RESEARCH ARTICLE

The Aristotelian- Al-Akhdari Conjugate Convection

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Abstract
This study explores the role of university professors in developing modern assessment methods and their impact on student performance at the Institute of Science and Techniques of Physical and Sports Activities. Assessment is viewed not just as a tool for measuring knowledge, but as a means to enhance learning outcomes. Using a descriptive-analytical approach, data were collected from 47 professors and 73 second-year students through questionnaires and interviews. Findings highlight varied levels of awareness among professors regarding updated assessment practices. While some still use traditional methods, others apply modern strategies that foster critical thinking and accommodate individual differences, positively influencing students' academic achievement.

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Introduction

Logic has never been a rigid or closed science, but has remained open to development and adaptation according to the needs of human thought throughout history. Aristotle (384-322 BC) laid the first foundations of formal logic, using analogy as a fundamental tool for reasoning, making this analytical pattern the standard for sound thought. Aristotle defined the forms of analogy according to the position of the middle term, establishing a logical system that moves from the general to the particular or from the whole to the part.

Aristotle defined logic as the science of proof or the science of analysis, focusing on the analogy of convexity; the backbone of his First Analytics, which he developed for logical arguments, is the conjunctive convexity analogy. However, medieval scholastic philosophy reformulated this pictorial science under the title "Organon," meaning the mental machine that protects the intellect from falling into error and the tool that allows the acquisition of all sciences in their counterparts. Under this title (i.e., the Organon), the teachers collected a large collection of Aristotle's books, some of which are purely logical and systematic (First Analytics and Second Analytics) and some

of which are of a philosophical, metaphysical, linguistic, or psychological nature (sayings, phrases, fallacies, dialectics, poetry, theater). To this is added a commentary by Porphyrius entitled "The Isagogy". (Al-Fendi, 1976, pp. 41-47) (Adala, 2020, page 16)
However, this philosophical legacy did not remain exclusive to Greek thought, but found its way to other cultures, where Muslim scholars approached it with a critical and innovative spirit. Among them, Abd al-Rahman al-Akhdari (1506-1575 AD) stood out, who was not a mere transmitter of the Aristotelian method, but reshaped it according to the needs of his scientific environment, simplifying the conceptional premises to make logic practical and more useful for students.

Conjunctive reasoning, the focus of this study, is a syllogism that connects two premises through a common middle ground to produce a necessary conclusion. This study poses a fundamental question: To what extent can the conjunctive convexity analogy be considered a basis for pictorial reasoning? From this question, sub-questions arise, the most important of which are: How perfect is the first form of this analogy compared to the other forms? Can the incomplete forms be traced back to it or does each form have its own methodological independence that requires reconsideration?

Accordingly, this study is organized as follows: The first section is devoted to examining the forms of convexity and the rules of each form that derive from its basic general rules. Consequently, its methodological foundations and logical controls are addressed. The second section deals with the source of the completeness of the first form, with a focus on the mechanism of returning incomplete forms to it. This is to clarify its role in justifying and proving the validity and legitimacy of the other forms, and to compare all this with what Abdul Rahman al-Akhdari says in his Sulamah. This is to ascertain the extent to which the verses of this ladder correspond to those of the first teacher (Aristotle). The approach adopted in this modest study is analytical and comparative. In the following, we will present the basis of the key concepts of the research.

Conceptual floor

Logic: In language: Speech. Among the scholastic philosophers - as we have indicated - is a tool whose observance protects the mind from error (definitions of al-Jarjani), or it is a science with laws that benefit from knowing the ways of moving from information to the unknowns and their conditions, so that no error occurs in the thought. (Saliba, 1982, page 428)

Formal logic: It is the consideration of perceptions, issues, and analogies in terms of their form rather than their substance. It is usually called Aristotelian logic or standard logic in general. One of the sections of this formal logic is a new logic called symbolic logic (Saliba, 1982, p. 429) . From a contemporary point of view, it is the science that studies the correct forms of proof, i.e. the science of the conditions of correct reasoning in terms of form rather than content. Therefore, it is called "formal logic" to include both classical logic and modern symbolic mathematical logic. Thus, Aristotle's earlier conceptualization of it (the science of proof) is closer to the contemporary meaning than that of the medieval scholastics.

Inference: Any process by which a case with a truth that is not directly known is accepted as true, by virtue of its interconnectedness with other cases previously recognized as true. (Lalande, 2001, p. 670) . In one word, inference is proof.

Fig: The image obtained by placing the middle term in both measurement introductions (Adala, 2020, p. 179) .

Multiplication: Defined as the quantitative and qualitative pattern of the three cases in a convex analogy. Multiplication is determined by the type of cases in the premises and the conclusion. Each type is denoted by a Latin vowel from the following letters from left to right: A,E,I,O

The first is for the positive kidney (Km), the second is for the negative kidney (Kx), the third is for the positive part (Cm), and the fourth is for the negative part (Cx).

From the first figure for example: "Barbara"Multiplication

(A) Grand introduction: Positive kidney
(A) Minor premise: Positive kidney

(A) Result: A positive kidney

They are used to determine the validity of measurements and assess their logical validity. (Imam, 2003, pp. 82-94)

After defining these basic concepts central to this research, it is worthwhile to provide an introduction to the concept of convexity in classical logic and give a brief overview of Al-Akhdari's personality. We also touch on his definition of logic in general and of convex analogy in particular, and compare it with that of his predecessors.

Smoked:

A conjunctive syllogism is a syllogism in which two premises are connected by a common middle term and together lead to a necessary conclusion. The term originates from the Greek word "Syllogisme," which means combining or linking issues to produce a single issue. Aristotle defined it as: (Aristotle, First Analyses, 1980, p. 142)"It is a statement composed of propositions which, if heard, necessarily follow from another" . It is an indirect deduction, where the conclusion is not reached from a single premise but through the intersection of the two premises by the middle term.
This analogy is characterized as convex, because it is made up of simple convex cases, and conjunctive, because it connects the two premises by a common term that allows the conclusion to be extracted.

Example:

Grand introduction: All men are mortal.
Minor introduction: Socrates is human.
Result: So Socrates is mortal.
In this example, "man" is the middle boundary connecting "Socrates" () (Aristotle, Aristotle's Logic, 1980, p. 150)the lesser boundary) and "mortal" (the greater boundary . Ibn Sina also emphasizes the importance of the premise in analogy by stating: "A premise is a part of an analogy, which is a statement that requires something for something, or takes something away from something" (Mehdi, Introduction to the Science of Logic (Classical Logic), 1990, p. 169) .

Al-Akhdhari and his logical system

Abd al-Rahman al-Akhdari (c. 920 AH/1514 AD - c. 953 AH/1546 AD) is considered one of the most prominent Algerian scholars in the tenth century AH on the outskirts of Biskra. He grew up in a scientific family well versed in jurisprudence, logic, and astronomy, and received his education from his father, brother, and the most prominent scholars of his time. He left behind several important works in various scientific and philosophical fields, most notably "AlSalam Al-Muruniq" in logic, "Al-Jawhar Al-Maknoon" in rhetoric, "Al-Saraj in astronomy" and other books that created his name in Islamic intellectual history. (Al-Darraji, 2009, page 15/16) ; (Al-Qwaisi, 1437H, page 9) .
Al-Akhdhari begins his system by praising God, and then defines the science of logic:

Praise be to Almighty and righteous God Logic is the instrument of access.
To the correctness of thought in quotes It's a standardized law of the mind.
It protects her from missteps and inaccuracies.

(Al-Akhdhari, Al-Salam Al-Muruniq in the Science of Logic, page 3)

Here, it is clear that he did not deviate from the conceptualization of logic as a machine that protects the mind from falling into error, a standard and a mental scale (Al-Farabi's Head of Science and Al-Ghazali's Balance of Science). Hence, Al-Akhdari moved away from Aristotle's conception of logic to conform completely to the views of medieval Muslim and Christian philosophers. He then proceeds to define analogy and explains it in a simplified manner by saying:

The measurements are made by a judge.

Self-obligated is another word for it.

(Al-Jindi, Explanation of Peace in Green Logic, page 76)
I mad al-Din al-Bintani explains that analogy is the estimation of one thing on the example of another, a combination of two or more issues in a way that leads to a result (al-Bintani, 1444 AH, page 503) . It is identical to Aristotle's definition of Syllogisme as a unification of issues (i.e., premises) into one issue, which is the result. This definition is inclusive rather than exclusive, as it includes all types of reasoning, not just the analogy of convection. Therefore, it is an inaccurate definition from a purely logical point of view, as every accurate definition must be inclusive:

Then there are two measurements who is it called a killer? Which indicates the result with strength and specialization?
(Al-Jindi, Explanation of Peace in Green Logic, page 78)

Here, Al-Akhdari defines the concept of conjunctive analogy, emphasizing that it indicates the result by force, i.e. by possibility, not by act, reflecting the theoretical abstraction of conjunctive convex analogy (Al-Jindi, Explanation of Peace in Al-Akhdari Logic, page 78).

This type of analogy is characteristic of Al-Akhdari and Aristotle:

- The premises and conclusion must be convex, formulated in the form of news sentences.
- The terms are arranged in such a way as to ensure a correct conclusion according to the four forms defined by Aristotle, so that the major premise consists of the major and minor terms and the minor consists of the minor and major terms. The conclusion consists of the smallest term, which is its subject, and the largest term, which is its object.
- It is also an inference that moves from the general to the specific, i.e., it is based on the principle of the universal and the principle of the indivisible. This means that what is said about a genus is said about each of its species, and what is said about a species is said about each of its individuals. Conversely, what is taken away from the genus is taken away from each of its species and what is taken away from the genus is taken away from each of its individuals. This, on the basis that a genus contains a set of species and a species contains a set of individuals, brings us back to the Forfarious tree in the logic of boundaries and perceptions. (adala, 2020, page 64)

On this definition of convexity, Al-Akhdari's concise explanation does not differ from that of the first teacher (Aristotle).

After establishing the definition of Aristotelian and Al-Akhdari's gestalt analogy, we move on to the first section of the article.

Research I: Aristotle's and Al-Akhdari's Forms and Rules of Convexity.

First requirement: The first and second forms, their types and rules.

First: Figure I

The form of a convex analogy is determined by the location of the middle term within the two premises. When the middle term is placed in the major premise and carried in the minor, we have the first form, which is the most complete form because it is able to produce certain results without the need for transformation. This form has the following conditions:

1. The major premise must be total to ensure that the middle term is exhausted.
2. The minor premise must be positive in order for the relationship between the minor and major terms to be realized.

3. The result follows the grand introduction in the qualitative.
4. The result also follows from the Minor Premise in Quantum. (adala, 2020, page 56) .

These rules are briefly outlined by al-Akhdari, who refers to the totality of the major and the obligation of the minor, and the subordination of the result in terms of quality and quantity without elaboration**.** The following is an example from Al-Akhdari:

Grand introduction: Every worship needs an intention.
Minor introduction: All ablution is worship.
Conclusion: So, every ablution needs an intention. This form produces four Aristotelian integers:

Result	**Type of cases**	**Logical arrangement**	**Name**
KM	KM, KM	A - A⇒ A	Barbara
KS	KM, KS	E - A⇒ E	Celarent
JM	JM, KM	A - I⇒ I	Darii
JS	JM, KS	E - I⇒ O	Ferio

(Imam, 2003, pp. 82/94)

In Al-Akhdari, this form is represented by the following:
And for presenters, I'm just skeptical.

Four by counting the center

Pregnancy is small and childbirth is big

Called suspiciously, first and foremost (Al-Jindi, Explanation of Peace in Green Logic, page 81) He adds in the terms:
His condition is that he needs to be found young and to see everything as he sees it.
(Al-Jindi, Explanation of Peace in Green Logic, page 83)

Al-Akhdhari's four multiplications are presented in a concise manner within his system of the conditions of the first form, where he expressed them in simplified terms that make it easier for students to memorize them. He mentioned all the approved multipliers and○́ F s in their presentation within the educational framework of his system as follows:

The first: Smallest (net positive), largest (net positive), resulting in a net positive.

The second: The smallest (net positive) and the largest (net negative) produce a net negative.

The third: Its smallest (partial positive) and largest (total positive) produces a partial positive. (Malawi, page 350) .
Fourth: Its smallest (partial positive) and largest (total negative) produce a partial negative. (Al-Akhdhari, Explanation of Al-Salam Al-Muruniq, 1980, page 142) (Al-Akhdhari, Al-Salam Al-Maruniq in the Science of Logic, page 102) (Al-Malawi, page 350)

II: Figure II

In this form, the middle term is carried in both propositions. It is often used to produce negative cases, so it is required:

1. The major premise must be total to ensure that the middle term is exhausted.
2. The minor premise must be positive in order for the relationship between the minor and major terms to be realized.
3. The result follows the grand introduction in the qualitative.
4. The result also follows the minor premise in quantum. (adala, 2020, page 56)

All of these conditions are mentioned by Al-Akhdari, but some of them are explicit and others are implied. For example:

Grand introduction: Every animal is mortal.
Minor premise: No inanimate object is mortal. Result: So no inanimate objects are animals.

At Al-Akhdari, the second form is described as follows:

And carrying it around again is known

The second is that they differ in how they

A major kidney has a condition signed

(Al-Jindi, Explanation of Peace in Green Logic, page 86)

It means that the difference in qualities (positive and negative) is necessary, provided that the major is total.

Aristotle's four correct multiples of this figure:

Result	Types cases of	Logical arrangement	Name
KS	KM, KS	E - A⇒ E	Cesare
KS	KS, KM	A - E⇒ E	Camestres
JS	JM, KS	E - I⇒ O	Festino
JS	JS, KM	A - O⇒ O	Baroco

(Imam, 2003, pp. 82/94)

Al-Akhdhari also organized these strokes, making it easier for students to understand them without compromising their logical essence, namely:

The first: The smallest (net positive) and the largest (net negative) result in a net negative.
The second: Its smallest (totally negative) and largest (totally positive) results in a total negative.
The third: Its smallest (partial positive) and largest (total negative) results in a partial negative.

Fourth, its minus (partial negative) and its plus (total positive) produce a partial negative. (Malawi, page 354) .
Second requirement: Styles of the third and fourth forms: Their types and rules

First: Figure III

In this form, the middle term is in both premises. It is often used to deduce partial cases.
It is required:

1. The minor premise must be positive.
2. One of the premises must be total to ensure that the middle term is exhausted.
3. The result is always partial and follows the macro in the micro. (Adala, 2020, page 56)

Example: Grand Prelude: Some people are philosophers.
Minor premise: All people are beings.
Result: Some beings are philosophers.
Aristotle's correct multiplication of this figure:

Result	Type of cases	Logical arrangement	Name
JM	KM, KM	A - A⇒ I	Darapti
JM	KM, JM	I - A⇒ I	Disamis
JM	JM, KM	A - I⇒ I	Datisi
JS	KM, KS	E - A⇒ O	Felapton
JS	KM, JS	O - A⇒ O	Bocardo
JS	JM, KS	E - I⇒ O	Ferison

(Imam, 2003, pp. 82/94) .

Al-Akhdari expressed this form by saying:
He put in all three A's.

The third is positive in their youth and to see the kidney of one of them (Al-Jindi, Explanation of Peace in Green Logic, page 90)
That is, the fact that the middle term is placed in both premises characterizes the third form, with the condition that the minor is positive and one of the two premises is total, as it is not possible to combine two negative premises, and that one of the two premises is total, which is the major premise. (Al-Akhdari, Al-Salam Al-Manawarq in the Science of Logic with Commentary, 2004, p. 59/60)

The difference between Aristotle's and Al-Akhdari's conceptualization of syllogism is evident in the nature of the latter's modifications for pedagogical purposes. Al-Akhdari altered the structure of the syllogisms, replacing the order of terms or the type of cases to make them easier to understand and to simplify the mechanics of reasoning. For example, in the second multiplication **(Disamis)**, Aristotle relies on a fully positive minor and a partially positive major, resulting in a partially positive result, while Al-Akhdhari modifies it so that the minor is partially positive and the major is fully positive, resulting in a partially positive result, breaking away from the strict Aristotelian analogy. Aristotle's third multiplication **(Datisi)** consists of a total positive major and a partial positive minor, resulting in a partial positive result, while Al-Akhdari made the major positive partial and the minor positive total, resulting in the same partial positive result.
In the **fifth** multiplication **(Bocardo)**, Aristotle maintains an overall positive minor and a partial negative major, making the result a negative partial. AlAkhdari switches the order of the terms and makes a partial positive minor and a partial negative major, which affects the result, making it a negative partial. In the sixth multiplication **(Ferison)**, Aristotle has the major as a negative whole and the minor as a positive partial to produce a partial negative result. However, Al-Akhdari presents a total positive minor and a partial negative major, a change that affects the nature of the reasoning. It is clear from this that Aristotle adhered strictly to the formal rules of

measurement, while AlAkhdari adapted them to serve the pedagogical dimension, giving his logic a flexible and educational approach that is not devoid of purposeful simplification.
(Al-Mallawi, page 354) .

II: Figure four

This form was not included by Aristotle in his original classification, but it was implied. It was later added by his student (Theophrastus). The middle term is portable in the major and objective in the minor.◌ It is characterized by a more complex structure, which makes it less commonly used. Its conditions are as follows:

1. Minor college with a positive major introduction.
2. A grand total with a difference in quality.
3. The result is partial, with a positive minimum.
4. Negative the minor with the total result.
5. The result follows how to minimize if it is macro and how to maximize if it is micro.
6. If the result is positive, then the premise must be total
7. If the result is negative, the major premise must be total. (Adala, 2020, pp. 56-57)

These rules are implied in Al-Akhdari's salam, not by direct statement, but by implication in the context of the verses in which he discusses the conditions for the validity of forms and darub. (Al-Akhdari, Sharh al-Salam al-Manawarq, 2016, page 152) Example:

Kubra: Every human being is an animal. Minor: Every talking animal.
Result: Some talking people are human. Aristotle's five correct multiples are:
(Imam, 2003, pp. 82/94).
Al-Akhdhari explained this form by saying:

Result	Type of cases	Logical arrangement	Name
JM	KM, KM	A - A⇒I	Bramantip
KS	KS, KM	A - E⇒E	Camenes
JM	KM, JM	I - A⇒I	Dimaris
JS	KM, KS	E - A⇒O	Fesapo
JS	JM, KS	E - I⇒O	Fresison

And the fourth shape is the opposite of the first
They are in order of completeness
Their minima are partially positive
The larger of the two is a net negative
(Al-Jindi, Explanation of Peace in Green Logic, page 94) He also differentiated between two cases:

- **First:** If the minor is partially positive, then the major must be completely negative.
- **Second:** If the minor is not, then the negative and the partial must not coexist.

It is noteworthy that Al-Akhdari sometimes changes the location of terms or the characteristics of cases to serve the educational goal of his system, without violating the fundamental logical rules. In the second multiplication **(Camenes)**, Aristotle had a fully positive major and a fully negative minor leading to a negative total result, while Al-Akhdari made it a partial positive major and a fully positive minor, resulting in a partial positive result. Similarly, in the third multiplication **(Dimaris)**, Aristotle made the major positive partial and the minor positive total, and the result is a positive partial result, while AlAkhdhari arranged it with a major positive total and a minor negative total, producing a negative total result. **(**Al-Malawi, page 354/358**)**

Third requirement: General Convexity Rules and Formal Foundations

In formal logic, an analogy aims to produce a logical conclusion from two premises, according to an exact triadic structure. Aristotle developed a set of strict rules to ensure the correctness of the inferential construction, which are the basis for each form of analogy. We have already mentioned that these general rules are the ones from which the rules of each form are derived.
These rules are highlighted below:

1. **There should only be three borders**:

The measurement must consist of three distinct terms:

- **The largest limit** is shown in the result as a load.
- **The smallest term** appears in the result as a subject.
- **The middle term** connects them in the two introductions.

2. **At least one of the two introductions must be** completed:

You can't derive a certainty from two partial premises, so at least one of the premises must be total.

3. **A positive premise is required**:

If both premises are negative, then the smaller and larger terms cannot be connected, preventing a conclusion from being reached. At least one of them must be positive.

4. **The impossibility of combining a partial major and a negative minor**:

This combination leads to the separation of the three terms, and thus the absence of inference.

5. **The middle term must take up at least one of the premises**:

Because it is the measurement engine, it must appear in a context that allows the other two terms to be connected.

6. **The result does not take a term that is not consumed by the introduction**:

If a term cannot be consumed in the premise, it cannot be consumed in the conclusion; otherwise, the analogy falls into a fallacy.

7. **A negative case cannot be deduced from two positive premises**: Positive cases do not involve negation, and therefore a negative judgment cannot be deduced from them.

8. **Subordination of the result to the weaker of the two premises**:

- If one of the premises is partial, then the result is partial.
- If one of the premises is negative, the result is negative. (Adala, 2020, p. 55) , (Sayed, 2006, p. 81/113; Mohammed, 2013/2014) .

The importance of these rules: These rules are a guarantee of the correctness of the logical construction of the analogy, and prevent falling into fallacies or incorrect conclusions. They represent the basis on which Aristotle builds his logical theory, as any conclusion that does not conform to them is not accepted. Logicians have pointed out that any violation of these rules loses the middle term's function of linking the larger and smaller terms, and leads to the invalidity of the analogy from a formal point of view (Adala, 2020, page 55) .

Paper II: The Source of the Perfection of the First Form and the Reversal of Imperfect Forms between Aristotle and Al-Akhdari.

First requirement: Source of perfection of the first form

The first form of gestalt analogy is the most complete and regularized form of the four forms, due to its clarity in the logical relationship between the three terms (largest, middle, smallest), both in terms of concept and meaning.

In terms of authenticity:

- What is true for the lower bound is true for the middle bound.
- What is true for the middle term is true for the upper term.
- Thus, what is true for the smallest is included in what is true for the largest, producing a logical certainty result.

Conceptually:

- The concept of the greatest limit is less than the concept of the middle limit.
- The concept of a middle boundary is less than the concept of a lower boundary.
- Thus, the concept of a greater limit is subsumed in the concept of a lesser limit.

This reverse symmetry between the concept and the concept, which is clearly visible in the first figure, gives this figure a clear logical balance. This is based on the inverse relationship between the concept and the conceptualizer: The more the concept, the less the believer. The more the concept, the less the concept.

Comparisons with other formats:

- **Second figure**: The middle term is wider than the larger term, and the larger term is wider than the smaller, disrupting the natural sequence of believability. The issue relates to the gradation of the external validity of the terms, not their mental content, which weakens the coherence of the logical structure and affects the strength of the conclusion.
- **Figure three**: The largest limit is the widest, then the smallest, and finally the middle, which loses the hierarchical relationship between concepts.
- **Figure four**: The smallest term is the widest , followed by the middle, then the largest, thus violating the structure of classical scaling.

Therefore, Aristotle considered the first form to be the most complete, because it is the only form in which the result is based on a sound and coherent relationship between the three terms in terms of both conceptual and conceptual consistency.

Greenhouse position:

Al-Akhdari agrees with Aristotle that the first form is the strongest and most complete. He strictly maintained his conditions in his system, noting that incomplete forms must be returned to him. However, unlike Aristotle, he does not stop at the formal aspect, but adds a pedagogical dimension that aims to facilitate the learning of logic and simplify the formal rules by linking them to practical applications, which helps the student to move from abstract theoretical understanding to the practice of logical reasoning in a concrete way. (AlAkhdari, Al-Sanusiyyah Al-Kubra and Al-Salam Al-Manouraq in the Science of Logic, 2005, p 32) .

Second requirement: Restoring the missing shapes to the first shape

Based on the above, the first form is considered by the rationalizers as a reference model through which the validity of the incomplete multiples in the other forms can be justified through specific transformations and mechanisms developed by the later rationalizers.

The aforementioned Latin names for all the productive and correct multiplications, each of which contains connotations that help to identify the mechanisms that must be used to restore the missing multiplication to its counterpart from the first productive and correct form. The process is denoted by the Latin consonant (silent) letters S, P, M, and C. Each name also includes other vowels that indicate the types of convectional cases that make up the multiplication, namely: A, E, I, O. We have mentioned their meanings earlier and they are a reminder:
A is a positive whole, E is a negative whole, I is a positive partial, and O is a negative partial. The consonants that indicate how to respond are:

- **S** means the exact opposite. This is for a negative whole or a positive partial.
- **P** is the opposite. This is, for a positive kidney.
- **M** is the exchange of the two premises. In other words, turning a major into a minor and a minor into a major.
- **C** i.e. the use of backward proof in the rebuttal process. (Adala, 2020, pp. 63-62) (Maher, 2005, pp. 130-135)

The first letter of each diminished product name refers to the whole product to which it is returned.
Examples:

1. **C** in **CESARE**← means return to **CELARENT**
2. **D** in **DARAPTI**← means returned to **DARII**
3. B **in BRAMANTIP**← means returned to **BARBARA**

Example	Logical explanation	Significance	Crafts
BRAMANTI P	Change the position of the major and minor premises to reach the order of the first figure	Switching introductions	M
CESARE	Performing the complete inversion of the negative major premise	Completely opposite	S
DARAPTI	Reverse the width of the minor to make it a positive partial	Reverse crosswise	P
FESTINO	Perform the complete inversion of the negative major premise.	Completely opposite	S
BAROCO	Assume the opposite of the result of the missing multiplication and convert it to a minor premise in the full multiplication and - thus - derive a result that is opposite to the premise of the missing multiplication.	Proof of succession	C

(Aristotle, First Analytics, 1983, pp. 4-7) . (Copi, 2005, pp. 240-243)

1. **An example of the BRAMANTIP multiplication from Figure Four:**

Grand Prelude: All philosophers are rational. (A)

Minor introduction : All rational people are talkers.(A)

Conclusion: So, some speakers are philosophers.**(I)**

✓ **Reply to BARBARA from the first figure:**

Grand introduction: All philosophers are sane (A) All sane people are talkers.(A)

Minor Premise: All rational people are talkers (A) All philosophers are sane (A)

Conclusion: Therefore, some speakers are philosophers (I)   All philosophers are speakers (A) as opposed to (P) (adala, 2020, pp. 62-63)

2. Example of multiplicationCESARE : From the second figure:
Grand introduction: No Philosopher is a Materialist (E)
Minor introduction: All psychologists are materialists (A)
Conclusion: No psychologist is a philosopher (E)
✓ Revert the measurement to the first form **(CELARENT)** using S:(the inverse of the major premise)
Full Reverse S
The Great Premise: No philosopher is a materialist (E) ← No Materialist is a philosopher (E)
Minor Introduction All psychologists are philosophers (A)← All psychologists are philosophers(A)
Conclusion: So, none of the psychologists are materialists (E).← None of the psychologists are materialists (E).
By switching the subject and object while maintaining negation and quantification, i.e., maintaining the negative result. (Copi, 2005, pp. 240-241). (Adala, 2020, pp. 62-63)

3. Example of multiplication DARAPTI : From the third figure:
Example: Introduction: All scientists are thinkers (A)
Minor introduction: All scientists are rational (A)
Conclusion: Some rational people are thinkers (I)

– Revert **to the first form (DARII)** using P:(the reverse of A):)

Grand introduction: All Scientists Are Thinkers← (A) All Scientists Are Thinkers (A)
Minor Premise All scientists are sane (A)← Some sane people are Scientists (I)
Reverse the width of P
Score: Some Sane People Are Thinking(I)← Some Sane People Are Thinking (I)
We turn A into I, switching the subject and object, preserving the grand premise, and equating the original result in terms of logical truth. (Copi, 2005, pp. 240-243)

4. Example of the FESTINO multiplication from the second figure:
Grand introduction**:** None of the pessimists are wise (E).
Minor introduction: Some philosophers are wise (I).
Conclusion: So, some philosophers are not pessimists (O).

– **Revert to the first form (FERIO) using S: the exact opposite of the major premise (E): Fully reversed S**

- Grand introduction : No one who is pessimistic is wise (E)← No one who is wise is pessimistic (E)
- Minor introduction: Some philosophers are wise ← (I) Some philosophers are wise (I)
- Conclusion: So, some philosophers are not pessimists (O).← Some philosophers are not pessimists (O).

The complete inversion of the case (E) is done by switching the subject and object without changing the quality or quantity, keeping the structure of the minor case the same and the result remains a negative partial. (Copi, 2005, pp. 240-241) (Adalah A., 2020, pp. 62-63)

5. An example of the BAROCO multiplication from the second figure:

- Example: The Great Premise: All wise men are humble. (A)
- Minor Premise: Some scientists are not humble (O)
- Conclusion: Some scientists are not wise(O)
- However, the second form cannot be directly traced back to the first form, because it contains an O-type case, so we resort to the successor proof.

✓ Reply to Figure 1 (BARBARA) Using the proof in reverse (C), we assume the opposite of the result to be the least premise of the whole product which, together with the other premises, leads to the opposite of the least premise of the incomplete product. In our example, we assume the opposite of the result: (All scientists are humble) and then build a new measure for the first form**: (BARBARA)**: **A - A⇒ A**

- Original Grand Prelude: All wise men are humble **(A)**
- Assumption: All scientists are wise **(A)**, which is the opposite of the result of the missing multiplication
- So: All scientists are humble **(A).** It is the opposite of the minor premise of the ellipse.

Due to the contradiction between the conclusion "All scholars are humble" and the original premise "Some scholars are not humble", the premise "All scholars are wise" is proven to be false, leading to the conclusion "Some scholars are not wise". The BAROCO analogy was thus restored **to the** first form **BARBARA** via the successor proof **(C)**, as the middle term "humble" could not be employed directly, so an indirect logical construction was required that led to the opposite of the original result (Geach, 1972, pp. 22-24) .

Thus, the multiples of the other three shapes are converted to the multiples of the first shape, proving that the first shape is not only theoretically complete, but also a transformational reference for the rest of the shapes.

Green and reply to the first figure:

Al-Akhdhari agreed with the principle of restoring incomplete forms to the first form, but he did not devote a detailed explanation of this rule within his ladder of logic, but limited himself to a general reference to its importance without going into analyzing its steps or explaining its symbols, as did other commentators who came after him. This approach can be seen in his statement:

Anything that is not from the first is rejected.
to him if it is true or else.
(Al-Akhdari, 2010, p. 75)
This verse is a clear indication of his commitment to the principle of rebuttal, as he recognizes that every analogy other than the first form must be returned to it if it is valid, or substituted for it if its conditions are not valid. However, Al-Akhdari, as is the habit of organizers to be brief, did not elaborate on the ways of restoration (such as complete reversal, transverse reversal, and switching the two premises), nor did he explain the significance of the symbolic letters in the names of the modalities, nor did he provide detailed examples showing how to convert the measurements from one form to another.
Some commentators have elaborated on this idea, including Sheikh alHussein bin Muhammad al-Makki in his commentary on the ladder, where he said: "The Nazim has emphasized that the three forms other than the first are returned to him when needed, and this is the doctrine adopted by the regions, but he did not indicate how, because it is explained in the extended logic books" (al-Makki, 2010, page 75) .

Al-Akhdari's position is understood by recognizing the principle in general, without going into the details of application and analysis, an approach that is in line with the intent of the educational and introductory system, and its ultimate goal was educational ً not encyclopedic. However, despite this brevity, the text remains rich and solid , enabling the student to understand the mechanisms of response and transformation, even through subsequent explanations and commentaries.

Conclusion:

Through this study, it is clear that Abd al-Rahman al-Akhdari was not a mere transmitter of Aristotle's logical system, but rather a new who utilized Aristotelian logic to serve jurisprudential and educational purposes, coming up with a system that combines formal rigor with pedagogical simplicity**.**

Al-Akhdari succeeded in making Aristotelian analogy a useful tool for learners, away from the complexities of philosophical logic. He focused on simplification, replacing the dry philosophical language with a systematic language that is easy to memorize and assimilate. He reshaped the analogy to make it a means of establishing sound reasoning and regulating jurisprudential reasoning, thus contributing to opening the horizons of ijtihad. It is a milestone in the history of the interaction between Aristotelian logic and Islamic thought.

As for the first teacher (Aristotle), his goal was to establish the rules of logical philosophical thinking that controls mental processes and establishes a kind of correct reasoning.He intended to fulfill the theoretical need for science before anything else, unlike the goal of the educational teachers . and those who followed them, such as our venerable scholar Abdul Rahman al-Akhdari, may God have mercy on him. Therefore, Aristotle deserves the first credit for establishing the science of formal logic, which will gradually develop over the ages, until it transforms in the modern era into a precise symbolic mathematical logic that constitutes a solid base for the mathematical sciences and a necessary theoretical base for automated information, the backbone of contemporary technology.

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