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ARGUMENT STRUCTURE

Representation and Theory

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*For my colleagues in Informal Logic and
Argumentation Theory in Gratitude for
Many Years of Collaboration*

Preface

These papers are a product of reflections on argument structure which I have engaged in, on and off, for thirty years. By “structure” here I mean “macrostructure” as defined in *Dialectics and the Macrostructure of Arguments* (1991). We are concerned here with how the various statements (and perhaps other elements such as modalities and rebuttals) constituting an argument may fit together, rather than whether a given argument instances some inference rule or pattern, such as *Modus ponens*, Syllogism in Barbara, or Statistical Syllogism. I first encountered this sense of structure in Monroe C. Beardsley’s *Thinking Straight* (1974, originally published as *Practical Logic* (1950)). It struck me immediately that Beardsley’s diagramming procedure should be a keystone of any informal logic course. How can one properly evaluate an argument unless one sees what supports what in that argument?

Thomas’ refinement of Beardsley’s procedure in *Practical Reasoning in Natural Language* (1986, first edition 1973) introduced distinguishing linked from convergent argument structure—a distinction which has proved both intuitively appealing and vexingly problematic ever since. I believe that although Thomas has identified an important distinction, he has not drawn it the right way. Substantiating this claim and presenting, motivating, and defending a constructive alternative which I believe draws the distinction in the right way has been an ongoing process which has continued from my first encountering the distinction through composing the three concluding essays for this collection. Thomas gets into difficulties, as I see it, when he speaks of the logical combination of two or more premises. The problem is that there are two senses of “logical combination” or “needing the others to support the conclusion” and Thomas’ specific examples of a deductive hypothetical syllogism, an inductive statistical generalization, and an abductive inference to best explanation conflate them. Speaking very intuitively or metaphorically for the present, one way in which premises logically combine is to “pool their weight.” Each premise may give some reason for the conclusion, but their combined weight constitutes a stronger case. We call this modal combination. Thomas’ example of a statistical generalization illustrates this sense:

- (1) After eating chocolate bar # 1 my face broke out.
- (2) After eating chocolate bar # 2 my face broke out.
- ⋮
- (N) After eating chocolate bar # N my face broke out. Therefore
- (C) Always, after eating a chocolate bar, my face breaks out.

(Thomas 1986, 59) Obviously, this argument illustrates modal combination. Intuitively, the higher the value of N, the stronger the argument. Although, conceding that each premise “provides a little support for the conclusion,” Thomas holds we should count this argument as linked because “the strength of support is much greater when the instances are considered in union together, and each reason needs the truth of the others in order for the conclusion to be supported” (Thomas 1986, 59). Thomas’ argument illustrating inference to best explanation,

- (1) His swimming suit is wet.
- (2) His hair is plastered down. Therefore
- (C) He’s been swimming.

(Thomas 1986, 59) again gives an instance of modal combination. Certainly, given both premises, we should be more confident of our conclusion than if we had just either premise alone, although each premise, by itself, gives some evidence.

By contrast, premises which taken individually do not constitute even relevant reasons for a conclusion, when taken in combination may constitute one obviously relevant reason. This is relevance combination. If one were given only one premise of Thomas’ illustration of a hypothetical syllogism:

- (1) If marijuana were legalized, then it could be commercially processed and made available in a form that did not need to be smoked.
- (2) If marijuana could be commercially processed and made available in a form that did not need to be smoked, then it could be made safer for people’s health. Therefore
- (C) If marijuana were legalized, then it could be made safer for people’s health.

(Thomas 1986, 58) and one were totally unaware of the connection stated in the omitted premise, one would not see why the stated premise was intuitively relevant to the conclusion. Together they constitute a deductively strong reason for it. I hold that premises involving relevance combination are linked, while premises involving modal combination are convergent. Thomas in general would count both as linked, thus conflating relevance and modal combination.

For Thomas, in convergent arguments the premises involve no logical combination, but “each reason supports the conclusion completely separately and independently of the other” (Thomas 1986, 60) For example, the argument

① <Martina has good scholastic aptitude.> ② <She is highly motivated.> Therefore ③ <she will do well academically in college.>

would be deemed convergent. But are the premises completely independent? On relevance considerations they are. But the two premises together give a stronger case for the conclusion than either by itself. In the argument they combine modally. Without distinguishing relevance and modal combination, both the Martina argument and the argument about chocolate bars appear both linked and convergent. Since relevance and modality are distinct issues, and premises can instance either modal or relevance combination, one should keep these two ways of combination distinct in an account of argument structure. Arguments are linked when premises combine on relevance considerations. They are convergent when the premises may combine on modal grounds.¹

Developing a system for diagrammatically representing argument structure adequately, which may reflect the modal/relevance distinction, is facilitated by incorporating some elements of the Toulmin model into Thomas' approach to constructing diagrams, which we call the standard approach.² Specifically, we must add the representation of modal qualifiers to our diagramming system. Certainly in an argument

P₁
P₂
⋮
P_n Therefore
Probably C

¹In distinguishing modal and relevance combination, I have been motivated by a difference Anderson and Belnap (1962) draw between two reasons why it is wrong to read " $B \rightarrow A$ " as " B entails A ," when " $A \rightarrow (B \rightarrow A)$ " is a theorem characterizing " \rightarrow ." First, there is a problem with necessity. An entailment is supposed to be necessarily true, not contingent or dependent upon any contingent matter of fact. Suppose " A " is a contingent statement. Then " $A \rightarrow (B \rightarrow A)$ " apparently asserts that the necessary statement " $B \rightarrow A$ " follows from the contingent statement " A ." Anderson and Belnap further press that "If A should be a true contingent proposition, then $B \rightarrow A$ is also contingently true, and an entailment is established because of an accident of nature" (1962, 30). " $B \rightarrow A$ " thus fails as an analysis of entailment on grounds of necessity. But necessity, and thus entailment, are modal notions. Anderson and Belnap develop that relevance is a distinct issue from necessity (and hence modality). " $B \rightarrow A$ " can be deficient as an analysis of entailment on grounds of relevance, as well as necessity. If " $A \rightarrow (B \rightarrow A)$ " is a theorem where " \rightarrow " is an alleged analysis of entailment, and " A " is a true statement (even if not contingent), then " $B \rightarrow A$ " is true, even if there is no intuitive connection of meaning between " B " and " A ". But

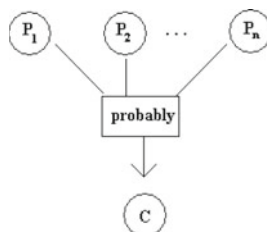
That Hilary Clinton was the first woman to serve as President of the United States entails that for any sets A , B , $A \cap B = B \cap A$

is simply false.

²We present the standard approach in [section 2](#) and the Toulmin model in [section 3](#) of [Chapter 1](#), before indicating a way to integrate them in [section 4](#).

“probably” could be construed as making a claim about how strongly P_1, P_2, \dots, P_n jointly support C , about the strength of the argument overall, although Toulmin counts modal qualifiers as modifying the conclusions of arguments. If each of P_1, P_2, \dots, P_n are independently relevant to C , separate lines could proceed from the representation of each premise to the representation of the modality and a single arrow from that representation to C (See Fig. 1).

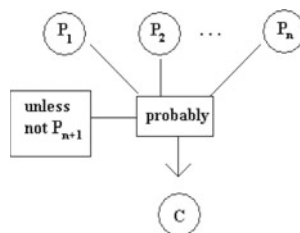
Fig. 1



This is appropriate, since we are understanding the modality as making a claim about the combined weight of the premises, i.e. about the weight of their modal combination.

Toulmin’s layout gives us a further way of representing Thomas’ intuitions over linked versus convergent reasoning without conflating relevance and modal linkage. Concerning the statistical generalization argument, Thomas points out quite rightly that “If no outbreak followed eating a chocolate bar in some instances, then the support given the conclusion by the other positive instances would be greatly reduced” (Thomas 1986, 59), and he offers this as a further reason for seeing the premises as linked, not distinguishing modal from relevance linkage. Now suppose that after eating N chocolate bars, my face broke out but upon eating bar $N+1$, I suffered no adverse consequences. Instance $N+1$ would function as a rebutting defeater and Toulmin gives us a way of representing rebuttals in arguments. We may still see each instance as constituting separate evidence for the conclusion but the defeaters as undercutting their combined force, to be represented by some modality. Letting “ P_i ” represent “After eating chocolate bar # i my face broke out,” Fig. 2 then represents both modal combination of the n premises and the defeating character of the information about instance $n + 1$.

Fig. 2



Besides distinguishing linked and convergent structures, Thomas also identified serial structure.³ It struck me that there was a close connection between the serial/linked/convergent distinction and the three ARG criteria formulated by Govier and others, and which I see deriving from Johnson and Blair's identification in the first edition of *Logical Self-Defense* (1977) of irrelevant reason, hasty conclusion, and problematic premise as the three basic fallacies. To be cogent, arguments must avoid all three. Their premises then will be relevant, their conclusions will be grounded adequately by the premises and thus not hasty, and those premises will be acceptable, not problematic. Should a proponent defend some claim by giving a reason for it, a challenger could question why she should accept that reason, why it was relevant to the claim the proponent alleges it supports, or whether the proponent could supplement his argument with some further reason. Thinking of the proponent's answer as extending his argument, the resulting argument will have a different structure depending on which question he answered. Giving a reason for accepting the original reason produces an argument with serial structure. Adding a relevance explaining premise yields an argument with linked structure, while mooted one or more additional reasons produces an argument with convergent structure.

We can go further. Should the proponent have presented his case for some claim (not necessarily consisting of just one reason) and used a modality to indicate how strongly, in his opinion, the premises supported the conclusion, the challenger, aware of various defeating conditions, could ask him why he is so sure. At the core, then, of argument structure and motivating four different structural considerations are four simple questions:

1. Why should I accept that premise?
2. Why is that premise relevant to the claim?
3. Can you give me an additional reason?
4. How can you be so sure?

Seeing different argument structures motivated by these different questions lets us make contact with another theoretical stream feeding informal logic and argumentation theory—pragma-dialectics, given perhaps its first comprehensive statement in van Eemeren and Grootendorst's *Speech Acts in Argumentative Discussions* (1984).⁴ Van Eemeren and Grootendorst see argument as fundamentally dialectical. A proponent puts forward and defends a claim to a challenger, who responds by asking critical questions. This critical exchange is the basic form of argument. In the first edition of my text *Thinking Logically* (1988), I put forward an intuitive

³Thomas identifies one further structure, divergent, where one premise supports two (or more) distinct conclusions. To evaluate such arguments, we evaluate the inference from the premise to each conclusion separately, as if we were evaluating distinct arguments. Hence, we may set divergent structure aside as not theoretically interesting. We characterize all four of Thomas' basic argument structures in [Chapter 1, Section 2](#).

⁴See especially pp. 15–18.

synthesis of Thomas' standard approach, as I believe it should be corrected, and elements from Toulmin's model, motivated by the notion of a dialectical exchange. In *Dialectics and the Macrostructure of Arguments* (1991), I presented a white paper, i.e. an extended argument, attempting to justify this approach through a dialectical theory of argument structure, providing a rationale for my understanding of argument structure and its diagrammatic representation. In [Chapter 1](#) of these papers, after contrasting the standard approach with Toulmin's model, I present the synthesis as developed in both (1988) and (1991). I also contrast the integrated approach with Wigmore's Chart Method, which Goodwin (2000) has recognized as another approach to representing argument structure and Pollock's method of inference graphs.

In his critical study (1992a) of *Dialectics and the Macrostructure of Arguments*, Alec Fisher found three discussions of especial value besides the contrast of Toulmin's model with the standard view. The first is the positive dialectical theory presented in the book. That discussion was included in [Chapter 2](#) of (1991) and is included in [Chapter 2](#) here. Although I have found much in the Toulmin model which is central to understanding argument structure and argumentation in general, I have found Toulmin's presentation in (1958) problematic at points, especially his discussion of warrants, in a way which leads to a confusing misinterpretation of how his model should be understood. Hence, although I have incorporated both modalities and rebuttals into my approach to argument diagraming, I have rejected Toulmin's distinction of data, warrants, and backing as appropriate for analyzing arguments as products—that is arguments laid out for analysis and evaluation. My reasons why were included in [Chapter 3](#) of (1991) and constitute [Chapter 3](#) here. This is the second discussion Fisher finds of special value. Besides discussing Toulmin, in [Chapter 3](#) I also examine the positions of certain philosophers who may be the intellectual ancestors of his views on warrants—Ryle and Mill. Finally, we have already noted that the linked-convergent distinction has proved problematic. That feature was recognized by the time (1988) and (1991) were written. I presented the approach sketched above to the problem of making the distinction in [Chapter 4](#) of (1991). This is the third discussion Fisher finds especially valuable and is included in [Chapter 4](#) here.

The 1990s saw publication of two further monographs on argument structure, Snoeck Henkemans' *Analysing Complex Argumentation* (1992) and Douglas Walton's *Argument Structure: A Pragmatic Theory* (1996). Both raise critical questions for my approach. In particular, Snoeck Henkemans presents a distinction between multiple and co-ordinatively compound argumentation which she regards as parallel with the convergent-linked distinction. But she finds no discussion of multiple argumentation in my account. I believe that this criticism and some of Snoeck Henkemans' other criticisms reflect that she and I are approaching the phenomenon of argumentation from different disciplinary perspectives—she from dialectic while I from logic (together with epistemology). I developed this response in "Argument Structure and Disciplinary Perspective" (2001) and include the relevant discussion in [Chapter 5](#) here. In particular, I do not read the multiple-co-ordinatively compound distinction and the linked-convergent distinction as the

same. The concept of multiple argumentation is central for the dialectical analysis of argumentation, but it plays no role in logical analysis. In [Chapter 5](#), I also respond to Snoeck Henkemans' analysis of modalities, rebuttals and more generally defeaters and counter-defeaters in (1992), again contrasting how our differing approaches reflect our different disciplinary perspectives.

In (2001), we related drawing the multiple-co-ordinatively compound distinction and the linked-convergent distinction, considered as two different pairs of distinctions, to the problem of resolving conflicts over how the linked-convergent distinction should be drawn, critically examining a number of proposals for making the distinction, including those appearing in various texts which Walton systematized in (1996). There Walton raises a critical issue over my use of relevance in drawing the linked-convergent distinction. I accept the criticism. The concept of relevance is an intuitive notion but, I hold, not a simple or unanalyzable concept. To do the work of distinguishing linked from convergent structure, we should present that analysis. A first formulation appears in (2001). Although I still agree with the overall approach of that analysis, I believe that my account of how it should be applied to mark the linked-convergent distinction needs to be corrected. In [Chapter 6](#) I present the corrected definition of relevance and relate it specifically to drawing the linked-convergent distinction.

Interestingly, Thomas gives us a clue for the characterization of linked structure by saying that his diagramming method was based on the work of several authors, in particular Gerhard Gentzen. We use Gentzen's discussion of the inference rule Cut to explicate the notion of a mediating element, which gives us the key to identifying arguments with linked structure. Given this criterion, we proceed to criticize the systematically presented tests Walton considers in (1996) for trying to do a syntactic job with semantic tools. We also consider a number of recent proposals and critiques concerning the linked-convergent distinction. These include Blair and Pinto's proposal that we need to distinguish complementary arguments as a third type of structure beside linked and convergent, and Vorobej's proposal concerning hybrid arguments. We defend our assumption that analysis precedes evaluation, which Gratton has questioned, and reply to direct challenges to our relevance test for linked structure. We also reply to G.C. Goddu's skeptical arguments against making the distinction. Our discussion has benefitted from correspondence with Professor Goddu, which we acknowledge with thanks.

In replying to Goddu, we acknowledge that a complete answer presupposes an account of enthymemes. In (1996), Walton identifies the feature that arguments may have unstated premises or conclusions as posing a major problem in argument diagramming. Accordingly we turn our attention to enthymemes in [Chapter 7](#), applying insights of David Hitchcock to construct our approach. The issue of enthymemes stands at the border between argument analysis and evaluation. The transition to argument evaluation raises further questions, three of which we address in [Chapter 8](#). Further purely evaluative issues we leave for another day.

Origins of the Chapters

The first three sections of [Chapter 1](#), together with the last section, were originally prepared for a chapter, “Argument Structure,” to appear in one volume of a proposed *Handbook on Practical Logic*. I wish to thank Prof. Francisca Sneock Henkemans for much useful advice in acting as referee for this chapter. The fourth and fifth sections, together with the appendices on Wigmore and Pollock, were prepared especially for this volume.

The first five sections of [Chapter 2](#) are a slightly revised version of Section 2.1, “The Dialectical Nature of Argument,” in *Dialectics and the Macrostructure of Arguments* (Berlin and New York: Foris Publications, a Division of Walter de Gruyter & Co., 1991). The last section of the chapter, my reply to Finocchiaro, has been added for this collection. [Chapter 3](#) is a revised version of Section 3.2 of *Dialectics and the Macrostructure of Arguments*. [Chapter 4](#) presents material from Section 4.4 again from *Dialectics and the Macrostructure of Arguments*, supplemented with material from Section 1.4 and from Section 6.5. We hereby thank Walter de Gruyter and Company for their permission to use this material.

The material in the first three sections of [Chapter 5](#) is substantially included in “Argument Structure and Disciplinary Perspective” (*Argumentation* 15, 397–423, 2001), with some minor editorial revision. We hereby thank *Argumentation* for the use of this material. The fourth section of [Chapter 5](#) is largely new with this volume.

[Section 6.1](#) contains further material from “Argument Structure and Disciplinary Perspective,” first on defining relevance with respect to inference rules. As in (2001), we then indicate how this bears on drawing the linked-convergent distinction, presenting a refined account. [Section 6.2](#) discusses themes also discussed in the *Argumentation* article. We thank *Argumentation* for allowing us to use this material also. [Sections 6.3](#) and [6.4](#) are new. [Chapter 7](#) and [8](#) are completely new to this volume.

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