the arrow from premise to conclusion.

[An alternative (hinted at by Epstein) is to demand a connecting premise. The purpose of this premise is to clarify which premise(s) are sufficient.
This makes us lazy.]

Positive proposal: use a split-tailed arrow.
This allows for challenges to the truth of any premise, the support from any premise, and the overall support.
Each of the (multiple) tails of the arrow means "support"; the (single) head of the arrow mean "justifies".
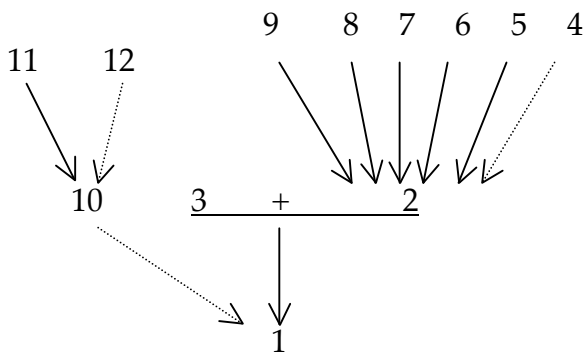
Direction of Arrows
A final suggestion is one of design.

Those who allow for objections and rebuttals employ arrows of a different type, but pointing in the same direction as the arrow standing for the initial argument.

All of Epstein, Kelley and Moore & Parker use an arrow with horizontal marks through them (which I'll call "hash-arrows") to represent a counterargument, while Johnson & Blair use dashed arrows. The premises which support the counterargument are given regular arrows, and the counterarguments to those get hash-arrows.

Here's an example (Epstein p. 363) (using dashed arrows instead of hash-arrows):

```
                    9    8  7  6  5   4
   11     12
                        \ \ \ \  \ \
    \      ⋮
     \     ⋮
      ↓    ↓           ↓ ↓ ↓ ↓  ↓ ↘
     10         3    +        2
              ⋮
               ⋮
                 ↘    ↓
                      1
```

Two possible confusions (two versions of the same thing):

The supports for the objections have regular arrows. E.g. 11 to 10 looks the same as 3 to 1, even though 11 is indirectly contrary to 1.

(Austhink "Note that the reason here helps the objection, not the main contention. It provides evidence that the objection is a good one."

http://austhink.com/reason/tutorials/Tutorial_4/2_reason_objection/reason_objection.htm)

Similarly, objections to objections look identical to objections, even though the former are indirectly supporting the main conclusion. E.g. 12 to 10 looks like 10 to 1, even though it is indirectly supporting 1.

We can respond to this issue by getting rid of the hash-arrow/dashed-arrow and using up-arrows for the objections, and their supports. Here's an example from a different argument. (8) is denying the truth of (7); (9) is pushing down *against* (8)'s attack on (7.)

$(5 + 6)$

7   9

1   8
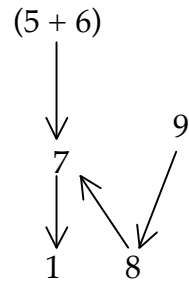
The role of the arrow in the *overall* argument is immediately clear, but determining whether an arrow supports or challenges *what it points at* is now more complicated, as it depends on the direction of the other arrow involved. For example, an objection to an objection will point downwards, in the same direction as the original supporting premises.

The hash-arrow method tells us the reverse: it tell us immediately whether a proposition is supporting or challenging *what it points at*, but the role of the support or challenge in the *overall* argument has to be worked out in relation to the chain of arrows back to the conclusion.