Argumentation Moods

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Abstract: Argumentation is an act of communication performed by a speaker aiming to persuade a listener to accept or reject a proposition, named thesis, using another proposition, called argument, and a relation between them – the frame of argumentation. Argumentations are evaluated relatively to the pragmatic value of success and to the logical value of correctness. These values are independent of each other – namely, from the success of an argumentation, nothing can be inferred about its correctness, and reciprocally. In order to establish the correctness of an argumentation, we can classify all argumentations into moods such as the syllogisms. A necessary condition for the correctness of an argumentation is the validity of its mood. The validity of the argumentative moods is investigated using the reduction method established by Aristotle for syllogistic moods.

Keywords: argumentation, validity, moods, argumentative modalities

1. Introduction

Argumentation is the communication act of a speaker (sender) aiming to persuade a listener (addressee) to accept or to reject a proposition, called thesis, using another proposition, called argument, and the relation between them (Eemeren–Grootendorst–Snoeck, 2009: 54).

For each elementary proposition, there is a corresponding fact, and reciprocally. The facts are relations among the semiotic parameters of expressions. The propositions are used to suppose that a fact takes place. If the presupposed fact is real, then the proposition is true, and if the fact does not take place, then the proposition has the value false.

For instance, through the proposition “The planet Mars is red.”, we suppose that the intension of the name “Mars” includes the intension of the term “red”, or the extension of the name “Mars” is an element of the extension of the term “red”.

Only if these relations between the intensions and extensions of the expressions take place is the proposition “The planet Mars is red.” true.

A fact is good if it has good consequences, and it is bad if it has bad consequences. The definition of ethical values of facts through their consequences does not lead to infinite regression since there are facts without consequences, namely, the subjective states of the evaluator. Since an evaluator has access only to his subjective states, these are ethically evaluated, and any other fact gains ethical value through its relationship to the subjective states of the evaluator.

On the other hand, only some facts are good, and only some facts are bad. From here, it follows that, if it is good for a fact to take place, it is bad if that fact does not take place, and if a fact is bad, then it is good if that fact is not real. Consequently, if a proposition has a certain ethical value, then its negation takes the opposite ethical value.

The tautologies and contradictions have no ethical value because there is no fact assigned to them. For instance, if a tautology were good (/bad), then any proposition would be good (/bad), contrary to the above presupposition, since a tautology is a consequence of any other proposition. Having in sight that the logic is the assembly of all tautologies, it means that logic has no ethical value, is neither good nor bad, and escapes any moral. Only factual propositions take ethical values, only they are associated to facts or systems of facts.

Both for truth and ethical values, there is a positive and a negative variant. The positive values are truth and good, and the negative ones are false and bad. If an evaluator gives to a proposition a positive value, then we say that s/he accepts that proposition. When the evaluator gives it a negative value, s/he rejects it. If the evaluator accepts or rejects a proposition due to its truth value, then s/he has an opinion, and if s/he accepts or rejects a proposition on the ground of its ethical value, we will say that s/he has an attitude about that proposition or presumed fact.

The goal of the speaker when s/he uses an argumentation is to influence or persuade the listener to accept or reject a proposition, namely, to form a certain opinion or attitude (Eemeren–Grootendorst, 2016: 13). The speaker proposes to the listener a proposition to be accepted or rejected, which is the thesis of argumentation (Eemeren–Grootendorst, 2016: 3). In order to reach his goal, s/he points to another proposition, called argument, about which s/he presumes that the listener accepts or rejects it (argumentative modalities) (Benoit, 1992: 166). The argument is displayed in a certain relation to the thesis, and this relation represents the frame of argumentation (Eemeren–Grootendorst, 2016: 158). Hence, the elements of an argumentation are thesis, argument, and the frame of argumentation (Freeley–Steinberg, 2005: 65).

The general form of an argumentation is “P because Q, and you accept Q”. Here, P is the thesis, Q is the argument, and the frame of argumentation is the subaltern relationship between thesis and argument, expressed through the word

“because” (Walton, 1996: 46). The listener, accepting both the argument and the relation between thesis and argument expressed through argumentation, has to accept the thesis in order to avoid a contradiction, namely, to avoid falling into error (Ehninger, 1992: 146). Let us say that, given the mentioned conditions, the listener would reject thesis *P*. In this case, the following would take place:

1. P^* (the listener rejects *P*; therefore, s/he accepts non-*P*). (1)
2. *Q* (the listener accepts the argument).
3. $Q \rightarrow P$ (the listener accepts the argumentation frame).
4. *P* (from 2 and 3).
5. $P \ \& \ P^*$ (contradiction, from 1 and 4).

Hence, to avoid the error, the listener cannot both accept the argumentation and reject the thesis; consequently, s/he either accepts the thesis or rejects the argumentation. If s/he rejects the argumentation, then s/he rejects the argument or rejects the argumentation frame. We reach the outcome that: when the listener is in the presence of an argumentation, s/he agrees with the thesis or rejects the argument or rejects the argumentation frame. For instance, concerning the argumentation “Mars is red since its surface contains iron ores.”, the listener accepts that Mars is red, or he rejects that on the surface of Mars would be iron ores, or s/he rejects that the presence of the iron ores would be enough for the planet Mars to be red.

2. Types of Argumentations

Argumentations can be classified using several criteria. Firstly, if an argumentation includes only one thesis, we say that it is simple, and if it includes more than one thesis, it is a complex argumentation (Eemeren–Grootendorst, 2016: 14). For instance, the above argumentation is simple, and it has a single thesis, the proposition “Mars is red.” In exchange, the argumentation “The number two is prime because it can be divided only by one and itself, and the number two is even since it is divisible by two. is a complex argumentation, including two theses: “the number two is prime” and “two is an even number”.

In their turn, simple argumentations can be classified according to the type of values, taking into consideration, distinguishing between alethic and ethic argumentations. For alethic argumentation, the thesis is sustained or rejected according to its truth value. For example, the argumentation “Mars is red since its surface contains iron ores.” is alethic. The speaker claims that the thesis “Mars is red.” is a true proposition.

Instead, for the ethical argumentations, the sustaining or rejecting of the thesis concerns its ethical value. For instance, in the argumentation “It is good that Mars

contains iron ores since we could exploit them.”, the thesis is held not because of its truth but because the fact meant by it is good or useful. Here, the argument is presented as a consequence of the thesis – namely, from the fact that Mars contains iron ores, it follows that we could exploit them in the future. The fact that we will exploit new iron ores is good, wherefore its sufficient condition is also good.

Another criterion is the purpose of an argumentation to sustain or reject the thesis. For instance, through the argumentation “There is water on Mars since there are alluvial formations on its surface.”, the thesis “There is water on Mars” is stated, while the argumentation “There is no water on Mars since there are no clouds in its atmosphere.” is used to reject the same thesis.

The direct argumentations connect the argument and the affirmation of the thesis, while for the indirect argumentation the argument is related to the negation of the thesis (Eemeren–Grootendorst, 2016: 15). When someone argues that “Mars is too far from Earth for visitors to come from there.”, the argument that “Mars is too far from Earth” is displayed as a contrary to the affirmation of the thesis that there are visitors from Mars; thus, such an argumentation is a direct one. On the other hand, for the argumentation “No Martian visited us because Mars is too far from Earth.”, the argument is showed as a sufficient condition for the negation of the thesis, so that argumentation is indirect.

As already mentioned, the frame of an argumentation means the relation between thesis and argument (Dale, 1977: 7). We say about two propositions that they are compatible when there is at least a context where both are true. For instance, the propositions “Mars is red” and “Mars is a planet” are compatible since they are both true for the actual context. Two propositions are opposite if there is no context where both are true. For example, “Mars is a planet” and “Mars is a galaxy” cannot be both true in any context.

We will further discern the relations of opposition between propositions:

1. Two propositions are contrary (C) if there is no context where their affirmations are both true. Regarding any given context, at least one of the contrary propositions is false. Their affirmations are opposite to each other.

2. Two propositions are subcontrary (c) if there is no context where their affirmations are both false. This time, in any context, at least one of the two subcontraries is true. If two propositions are both contrary and subcontrary, they are contradictory (e). Two contradictory propositions have different truth values relatively to any context.

3. A proposition is the supraaltern (S) of another proposition if the affirmation of the first and the negation of the second are opposite. There is no context in which the first proposition is true and the second is false or, in any context, if the first proposition is true, the second is also true.

4. A proposition is the subaltern (s) of another proposition if the negation of the first proposition and the affirmation of the second one are opposite. Relatively

to any context, if the first proposition is false, the second one is false too. If two propositions are both in relation of supraalternation and subalternation, they are equivalent (e) to each other. Equivalent propositions have the same truth value in any context.

The relations of contrariety and subcontrariety are antireflexive, symmetrical, and non-transitive, namely, they are distinguishing relationships. The alternation relations are reflexive, non-symmetrical, and transitive, being weak-order relationships. Moreover, subalternation and supraalternation are inverse relations. If a proposition is the subaltern of another proposition, the second one is the supraaltern of the first proposition.

Subalternation is also called consequence, and supraalternation is a relation through hypothesis (Walton, 1996: 168). The subaltern proposition is a consequence of the supraaltern, while the supraaltern is a hypothesis relative to the subaltern. In the same way, the subaltern is a necessary condition for the supraaltern, and the supraaltern is a sufficient condition for the subaltern. We notice that when the sufficient condition is true, the necessary condition is also true, and if the necessary condition is false, it follows that the sufficient condition is false too.

The compatibility relations are the negations of the relations of opposition. For instance, two propositions are non-contrary if there is at least a context where both of them are true. Analogously, two propositions are non-contradictory if there are contexts where both propositions are true or there are contexts where both are false, etc. Besides the negations of the opposite relationships, another relation of compatibility is independence. Two propositions are independent if neither the affirmation nor the negation of a proposition is opposed to the affirmation or negation of the other. Hence, two independent propositions can take any truth value relatively to a given context.

Two factual propositions must be in one of the following relationships: independence, supraalternation, subalternation, contrariety, subcontrariety, equivalence, or contradiction. For instance, if two propositions were simultaneously contrary and subaltern to each other, one of them should be a contradiction. We are further concerned about the argumentations with factual propositions, wherefore their argumentative frames consist of the mentioned relationships.

The relations of opposition are reducible one to another. For instance, they can be expressed through alternation and negation. The contrary of a proposition is the negation of a necessary condition, and the subcontrary is the negation of a sufficient condition. Similarly, we can express the alternation using contrariety. A necessary condition of a proposition is the negation of a contrary of that proposition, and the sufficient condition of a proposition is expressed by the contrary of its negation.

During the usual appeal to argumentations, the relations of alternation are preferred, especially the argument is supposed to be a sufficient condition of the thesis. However, we cannot exclude the argumentations where relations other than alternation are used. Therefore, concerning the argumentation frame, we must take into consideration both the relations of alternation and contrariety. The argumentation frame is most often an opposition relation since these relations point out that if a proposition takes a certain truth value, another proposition has, in its turn, a determinate truth value. For instance, if the sufficient condition is true, then the necessary condition is necessarily true; instead, for a compatibility relation, if a term is a true proposition, we can say nothing about the value of the other term.

The relations of compatibility can be used in order to reject an argumentation or for counter-argumentation. For instance, we can reject the frame of an argumentation consisting of an opposition relation, arguing that, in fact, the thesis and the argument are in a compatibility relationship. As an example, the argumentation “Mars is red since its surface reflects the sunlight.” can be rejected bringing the argument that the reflection of the sunlight by the surface of a planet is not a sufficient condition for that planet to be red – namely, the reflecting of the sunlight and not being red are compatible.

The argumentations are also characterized through the assumption made by the speaker concerning the state of the listener at the moment of the argumentation. The speaker may assume that the listener agrees with certain propositions used as arguments. We admit that if the listener accepts the affirmation of a proposition, then s/he rejects its negation, and if s/he accepts the negation, then s/he rejects the affirmation. On the other hand, we consider that the speaker always assumes that the listener accepts the argumentation frame.

Besides acceptance and rejection, there is a third argumentative modality, indifference, because it is possible that a proposition be neither accepted nor rejected. Instead, we discern only two enunciative modalities: affirmation and negation. The relations between the argumentative and enunciative modalities are displayed in the following table:

Table 1. *Argumentative and enunciative modalities*

Affirmation	Acceptance	Rejection	Indifference
Negation	Rejection	Acceptance	Indifference

If the affirmation is accepted or rejected, the negation is rejected or accepted and reciprocally. Moreover, if the listener is indifferent to an affirmation, similarly, s/he will be indifferent to negation. If the affirmation is not accepted, it does not result that negation is automatically rejected since indifference is not excluded. Likewise, if the affirmation is not rejected, we cannot state that the negation should be accepted.

There are two different kinds of values for argumentations: pragmatic and logical values (Dale, 1977: 3). From a pragmatic view, the argumentations are either successful or not. An argumentation is successful if the speaker reaches his/her goals and the position of the listener is modified according to the argumentation. For instance, an alethic argumentation where a certain thesis is stated is successful if the listener accepts the thesis, and in this fashion s/he will change his/her opinion on a certain topic related to that thesis (Eemeren–Grootendorst, 2004: 71).

From the logical perspective, argumentations are either correct or incorrect. An argumentation is correct if the argument and the frame of argumentation are sufficient to support the thesis (Dale, 1977: 6). If these conditions are accomplished, then, if the listener does not accept the thesis, s/he will be wrong. The relation between logical values of argumentation and the possibility of error is the following: if the listener rejects the thesis of a correct argumentation, s/he is wrong. If the listener accepts the thesis of an incorrect argumentation, s/he is not always wrong since there can be incorrect argumentations with true thesis (Eemeren–Grootendorst–Snoeck, 2009: 56).

The pragmatic and logical values of argumentations are independent. If an argumentation is successful, it does not mean that it is also correct, and, reciprocally, not every correct argumentation is always successful. Therefore, the listener can be persuaded through argumentation to accept or reject a proposition no matter if the argumentation is correct or not. Success cannot be used as an argument to state the correctness of an argumentation, the truth of a proposition, or the kindness of a fact (Micheli, 2012: 115).

The pragmatic value of an argumentation is difficult to be evaluated. In order to see if an argumentation is successful, we should verify if the listener's system of opinions and attitudes has been changed by the argumentation; but such a task is impossible to accomplish (Eemeren–Grootendorst, 2016: 14). On the one hand, the opinions and attitudes are subjective, and they are not accessible from outside, wherefore we cannot know the opinions and attitudes of another person. We could notice the manifestations of a subject and extrapolate some hypothesis concerning his/her opinions, but we cannot reach certainty (Eemeren–Grootendorst–Snoeck, 2009: 54).

On the other hand, the opinions and attitudes are acquired freely. A subject may adopt any opinion, no matter if s/he is affected by an argumentation or not; therefore, we cannot conclude that an argumentation has played any role regarding the process of adopting an opinion. For instance, let us suppose that listening to the weather forecast someone does not take the umbrella when s/he leaves home. We cannot come to the conclusion that s/he does not take his/her umbrella because s/he believes that it is not raining; s/he might forget to take his umbrella. Moreover, even if s/he believes that the sky is clear, we cannot claim

that just the weather forecast lead him/her to that opinion; we cannot exclude the alternative that s/he has learned the weather condition by looking out the window.

3. Argumentative Moods and Figures

The acceptance of the thesis is justified or grounded only for logical, correct argumentations (Eemeren–Grootendorst, 2004: 72). In order that the thesis of an argumentation be justified, it has to come from the argument and the frame of argumentation; moreover, the suppositions concerning them have to be true – namely, the argument and the frame must take the value supposed by argumentation. If one of these conditions is not fulfilled, the thesis does not necessarily result from argumentation, and there is no ground for acceptance; therefore, the argumentation is not logically correct (Feteris, 1999: 20).

To verify the correctness of an argumentation (Eemeren–Grootendorst, 2016: 30), we can use the following method:

1. We associate an inference to the evaluated argumentation, where the premises are the argument and the frame, and the conclusion is the thesis.
2. The premises of the associated inference must have the value presupposed by argumentation.
3. The associated inference must be logically correct.

If these requests are fulfilled, the argumentation is correct and the acceptance of the thesis is justified. Many times, the condition (3) takes place only if other premises are added, namely, the associated inference is conditionally correct. In such a case, the argumentation, in its turn, is correct only under some supplementary conditions, which must also be evaluated. For instance, in order to establish the correctness of the argumentation “Mars is red since its surface contains iron ores.”, we will create the following associated inference:

- If the surface of a planet contains iron ores, that planet is red (Frame).   (2)
 The Mars surface contains iron ores (Argument).
 **Mars is red (Thesis).

The inference is correct only under the condition that Mars is a planet, i.e. it should be added the premise “Mars is a planet”. The speaker takes this condition implicitly accepted by the listener and does not express it. Such conditions which remain unexpressed during an argumentation are called commonplaces (Eemeren–Grootendorst, 2016: 60).

Other conditions for correctness are: the proposition “Mars surface contains iron ores” has to be true, and “The surface of a planet contains iron ores” has to be a sufficient condition for that planet to be red. Only if all of these conditions

are fulfilled can the thesis be justifiably accepted on the ground of the given argumentation.

The quality of the propositions from the associated inference is the product between argumentative and enunciative modalities as they are manifested during the argumentation. For instance, if the argument of an argumentation is supposed to be accepted, and it is also asserted, then its quality is affirmative. Instead, if the argument is supposed to be rejected, and it is asserted through argumentation, its quality in the associated inference is negative. Generally, through the composition of argumentative and enunciative modalities, we get the affirmative or negative quality of a proposition according to the next table:

Table 2. *The quality of propositions*

	Acceptance	Rejection
Assertion	Affirmative	Negative
Negation	Negative	Affirmative

For example, if we suppose that the listener believes that an asserted proposition is true, then the quality of that proposition is affirmative, and if we suppose that the listener believes that the negation of that proposition is true, then its quality is negative. In this way, the associated inference to the argumentation “Admit that Mars is a planet since you agree that Mars orbits the Sun, and if Mars orbits the Sun, then Mars is a planet.” is:

If Mars orbits the Sun, then Mars is a planet. (3)
 Mars orbits the Sun.
 **Mars is a planet.

The corresponding formula to this associated inference is $(q \ \& \ (q \rightarrow p)) \rightarrow p$. Instead, the associated inference to the argumentation “Admit that Mars is a planet since you reject that Mars emits light, and if Mars does not emit light, then it is a planet.” takes the form:

If Mars does not emit light, then Mars is a planet. (4)
 Mars does not emit light.
 **Mars is a planet.

This time, the formula of the inference is $(q^* \ \& \ (q^* \rightarrow p)) \rightarrow p$, where the quality of the argument is negative because, although the argument is asserted during the argumentation, the supposition of argumentation is that the listener rejects the argument.

Taking into account that inferences can be discerned by the quality of the component propositions and, for argumentations, the quality of a thesis or argument is given by the argumentative and enunciative modalities, it follows

that there are more argumentations assigned to the same associated inference. Therefore, we must separate the forms or moods of inferences from the moods of argumentations. If the mood of an inference is valid, it means that there are more valid argumentative moods corresponding to it (Dale, 1977: 6).

For instance, since the inference mood $(q \ \& \ (q \rightarrow p)) \rightarrow p$ (ponendo ponens) is valid, then, if we remember the relation between argumentative and enunciative modalities on the one hand and the quality of propositions on the other, it means that the following argumentative moods are also valid:

- (5)
- Admit p since you agree that q and q is sufficient for p.
  - Admit p since you reject q^* , and q is sufficient for p.
  - Reject p^* since you agree q, and q is sufficient for p.
  - Reject p^* since you reject q^* , and q is sufficient for p.

Let us introduce the below convention to express the alethic argumentative moods:

- (6)
1. The order of the elements of argumentation in a certain mood is: thesis – argument – relation – argument – thesis. The prefix of a mood (thesis – argument) includes the thesis and the argument, and it is followed by the frame of argumentation (relation – argument – thesis) as a relation between argument and thesis.
  2. The assertion is noted through A and the negation through N.
  3. Acceptation has no special symbol, and rejection is represented through (*). We will leave out indifference.
  4. The argumentative modalities are applied only to the elements of the prefix, the thesis, and argument.
  5. The possible relations between propositions are symbolized as follows: S – subalternation, C – contrariety, E – equivalence, s – subalternation, c – subcontrariety, e – contradiction.

For example, the mood “Admit thesis P since you agree with argument Q, and the argument is a sufficient condition for the thesis.” is expressed as AASAA. Analogously, the argumentative mood “Reject thesis p since you agree with argument q, and the argument is contrary to the thesis.” is represented using the next string of symbols: A^*ACAA . Here, the assertion of the thesis is rejected (A^*), the assertion of the argument is accepted (A), and the frame of argumentation is the contrariety relation between the affirmations of the argument and thesis, CAA.

After the criterion of relation, we can divide the argumentative moods into argumentative figures. For instance, the moods of the form $xySzw$ belong to figure S, and the moods $xyCzw$ are included in figure C. In this fashion, the mood ANSAA belongs to figure S, and AACNN is a mood of figure C.

4. Evaluation of Argumentative Moods

In order to establish the valid moods of alethic argumentations, we will use the reduction method introduced by Aristotle for syllogisms (Didilescu–Botezatu, 1976: 114). Firstly, the argumentative modality is eliminated:

1. If the argumentative and enunciative modalities are both positive, or (7) if they are both negative, the affirmative modality is taken. In this way, A is not modified, while N* is replaced by A. For instance, AN*SAN is equally valid to AASAN.
2. If one of the argumentative and enunciative modalities is positive and the other is negative, then the negative enunciative modality is kept – namely: A* = N, and N remains unchanged. The mood A*A*SNN is equally valid to NNSNN.

As noticed previously, any relation between propositions can be expressed through supraalternation and negation; in this way, all argumentative figures can be reduced to figure S:

1. Subalternation is reduced to supraalternation, changing the quality of symbols from the argumentative frame, where A becomes N and N becomes A because $S_{qp} = sq^*p^*$. For instance, the mood AAsAA is equally valid to the mood AASNN. It is the same from the validity perspective to argue that “Mars is a planet since Mars orbits the Sun, and if Mars orbits the Sun, then it is a planet.” (mood AASAA) or to argue that “Mars is a planet since Mars orbits the Sun, and if Mars were not a planet, then it would not orbit the Sun.” (mood AAsNN).
2. The contrariety can be reduced to supraalternation if the enunciative modality of the second term is changed because $C_{qp} = S_{qp}^*$. For example, the mood NNCNA is equally valid to NNSNN. The argumentation “Mars is not a star since you agree that Mars is not a source of light, and it is incompatible that Mars is not a source of light and Mars is a star.” (mood NNCNA) is equally valid to the argumentation “Mars is not a star since you agree that Mars is not a source of light, and if Mars is not a source of light, then it is not a star” (mood NNSNN).
3. Subcontrariety is reduced to supraalternation if the enunciative modality of the second term of the relationship is changed. The moods AAcAA and AASAN are equally valid.
4. The equivalence is obtained through the composition of supraalternation and subalternation. Therefore, E-moods cannot be reduced to simple S-moods but to forms including a complex argumentative frame where the relation between argument and thesis is a conjunction of two supraaltern relations. For instance, the E-mood AAEAA is equally valid to the mood AA(SAA & SNN). A term of conjunction keeps unaltered the qualities of the propositions, while, for the other term, they are replaced through their opposite qualities. For example,

the argumentative form “Accept the thesis since you accept the argument, and the argument and thesis are equivalent.” is equally valid to “Accept the thesis since you accept the argument, and if the argument is a sufficient condition for the thesis and if the argument is false, then the thesis is false too”.

5. In their turn, the e-moods can be reduced using the supraaltern relation if for one term of conjunction the enunciative modality of the argument is changed, and for the other the enunciative modality of the thesis is replaced by the opposite. For instance, the mood ANeAA is reduced to AN(SNN & SAA). The argumentation “Accept the thesis since you reject the argument, and the argument is contradictory to the thesis.” is equally valid to “Accept the thesis since you reject the argument, and if the non-argument entails the thesis and if the argument is true, then the non-thesis is also true”.

According to these rules, all argumentative moods can be reduced to the following sixteen moods of S figure, where the supposed relation between argument and thesis is supraalternation: AASAA, AASAN, AASNA, AASNN, ANSAA, ANSAN, ANSNA, ANSNN, NASAA, NASAN, NASNA, NASNN, NNSAA, NNSAN, NNSNA, and NNSNN. Let us call them *canonical moods*.

If we apply the logical decision methods, we reach the result that the valid canonical moods are: AASAA, ANSNA, NASAN, and NNSNN. For example, the corresponding formula of the mood ANSNA is $(q^* \& (q^* \rightarrow p)) \rightarrow p$. This formula is a logical law; consequently, the argumentative mood is valid.

Instead, the formula of the canonical mood AASAN, namely $(q \& (q \rightarrow p^*)) \rightarrow p$, is not a logical law because, for the interpretations of the variable symbols $p = \text{false}$ and $q = \text{truth}$, this formula takes the interpretation false. For instance, while the argumentation “Admit that Mars is a planet since you reject that Mars emits light, and if Mars does not emit light, then it is a planet.” is valid, the argumentation “Accept that Mars is a planet since you accept that Mars orbits the Sun, and if Mars orbits the Sun, then Mars is not a planet.” is an invalid argumentation.

From the fact that an argumentation is valid, namely, it belongs to a valid mood, it does not follow that it is correct; validity is a necessary condition for correctness but is not sufficient. For instance, if we take the first argumentation from the previous example, the listener is justified to accept the thesis only if it is false that Mars emits light, and that Mars does not emit light is a sufficient condition in order for Mars to be a planet.

We may notice that, for the valid canonical moods, the prefix and the suffix are symmetrical to the symbol of relationship between the argument and thesis. A canonical mood is valid if the qualities of the argument and of the thesis are identical both in the prefix and in the frame of argumentation.

If the reduction rules are reversed, we can restore all valid argumentative moods from the valid canonical moods. For instance, if we focus on the

canonical mood AASAA, we reach other valid moods in the S figure displaying the argumentative modalities. Noticing the affirmative quality of both thesis and argument, it follows that the enunciative and argumentative modalities are either both positive or both negative. Hence, the moods AASAA, AN*SAA, N*ASAA, and N*N*SAA are all valid. In other words, since the mood “Accept the thesis because you accept the argument, and the argument is a sufficient condition for the thesis.” is valid, the following moods are also valid:

Accept the thesis because you reject the non-argument, and the argument is a sufficient condition to the thesis. (8)

Reject the non-thesis because you accept the argument, and the argument is a sufficient condition to the thesis.

Reject the non-thesis because you reject the non-argument, and the argument is a sufficient condition for the thesis.

Similarly, we can recover the valid moods corresponding to AASAA belonging to other figures, i.e. with another relation between argument and thesis. For instance, if rule (2) is used, the valid mood of C figure assigned to AASAA is AACAN. After introducing the argumentative modality, the corresponding valid moods forming C figure are AACAN, AN*CAN, N*ACAN, and N*N*CAN. If these symbols are interpreted, then the following expressions of valid argumentative moods are obtained:

Accept the thesis since you accept the argument, and the argument and the non-thesis are contrary. (9)

Accept the thesis since you reject the non-argument, and the argument and the non-thesis are contrary.

Reject the non-thesis since you accept the argument, and the argument and the non-thesis are contrary.

Reject the non-thesis since you reject the non-argument, and the argument and the non-thesis are contrary.

Table 3 includes the valid moods of the argumentative figures, where the argumentative modalities are not taken into account.

Table 3. *Valid argumentative moods*

Figure S	Figure s	Figure C	Figure c
AASAA	AAsNN	AACAN	AAcNA
ANSNA	ANsAN	ANCNN	ANcAA
NASAN	NAsNA	NACAA	NAcNN
NNSNN	NNsAA	NNCNA	NNcAN

Setting out from these moods, we can obtain other valid moods if the argumentative modalities are explicitly expressed. For instance, from the valid mood AAcNA, namely “Admit the thesis since you admit the argument, and the non-argument and the thesis are subcontrary.”, the following valid moods are also obtained: AAcNA, AN*cNA, N*AcNA, and N*N*cNA.

It is useful that for the ethical argumentations the canonical moods be taken from a figure, where the argument is presented as a subaltern of the thesis since – as we have already seen – a proposition is ethically accepted or rejected if a consequence thereof is also accepted or rejected. Let us agree to represent the ethical moods in the same manner as the alethic ones, adding in front the symbol M. For instance, the mood MAAsAA will be read: “Accept the thesis as good since you agree that the argument is good, and the argument is a consequence of the thesis.”

In this way, the canonical ethical moods are: MAAsAA, MAAsAN, MAAsNA, MAAsNN, MANsAA, MANsAN, MANsNA, MANsNN, MNAsAA, MNAsAN, MNAsNA, MNAsNN, MNNsAA, MNNsAN, MNNsNA, and MNNsNN. Applying the logical decision methods, we arrive at the valid canonical ethical moods: MAAsAA, MANsNA, MNAsAN, and MNNsNN.

For example, let us decide on the validity of the mood MNASAN. This mood is valid if the formula $(Gq \ \& \ (p^* \rightarrow q)) \rightarrow Bp$ (if the argument is good and if it is a consequence of the non-thesis, then the thesis is bad) is logically valid. The demonstration runs as follows:

For $q = G$: (10)

1. $(1 \ \& \ Gp^*) \rightarrow Bp$
2. $Bp \rightarrow Bp$
3. 1 (truth).

For $q = B$:

1. $(0 \ \& \ Bp^*) \rightarrow Bp$
2. $0 \rightarrow Bp$
3. 1 (truth), the given formula is a logical law; therefore, the mood

MNASAN is valid.

In the same fashion, let us show that the mood MNAsNN is not valid. The corresponding formula is $(Gq \ \& \ (p^* \rightarrow q^*)) \rightarrow Bp$.

For $q = G$: (11)

1. $(1 \ \& \ Bp^*) \rightarrow Bp$
2. $Gp \rightarrow Bp$
3. 0 (false), the given formula is not a logical law.

The following forms of argumentation are expressions of the valid canonical ethical moods:

Take the thesis as good since you agree the argument is good, and the argument is a consequence of the thesis (MAAsAA). (12)

Take the thesis as good since you agree the non-argument is good, and the non-argument is a consequence of the thesis (MANsNA).

Take the non-thesis as good since you agree the argument is good, and the argument is a consequence of the non-thesis (MNAsAN).

Take the non-thesis as good since you agree the non-argument is good, and the non-argument is a consequence of the non-thesis MNNsNN).

The argumentation “It is good to colonize the planet Mars since it is good that Earth not be overpopulated, and if we colonized Mars, the Earth would not be so overpopulated.” is valid, belonging to the mood MANsNA. Like for the alethic moods, we can obtain other valid ethical moods reversing the reduction rules. For instance, once the mood MAAsAA belonging to the figure s is valid, the mood MAACNA from figure C is also valid: “Accept the thesis as good since you accept the argument as good, and the non-argument is contrary to the thesis.”

Even if an argumentation belongs to a valid mood, it does not mean that the argumentation is correct and the listener is justified to accept the thesis. It is not excluded that a mood is valid and the thesis has another value than the one presumed through argumentation. However, the validity of argumentative moods is a necessary condition for a thesis to be justified. Even if the thesis of an argumentation from an invalid mood is true, its truth does not result from that argumentation (Freeley–Steinberg 2005: 61).

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