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A Problem Unsolved
Identification des structures d'arguments liées et convergentes
Un problème non résolu

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Article abstract

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Identifying Linked and Convergent Argument Structures: A Problem Unsolved

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Abstract: To analyze the argument structure, the linked vs convergent distinction is crucial. In applying this distinction, argumentation scholars test for variations of argument strength under premise revision. A relevance-based test assesses whether an argument's premises are individually relevant to its conclusion, while a support-based test assesses whether premises support the conclusion independently. Both criteria presuppose that evaluating an argument's strength is methodologically prior to identifying its structure. Yet, if 'argument structure' is a concept of analysis, then a structural analysis would precede evaluating an argument's strength. We problematize that state-of-the-art methods to identify structures fail, because they rely on evaluative judgments, and so "put the cart before the horse."

Résumé: Dans cet article, j'adopte un cadre pluraliste sur l'argumentation, où les normes qui dirigent la construction et l'évaluation de l'argumentation dépendent du but de notre engagement dans cette pratique. Un domaine d'argumentation spécifiquement épistémique est distingué, et je soutiens, sur la base de découvertes récentes en épistémologie modale, que ce domaine est dirigé par la norme modale de sécurité, selon laquelle une croyance est sûre juste au cas où elle serait produite par une méthode qui ne produirait pas facilement une fausse croyance. Bien que ce critère soit bien connu et non controversé en épistémologie, il n'a jusqu'à présent pas été appliqué aux théories épistémiques de l'argumentation. Je montre la fécondité d'introduire cette norme modale dans notre théorie de l'argumentation en soutenant que cela permet une perspective nouvelle et supérieure sur la pertinence de l'interlocuteur persistant dans la théorie de l'argumentation, et plus généralement sur la relation entre les normes dialectiques et épistémiques.

Keywords: argumentation, convergent, dependence, linked, relevance, structure

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1. Introduction

As the three central research questions for the study of argument structure, A. Francisca Snoeck Henkemans (2001, pp. 101f.) identifies the following: (1) *Definition*: how to define argument structure and its types? (2) *Analysis*: how to identify the structure of a specific argument? (3) *Intellectual history*: how did the concept 'argument structure' and its typologies develop? Other than by briefly reviewing scholarly approaches (Sect. 2), here we mostly neglect (3). Since a reasoned view on (2) grounds in a reasoned answer to (1), we treat (1) as the most fundamental question. We claim that the distinction between linked and convergent argument structures remains unclear today because (1) is yet to be answered satisfactorily.

The concept of 'argument structure' is complementary to the concept of 'argument scheme.' Whereas an argument structure "characterizes the 'external organization' of the argumentation" (van Eemeren et al. 2014, p. 21), an argument scheme "defines […] how the 'internal organization' of the argumentation is to be judged" (2014, p. 19). Argumentation scholars who theorize such structures on a *logical* approach tend to highlight the goal of "determin[ing] whether the premises constitute good reasons for accepting the conclusion, good in the sense of transferring the acceptability of the [accepted] premises […] to the conclusion" (Freeman 2011, p. 109). The focus thus rests on the structure of the *argument-as-product*, itself a simplified static representation of the dialectical process of arguing. Scholars who pursue a *dialectical* approach, by contrast, highlight the functions that argumentation structures fulfill in the process of argumentation (Snoeck Henkemans 2001, p. 101). Here, "the focus of interest concerns how well a critical discussion has come to a reasoned resolution of some disputed question" (Freeman 2011, p. 109).[1]

[1] Use of the term 'reason' occurs on the understanding that pragma-dialecticians use 'argument,' as opposed to 'standpoint,' in ways that roughly correspond to how other scholarly traditions use 'reason' or 'premise,' as opposed to 'conclusion.'

As argumentation scholars today seek "to provide theoretical instruments for analyzing, evaluating and producing argumentative discourse in an adequate way" (van Eemeren 2018, p. 5), the main theoretical approaches use different labels to denote argument structures (Fig. 1). Informal logicians, for instance, distinguish *serial*, *linked*, and *convergent* structures, while pragma-dialecticians speak of *subordinative*, *coordinative*, and *multiple* structures. These terms, however, fail to entail a substantial difference (Snoeck Henkemans 2001, p. 101). We adopt the former terminology.

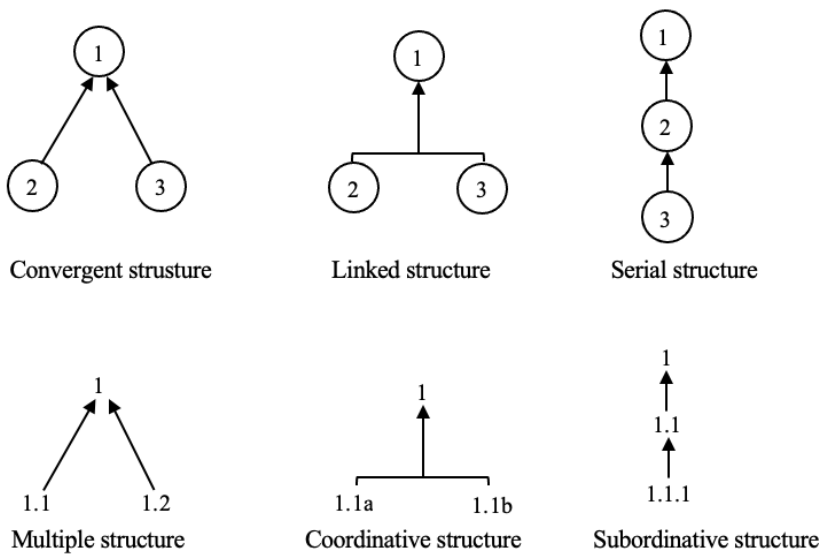

Fig. 1 Three argument structures, with the top-most node representing the conclusion, and the other nodes the premises.

The central distinction is that between a *convergent* and a *linked* structure. Drawing this distinction is what Geoff Goddu rightly calls "*the* problem of structure" (2007a, p. 11; *his italics*). Multiple premises of a convergent structure (i.e., convergent premises) are interpreted logically as alternative *lines of support*, or dialectically as alternative *lines of defense*, for the standpoint. In a linked structure, by contrast, multiple premises provide only a single line of support/defense. In a *serial* structure, finally, a single

premise provides a single line of support/defense for a conclusion, where this premise is itself a conclusion supported by another line of support/defense. The serial structure thus amounts to a hierarchical arrangement of a single line of support/defense that involves an intermediate conclusion.

Virtually all structural analyses recur to the mutual in-/dependence or ir-/relevance of the premises. Roughly, if an argument's premises are independent of other premises, or are irrelevant to the conclusion, then the argument instantiates a *convergent* structure, otherwise a *linked* structure. Our main claim is that judgements of premise-dependence or -relevance that *inform* a structural analysis depend on *evaluating* the argument's comparative ability to transfer the acceptability of the premises to its conclusion. This is what creates the problem of distinguishing linked from convergent structures in the first place.

Also known as *argument strength*, the transfer of acceptability is modelled as a function of what scholars variously call the argument's *justificatory force*, its *weight*, or the *degree of support* that premises lend to the conclusion. Since the identification of argument structure thus relies on evaluating premise in-/dependence and ir-/relevance, analyzing the support that premises lend to a conclusion requires evaluating the *contents* of premises and conclusion, and how these contents relate to each other, as well as to additional, possibly contravening information. A structural analysis, however, is thought to occur *before* evaluating argument strength: argument analysis is *preparatory* to argument evaluation (Freeman 2011, p. 141; van Eemeren and Grootendorst 1992, p. 95f.; Walton 1996, p. 79, p. 81). But to settle a *structural* question, analysts in fact recur (implicitly) to evaluative judgments, and so engage in argument *evaluation* (see Goddu 2007a, p. 19).

This, we argue, *defines* 'argument structure' in the wrong way. This definition necessarily leads to problems in analysis, because matters of analysis depend on matters of definition. At any rate, the definition challenges the idea that 'argument structure' is an analytic rather than an evaluative concept. We purposefully ignore the question whether the linked-convergent distinction

is at all valuable.[2] Our goal is rather to demonstrate that state-of-the-art methods by which to draw this distinction are ineffective because the definition of argument structure and its types is defective.

We start by introducing a static logical and a dynamic dialectical approach to argument structure (Sect. 2). As the dynamic aspect of the dialectical approach is far from obvious, we hold that the current state of this approach amounts to yet another static approach (Sect. 3). We then turn to two ways of distinguishing convergent from linked structures using support-based and relevance-based tests (Sect. 4). Since both ways entail testing for variations of argument strength under premise revision, we claim that this has things backwards (Sect. 5). Our conclusions are in Sect. 6.

2. Logical and dialectical approaches to argument structure

2.1. The logical approach

A logical approach pays attention "only to the structur[al] aspects of argument structure as they manifest themselves in the product of the reasoning process" (Snoeck Henkemans 2001, p. 101). Following Monroe Beardsley's (1950) distinction between *convergent*, *divergent*, and *serial* structures, the relevant terminology nevertheless cites the term 'support.' This particularly invokes an evaluative aspect regarding the support that an argument's premises lend to its conclusion.

A *convergent* argument is defined as one where "several independent reasons support the same conclusion," while in a *divergent* argument "the same reason supports several conclusions," whereas a *serial* argument "contains a statement that is both a conclusion and a reason for a further conclusion" (Beardsley 1950, p. 19). What proves crucial here is that the support for the same conclusion is said to arise from reasons, or premises (Adler 2008), that are in a relevant sense *independent*.

The first to distinguish a *convergent* from a *linked* structure seems to have been Stephen Thomas (1997 [[1]1973]) (Snoeck Henkemans 2001, p. 108). For the linked structure, Thomas ob-

[2] For a negative answer, see Goddu (2007b).

serves that reasons provide *inter-dependent* support to a conclusion. "When a step of reasoning involves the logical combination of two or more reasons, they are diagrammed as *linked*" (Thomas 1997, p. 50; *his italics*). By contrast, "[w]hen two or more reasons do not support a conclusion in a united or combined way"—by which Thomas means that "each reason supports the conclusion completely [sic] separately and independently of the other"—then "the reasoning is *convergent*" (Thomas 1997, p. 52; *his italics*).

Irving Copi and Carl Cohen similarly distinguish a *convergent* from a *linked* structure such that, in the former, "each of the […] premises supports the conclusion *independently*. Each supplies some warrant for accepting the conclusion and would do so even in the absence of the other premiss" (1990, p. 19; *italics in original*). In a linked argument, by contrast, the "premisses must work together to support their conclusion," which is to say that premises "work cooperatively" (1990, p. 20).

Robert Pinto and Tony Blair (1993) likewise distinguish "between a 'group' of premises that together form one inference and 'independent' groups of premises which can be seen as parallel inferences to arrive at the same conclusion" (Snoeck Henkemans 2001, p. 112). Here, 'dependence' expresses that "the premises work in combination to support the conclusion," and 'independence' expresses that "the premises of each group are able to provide their support without any help from premises in any other group make them independent of each other" (Pinto and Blair 1993, p. 77; see Snoeck Henkemans 2001, p. 112).

Adopting this idea, Leo Groarke, Christopher Tindale and Linda Fisher (1997) improve on its formulation: "[l]inked premises work together. Taken independently, they do not support the argument's conclusion. Convergent premises do not require each other, for they support the conclusion *independently* of the argument's other premises" (Groarke, Tindale and Fisher 1997, p. 35; *italics added*; see Snoeck Henkemans 2001, p. 114).

Without denying the crucial role of premise in-/dependence for an analysis of argument structure, other scholars recur to the concept of 'relevance' as a *supplementary* factor to 'dependence'. In discussing tree-diagrams as a means of mapping an argument's logical structure, for instance, Ralph Johnson and Tony Blair

observe for linked arguments that "two or more premises are *relevant* in combination," whereas in convergent arguments there are "two or more distinct, *independent* grounds for a conclusion" (1994, pp. 36-38; *italics added*). Independence and irrelevance are thus associated with a *convergent* structure, while dependence and relevance are associated with a *linked* structure.

Like Johnson and Blair (1994), Trudy Govier's (2010) version of this distinction places relevance next to independence:

> "*Linked* premises can support the conclusion in the argument only when they are taken together; no single premise will give any support to the conclusion without the others. […] When the support is of the *convergent* type, each premise states a separate reason that the arguer thinks is *relevant* to the conclusion. In these cases, premises are not linked and are not *interdependent* [i.e., independent] in the sense that each one could support the conclusion without the others." (Govier 2010, pp. 37f.; *italics added*)

In sum, when distinguishing a convergent from a linked argument structure—with the concept of relevance added, or not—the in-/dependence of the premises is central. We return to this in Sect. 4.1 and subsequently argue that premise-dependence fails as a useful criterion (Sect. 5.1). Let us first turn to the dialectical approach.

2.2. The dialectical approach

Whereas a logical approach to argument structure focuses on the argument-as-product (as an abstract inferential object where reasons support a conclusion), the dialectical approach connects the concept of 'argument structure' with that of the 'dialectical situation.' Here, it "depends on the antagonist's doubts and the way the arguer [i.e., the proponent] attempts to deal with these doubts what the resulting structure of [the] argument will be" (Snoeck Henkemans 2001, p. 119; see van Eemeren and Grootendorst 1984; 1992; 2004). Specifically, multiple (i.e., convergent) and coordinative (i.e., linked) structures are treated "as resulting from *different types of defensive moves* aimed at removing different forms of criticism" (Snoeck Henkemans 2001, p. 121; *italics added*; see Snoeck Henkemans 1992).

Coordinative argumentation is a response to a *criticism of sufficiency* and can be neutralized in one of two ways. In a direct or *cumulative* defense, the protagonist adds at least one new reason; in an indirect or *complementary* defense, the protagonist refutes the antagonist's counter-reason. In both cases, old and new reasons must be somehow combined, "because the arguer can only convince the opponent of the acceptability of the standpoint if [s]he succeeds in removing the opponent's doubt or criticism regarding the sufficiency of the [entire] argumentation" (Snoeck Henkemans 2001, p. 121).

In *multiple* argumentation, "the only connection between the arguments [or reasons] is that they are all advanced as a [separate] defence of the same standpoint" (Snoeck Henkemans 2001, p. 121). As before, there are two ways of offering a defense. The protagonist may "*withdraw* his [original] argument and undertake a new attempt to defend the standpoint" (pp. 121f.; *italics added*); or "in anticipation of a possible non-acceptance of his argument, the protagonist may *advance a new argument* […] motivated by the (potential) failure of a previous attempt" (p. 122; *italics added*).

James Freeman similarly identifies argument structure with respect to the dialectical situation. In a *convergent* structure, "two or more premises are each independently relevant to the conclusion," and each premise is "given to answer the question—Can you give me an additional reason?" (1991, p. 94). In a *linked* structure, "two (or more) premises must be taken together or are intended to be taken together to see why we have one relevant reason for the conclusion," such that "at least one of [the] linked premises [must be] offered to answer the question—Why is that (the remaining premise or premises) relevant?" (1991, p. 94). This serves to distinguish two types of premise combination: "premises involving relevance combination are linked, while premises involving modal combination are convergent" (Freeman 2011, viii).

In agreement with Snoeck Henkemans (1992), Freeman holds that "the modality qualifies the standpoint" by "express[ing] […] different levels of commitment to the proposition advanced by the standpoint" (2011, p. 120). For instance, 'Socrates is *certainly* guilty of corrupting the youth' and 'Socrates is *possibly* guilty of

corrupting the youth' both "express the same proposition, but the standpoints taken with respect to the proposition are different in each case, since each involves a different degree of commitment to the proposition" (Freeman 2011, p. 120; see Snoeck Henkemans 1992, p. 110). With a modal combination, then, "[e]ach premise may give some reason for the conclusion, but their combined weight constitutes a stronger case" (Freeman 2011, vii).

In sum, the logical approach targets the argument-as-product resulting from a process of reasoning or argumentation. Different structures are determined via the support-relation among premises and conclusion, i.e., whether reasons support the conclusion individually or jointly. The dialectical approach, by contrast, which targets the argumentative process, determines argument structures according to whether the reasons defending a standpoint against an antagonist's doubts do so individually or jointly.

3. Argument dynamics

We saw that a logical approach focuses on structures that manifest themselves in a product of reasoning or argumentation, whereas a dialectical approach focuses on structures that arise in the process of defending a standpoint against an opponent's doubt or criticism. The term 'argument[ation] structure' thus refers either to the specific arrangement of conclusion-supporting reasons in a *static* product, or to the constellation of defensive moves in a *dynamic* process that unfolds under an opponent's critical pressure. In the pragma-dialectical theory, for instance, the purpose of identifying argument structure is to elaborate how such defensive moves contribute to resolving a difference of opinion on the merits (van Eemeren and Grootendorst 2004).

Whereas the distinction between *supporting a conclusion* and *defending a standpoint* merely reflects a preferred theoretical perspective regarding the goal of offering reasons, the distinction between a static *argument-as-product* and a dynamic *argumentation-as-process* is substantial, because extracting only the premises and the conclusion—as is typical for an argument-as-product—entails neglecting, indeed deleting, material that is constitutive of the argumentation-as-process. But the dialectical approach to

argument structure fails to *accomplish* the task of representing the dynamic process of argumentation. To see this, consider the argumentation A-1 by Thomas (1986), as cited in Freeman (2011, p. viii). On the dialectical approach, an analyst would intuitively identify A-1 as a *convergent* structure, because the proponent seems to defend the standpoint against doubt or criticism using three *independent* reasons, R1-R3.

A-1 An argumentation with a convergent structure (Freeman 2011, p. viii)

[R1] His swimming suit is wet.
[R2] His hair is plastered down.
[R3] He is wearing swimming goggles. Therefore
[Conclusion] He's been swimming.

What kind of dialectical situation might be associated to A-1? As per Freeman's method of reconstructing the dialectical situation, to connect any two convergent premises one may imagine the antagonist intermediately asking: "Can you give me an additional reason?" One can thus transform argumentation A-1 into the dialogue D-1 between, say, Nancy and Tony.

D-1 A dialogue reconstructed from A-1

Tony: "You see, he's been swimming [conclusion], because his swimming suit is wet [R1]."
Nancy: "Can you give me an additional reason?"
Tony: "His hair is plastered down [R2]."
Nancy: "Well, can you give me an additional reason?"
Tony: "All right, he is wearing swimming goggles [R3]."

In D-1, Tony initially forwards only R1, whereas R2 and R3 arise in response to critical pressure by Nancy. Were the dialogue D-1 to unfold as described, then two assumptions would normally hold. First, Nancy was insufficiently convinced by R1, and receiving R2 did not change this. Otherwise, why would she continue to ask for an additional reason? Second, compared to R2 and R3, R1 deserves identification as Tony's original premise, because R2 and

R3 are forwarded only in response to critical pressure by Nancy. Compared to R3, moreover, R2 seems to enjoy a priority status because Tony offered R2 before R3.

Neither assumption, however, can be readily justified, because the transformation of A-1 into D-1 requires information that is *absent* from A-1. Can one nevertheless readily identify the structure of a dialogue? It turns out that one rather cannot, or so D-2 shows, where R3 is withdrawn under critical pressure.

D-2 A dialogue where reason R3 is withdrawn

(1) Tony: "You see, he's been swimming [conclusion], because his swimming suit is wet [R1], and swimming makes one's suit wet [R2]. Moreover, his hair is plastered down [R3]."
(2) Nancy: "But, actually, I saw his hair was dry."
(3) Tony: "Well… all right, my guess [R3 withdrawn]."

Given Tony's original utterance in (1), R1 and R2 instantiate a *linked* sub-structure, which, like R3, feature separate premises, whereas R1, R2, and R3 together instantiate a *convergent* structure. So, if R3 is withdrawn in (3), then the structure constituted by R1 and R2 turns out to be *linked*. Now, is the structure in D-2 linked or convergent? The best answer, apparently, is that the structure has *changed* from a convergent to a linked structure. Notice that this issue is general, pertaining to *any* transformation of an argumentation into a dialogue.

Other than withdrawing a reason, of course, arguers can make other changes, e.g., revising a reason or even a conclusion. To our best knowledge of the literature, the dialectical approach to argument structure has so far failed to discuss these changes, leaving it unclear whether a dialectical analysis can adequately deal with argument dynamics. So, without denying the theoretical and terminological differences between 'supporting a conclusion' and 'defending a standpoint against doubt or criticism,' respectively between a static and a dynamic perspective, the current state of the dialectical approach to argument structure is virtually indistinguishable from the logical approach. Both target a *static* argument-as-product.

We now turn to ways of testing whether arguments-as-products feature linked or convergent structures.

4. Testing for linked and convergent structures

4.1. Support-based tests

To distinguish a linked from a convergent structure, Douglas Walton (1996, pp. 119f.) lists five tests (T1-T5; here listed in a modified order).[3] Generally, if the truth of an argument's antecedent (comprising the premises) leads to the truth of its consequent (the conclusion), then the argument passes the test, resulting in a positive test-result; otherwise the test-result negative. A positive test-result indicates that the argument's structure is *linked*, whereas a negative test-result indicates that it is *convergent*. In each case, the test-criterion is the effect exerted upon the support-relation if a single premise is considered false or is suspended (i.e., neither known to be true nor false). In this case, the conclusion receives insufficient support or no support at all.

T1-T4 are binary tests, while T5 reports the test-result in comparative, yet vague terms (ordinal measurement level). Except for T-2, which Walton develops in analogy to T-1, T-3, and T-4, the other four tests draw on previous literature.

> T1 *Falsity/no support*
> If one premise is false, then the conclusion no longer receives any support.

> T2 *Falsity/insufficient support*
> If one premise is false, then the conclusion receives insufficient support.

[3] To identify the structure of an argument, Walton's pragmatic theory of argument structure distinguishes four types of evidence: the argument type, textual evidence such as indicator words, contextual evidence on the purpose of the argument, and the test-result (Walton 1996, p. 152). Here we focus on the tests themselves. For a critique of the relations between the four evidence types, see Goddu (2007a, pp. 13f.).

T3 *Suspension/no support*
If one premise is suspended, then the conclusion receives no support.

T4 *Suspension/insufficient support*
If one premise is suspended, then the conclusion receives insufficient support.

T5 *Degree of support*
If the joint strength of the argumentation is much greater than if each premise is considered separately, then the argument has a linked structure.

T1, called the Copi-Cohen test (Copi and Cohen 1990, p. 20), shall not only indicate "whether the premises 'work cooperatively' or 'independently'" (Walton 1996, pp. 109f.), but also "whether each [premise] is absolutely needed for the other [premise(s)] to provide any support at all to the conclusion" (1996, p. 111). By weakening the antecedent-condition—from a premise being *false* to being *suspended*—one obtains T3, called the Freeman test (Freeman 1988, p. 178). T3 tests for non-zero support by asking whether, "if we suspend the one premise, does the other give *any reason at all* to support the conclusion?" (Walton 1996, p. 113; *italics added*). T4 does the same for non-zero but insufficient support (van Eemeren and Grootendorst 1984, p. 91; Windes and Hastings 1965, p. 216). Specifically, T4 tests for insufficient support that is typical for multiple argumentation, where among "'a series of separate and individual arguments [read: reasons]' for a conclusion […] it does not matter [with respect to supporting the conclusion] *which* [reason] is chosen" (Walton 1996, pp. 114f.; *italics original*; see van Eemeren and Grootendorst 1984, p. 91). Apparently, T2 is designed in analogy to T1, T3 and T4.

T1-T4 are *binary* tests, whereas T5 addresses a *comparative* notion of support. Inspired by Thomas (1981, p. 52) and Malcolm Acock (1985, p. 83)—wherefore Walton calls it "Thomas-Acock test"—T5 tests "how well the conclusion was supported before [a] premise was removed versus how well [the conclusion] is supported once the premise is taken away" (Walton 1996, p. 121). Thom-

as' and Acock's tests, however, do test for *distinct* states of affairs. For Thomas, "[t]he test for a linked argument is: if one premise is taken away, the conclusion is more weakly supported than it was when that premise was in the argument" (Walton 1996, p. 125). According to Thomas's test, then, the argument '(i) his swimming suit is wet; (ii) his hair is plastered down; therefore, he's been swimming' instantiates a *linked* structure, because if (i) or (ii) is suspended, the conclusion is less supported than otherwise. This test-result is counter-intuitive; scholars would normally consider the argument to instantiate a *convergent* structure.

According to Acock's test, it holds for a linked argument that "the sum of the amount of support given independently [by the premises, to the conclusion] is less than the amount of support [the premises] give to the conclusion when taken together" (Acock 1985, p. 83; see Walton 1996, p. 125). This means Acock's test compares the *joint* support that the entire premise set lends to the conclusion to the *sum* of the support that each premise lends individually. The test thus differs from Thomas's in that Acock's test must first (somehow) determine the support each premise lends individually *and form the sum*, and then compare that sum to the joint support lent by the premise set. By contrast, Thomas's test determines the joint support, and then establishes whether suspending a premise does result in reduced support, without summing the support that each premise lends individually.

Robert Yanal (1988, p. 42; Walton 1996, p. 127; c.f. Yanal 1991; 2003) has refined Thomas's test by altering the change in support from 'is greater/less than' to 'is *much* greater/less than,' yielding T5.[4] As Walton observes, what T5 "literally says is that, when we remove the premise (or component argument [sic]) in question, the level of support for the conclusion drops considerably," which entails that "the argument is no longer strong enough to meet the [contextually determined] level of burden of proof […] to make the conclusion acceptable. So construed, [T5] amounts to the same finding as [T4]" (1996, p. 166).

[4] Goddu (2003) provides a more detailed account of Yanal's test (aka the ordinary summing test). He contends that this test, as well as two related versions of it, fail because the tests cannot identify convergent structures in all relevant cases.

Yet, T5 does *not* require that the support changes from sufficient to insufficient. T5 merely requires that, in a linked structure, the degree of joint support is much greater than the support that is generated if the premises are considered individually. It therefore remains possible that, even after a very large increase in strength, the argument nevertheless cannot meet the sufficiency requirement. Hence, T4 and T5 are distinct tests, that use distinct test-criteria.

In sum, all tests rely on the variation in strength/support to address the mutual dependence of the premises. This makes considering the variation of strength/support inherent in the concept of 'dependence,' and hence in the concept of 'argument structure.' Yet, defining argument structures based on strength variation does not always succeed. As we explain in Sect. 5.1, T1-T5 therefore fail to be *absolute* tests. First, we turn to yet another way of distinguishing linked from convergent structures, which we criticize in Sect. 5.2.

4.2. Relevance-based test

We saw in Sect. 2 that argument structure types can be defined by using relevance as a supplementary factor to dependence. Freeman holds that an argument instantiates a *convergent* structure if "two or more premises are each *independently relevant* to the conclusion," which means that "[e]ach gives a separate piece of evidence for the conclusion" (2011, p. 94; *italics added*). Particularly premises that involve *modal* combinations are said to be convergent because "each premise may give some reason for the conclusion, whereas their combined weight [i.e., support] constitutes a stronger case" (2011, p. vii). By contrast, Freeman considers premises involving *relevance* combinations as *linked*, such that "premises which taken individually do not constitute even relevant reasons for a conclusion [may,] when taken in combination [, …] constitute one obviously relevant reason" (2011, p. viii). This implies that Freeman's test is not exclusively based on relevance, but also on dependence, because the test involves considerations of strength variation.

The relevance relation between any two statements, *P* and *Q*, Freeman submits, is best thought of "as a ternary relation between *P*, *Q*, and a set of inference rules *I*" (Freeman 2011, p. 130; see

Freeman 1992). Here, *I* may contain formal deductive or inductive rules, as well as material inference rules (e.g., Toulmin's warrants). For instance, 'Harry was born in Bermuda' is relevant to 'Harry is a British subject,' because *I* contains the rule 'from *x* is born in Bermuda, infer that *x* is a British subject' (1992, pp. 131f.). This consideration is based on Charles Peirce's (1955, p. 130) *inference habit* which "convey[s] us from one judgment to another" (Freeman 2011, p. 130). It is in virtue of an inference habit, then, that one can "perceive or intuit relevance" (2011, p. 130).

This ternary-relation of relevance Freeman defines as follows:

> "A statement *P* is relevant to a statement *Q* if there is some inference rule in the canonical set *C* licensing the move from *P* to *Q*. Similarly, a set of statements P_1, P_2[,] …, P_n is relevant to a statement *Q* if there is some n-premised inference rule in *C* licensing the inferential move from P_1, P_2[,] …, P_n to *Q*." (Freeman 2011, p. 131)

Though Walton (1996, p. 113), who characterizes T3 as 'the Freeman test', claims that this test uses only premise dependence based on strength variation (see our Sect. 4.1), Freeman here distinguishes linked from convergent argument structures by considering relevance besides dependence. Relevance-based tests do thus seem to be more developed than support-based test. Yet, as we show in Sect. 5.2, Freeman's test must likewise be grounded in support/strength, and so is also problematic.

5. Problems

5.1. Evaluating T1-T5

Prima facie, the fundamental difference between linked and convergent argument structures is whether the premises support a conclusion jointly, or in a combined or united way (Thomas 1997, p. 52), i.e., whether the premises "work together to support conclusion" (Copi and Cohen 1990, p. 20). This, however, does not yield a well-specified criterion to distinguish a linked from a convergent structure. For the linked structure, 'working together' presumably means that the premises jointly increase the conclu-

sion's acceptability. But this also holds for a convergent argument, because convergent premises lend comparatively "more support to the conclusion collectively than each [convergent premise] would individually" (Walton 1996, pp. 111f.), that is, "convergent premises together [make] a stronger case for the conclusion than either [premise] by itself" (Freeman 2011, p. ix). So, convergent premises do likewise work together to increase the conclusion's acceptability. In brief, premises work together in a convergent *and* a linked structure.

A relevant difference between both structures might arise if 'working together' meant that the premises in a *linked* structure work together *necessarily*, whereas this need not hold for a *convergent* structure. The presumably most straightforward way of interpreting necessity is to specify it as 'the degree of support each premise is required to lend to the conclusion.' On this interpretation, if the premises of an argument with a *linked* structure support the conclusion independently, then the support that each premise lends to it cannot meet this required degree. In a *convergent* structure, by contrast, the support that each premise lends to the conclusion must meet this required degree. But this interpretation—which corresponds to the mainstream view today—precisely creates the problem of clearly distinguishing linked from convergent structures, because it places argument evaluation before argument analysis.

If the degree of support is specified as the degree that is required for *sufficient* support, what could explain why *linked* premises must work together necessarily is that each linked premise lends insufficient support to the conclusion (although premises jointly lend sufficient support). *Convergent* premises, by contrast, need not work together, because each convergent premise already lends sufficient support to the conclusion. The specification 'sufficient support' would work for T2 and T4. Yet for T1 and T3, the required degree of support would have to be specified as 'any support,' such that in a linked argument, and absent a given premise, the conclusion receives *no* support. And although the formulation of T5 does not imply a clear specification of the required degree of support in terms of sufficient or any support, it can be interpreted as

a *significant increase* in the degree of support that results from considering the linked premises jointly as opposed to individually.

All five tests thus assume that the necessity of linked premises to work jointly is based on a variation between two states of support. The first state amounts to all linked premises jointly supporting the conclusion. The second state amounts to only one premise supporting the conclusion, namely that premise which is not suspended or considered false. This at least holds for arguments with two premises. Arguments with more than two premises face a distinct complexity problem, addressed below.

To see how this plays out using an example where the required degree of support is specified as 'sufficient support', we can contrast the argumentation A-2, which would normally be analyzed as a *convergent* structure, with the argumentation A-3, which would normally be analyzed as a *linked* structure:

A-2 A convergent argumentation (Freeman, 2011, p. viii)

[R1] His swimming suit is wet.
[R2] His hair is plastered down. Therefore
[C] He's been swimming.

A-3 A linked argumentation

[R1] His swimming suit is wet.
[R1-C] A wet swimming suit implies one has been swimming. Therefore
[C] He's been swimming.

The following problems now arise:

The inconsistency problem

On the assumption that A-3 instantiates a *linked* structure, both of its premises are individually necessary and do jointly provide sufficient support to the conclusion. In this case, if R1-C were suspended, then C would be left with insufficient support from R1. By contrast, on the assumption that A-2 instantiates a *convergent* structure, each of R1 and R2 can support C sufficiently. Both assumptions together, however, do result in an inconsistency: R1

by itself can, but at the same time cannot, support C sufficiently. Let's call this the *inconsistency problem*.

One way of resolving the inconsistency problem would be to stipulate that, before judging the sufficiency of support in a convergent structure, all implicit premises must be made explicit. This may seem to explain that, in A-2, C is not *independently* supported by R1, whereas C is so-supported once the implicit inference rule R1-C is added, as in A-3. But this way of addressing the inconsistency problem provides only a seeming solution. For once the linked structure is treated in the same way—such that a reconstruction of implicit elements is allowed (even required) before evaluating the dependence relation—R1 and R1-C in A-3 would cease to be dependent, because in reconstructing the argument 'R1 therefore C,' one may supply R1-C as an implicit premise. Similarly, if R1 is suspended, then, after a reconstruction, R1-C alone can support C sufficiently. The linked argumentation 'R1, R1-C, so C' would thus change into a convergent argument, because its premises individually support the conclusion sufficiently.

The presupposition problem

As a yet more serious problem, when maintaining that R1 or R2 by itself, or R1 and R1-C together, do support the conclusion sufficiently, one must presuppose that the premise(s) lend sufficient support to the conclusion. Let's call this the *presupposition problem*. But there is no obvious reason to presuppose that the relation between the premise(s) and the conclusion must be evaluated as a sufficient supporting relation. In A-2, for instance, one may doubt that R2 is a sufficient reason for C, because taking a shower (rather than swimming) may also cause one's hair to be plastered down.

Furthermore, when presupposing that the conclusion receives sufficient support, analysts incur a presupposition regarding the acceptability of the premises. A false premise, after all, can offer no support to the conclusion, let alone sufficient support. And since the tests T1 to T5 (see Sect. 4.1) identify argument structure as a function of the premises' presupposed acceptability, these tests *require* evaluative judgements to satisfy the respective test-condition. A fully explicit version of T1, for instance, would read: 'If one premise is assumed to be false, while the other premise is

assumed *not* to be false, then the conclusion no longer receives any support.' The presupposition for T1 thus is that the other premise is not false. Of course, applying T1 does not require that analysts *know* the acceptability of that premise. But to identify the structure of an actual (real-life) argument, they must nevertheless presuppose an evaluative judgement of that premise.

The requirement on premise-acceptability in T1 (and T3) does not apply to T2 or T4. A fully explicit version of T2, for instance, should instead read: 'If one premise is assumed to be false, while the other premise is assumed to be *true* (or very plausible), then the conclusion receives insufficient support.' For the test-result to align with pre-theoretical intuitions, after all, the impact of the acceptability of the other premise on argument strength should be minimal. Otherwise, if the acceptability of the other premise is extremely low, even an intuitively convergent argument can be identified as linked. For instance, if R1 is assumed to be false, while R2 is *not* assumed to be true or very plausible (but is rather implausible), then C can only receive insufficient support. This would indicate that A-2 instantiates a linked structure. But this breaks with the intuition that A-2 is a convergent argument. Therefore, 'the other premise is assumed to be not false' is the minimal requirement for T1-T4, whereas in T2 or T4 the other premise must be assumed to be true (or very plausible).

The presupposition problem generalized

Not only does the focal problem involve a presupposition regarding the acceptability of some other premise, as well as of the semantic or pragmatic relation between it and the conclusion. The problem generalizes to both premises. For nothing about the tests T1 to T5 constrains the specific premise an analyst might set to the status *false* or *suspended*. Indeed, the specific premise having this status should be immaterial to identifying an argument's structure. Otherwise, given the *same* test, an argument may have more than one structure. The premise that is set to the status false/suspended should therefore be selected randomly. Yet, if the other premise (that besides the randomly selected premise) has to fulfil some acceptability requirement, then the constraint for T1—'If one premise is assumed to be false, while the other premise is assumed

to be not false, then the conclusion no longer receives any support'—should be reformulated as: 'Assuming all premises are not false, if one premise is false, then the conclusion no longer receives any support.'

The meaningfulness problem

One consequence of this constraint is that the resulting structural identification in T1 pertains to *possible* states of an argument, states where all premises are not false. But this leaves other possible states unidentified. And if some premises turn out to be false, then the argument structure may change. This clearly challenges the value of performing these tests, suggesting that they may be meaningless, and so damages the theoretical value of the concept 'argument structure.'

The complexity problem

Practically, given a complex argument with more than two premises, or even more than one type of structure (i.e., a complex argument comprising sub-arguments), how should an analyst identify the premises that work separately, indicating a *convergent* structure, while other premises work jointly, indicating a *linked* structure? A more complicated method certainly seems to be required (Goddu 2003, pp. 219-225). According to Walton, however, "the same [test for two premises] applies to any number of premises in an argument" (Walton 1996, p. 182). One can only imagine how complicated this would be, involving a great deal of presupposition, evaluation, and comparison before the structure of a complex argument is identified.

In sum, we do neither claim that the dependence criterion is useless in identifying argument structure, nor that one should cease to specify the notion of 'premises working together' as 'premises working together necessarily.' We rather contend that it is problematic to interpret the notion of necessity—which functions as the sole criterion in determining whether premises are mutually dependent—as *achieving some required degree of support for the conclusion*.

We now turn to Freeman's test, which combines considerations of dependence and relevance.

5.2 Evaluating Freeman's test

When applying Freeman's ternary relation of relevance to A-2 and A-3, the above problem arises again. Assume one grants that A-2 instantiates a convergent structure and A-3 a linked structure. Following Freeman, that A-2 is convergent entails that each premise—for instance, 'his swimming suit is wet'—is *individually relevant* to the conclusion. On this understanding of relevance, anyone who agrees that A-2 is convergent should grant an inference rule—e.g., 'if one's swimming suit is wet, then one has been swimming'—licensing the move from 'his swimming suit is wet' to 'he has been swimming.' This, however, contradicts Freeman's own claim that A-3 is linked, because at least one individual premise—namely: 'his swimming suit is wet'—constitutes what in Freeman's sense is a relevant reason for the conclusion. This is similar to the inconsistency problem for the support-based tests T1-T5 (see Sect. 5.1).

Like the support-based tests, moreover, Freeman's relevance-based test features a constraint on the argument to be analyzed. Recall that, according this method of analysis, a *linked* argument's premises would fail to be individually relevant to the conclusion, yet are jointly relevant to it (see Sect. 4.2). So, in a linked argument each premise *by itself* offers no support to the conclusion because there is no inference rule that connects each premise with the conclusion. Meanwhile, given that the premises may be false, they need not *jointly* offer any support to the conclusion either. In a *convergent* argument, by contrast, the combined premises lend a *greater* degree of support to the conclusion than each premise lends to it individually. So *each* premise must individually offer at least some support. Otherwise, given any randomly selected individual premise, the combined degree of support cannot be greater than the individual premises' degree of support.

Therefore, if both R1 and R2 are false, and if inference-rules connect R1 with C, and R2 with C, respectively, then A-2 would be identified as neither linked nor convergent. After all, the premises do provide individually relevant reasons for the conclusion (so

the argument is not linked), and the premises taken together fail to constitute a modal combination that offers stronger support (so the argument is not convergent). In both the relevance- and the support-based tests, then, argument evaluation *informs* argument structure identification. But this once again challenges the idea that 'argument structure' is a concept of analysis.

6. Conclusion

On a dialectical and a logical approach alike, a linked argument structure is distinguished from convergent structure according to whether the premises work together necessarily. This distinction is theoretically basic today and may even be considered intuitive. What remains problematic is how the mainstream scholarly view specifies 'necessity'. Both dependence-based and relevance-based tests specify 'necessity' as the achievement of some required degree of support for a conclusion. But this entails that a structural analysis grounds in analysts' evaluative judgements. This is inconsistent with the idea that 'argument structure' is an analytical concept that is methodologically prior to argument evaluation. Argumentation scholars require a new way of specifying necessity that does not involve argument evaluation.

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