

## A Critical Analysis of a Critique on Truth-Functional System Semantics

### Is the Conclusion of an Argument Independent of the Premises?

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### Abstract

In Classical Logic, an argument is deemed valid if and only if it lacks a counterexample. However, arguments like  $Q \vdash P \vee \sim P$  and  $P \wedge \sim P \vdash Q$  are considered valid based on this definition, despite natural intuition challenging their validity. *A New Outlook on the Elements of Logic* introduces a novel definition for argument validity, rendering the aforementioned arguments unprovable. This new definition necessitates revisions in argument evaluation, the substitution rule, the definition of logical truth, methods for determining argument validity and invalidity, as well as the definition and procedure of soundness and completeness proofs in Classical Logic. The establishment of the Truth-Functional System of Propositional Logic stems from this revised definition.

Asadollah Fallahi critiques this system in "*Hajhosseini's Truth-Functional Semantics*," published in *Philosophy and Kalam*, 2023, Vol. 56, issue 1. While proposing scattered criticisms, this article reveals that, aside from one critique requiring rectification due to an inadvertent mistake, the other criticisms stem from fallacies, unfounded accusations, non-compliance with certain critique conditions, incorrect formulation of the definition of a valid argument, and oversight of consequences arising from new conditions for argument validity and its definition.

**Keywords:** Classical Logic, Truth-Functional System and its Semantics, Argument Validity, Soundness and Completeness

### Introduction

According to the definition of the validity of an argument in classical logic, the argument  $P \vdash Q$ , where  $P$  and  $Q$  are independent of each other, has a counterexample and is evaluated as invalid. Each of the two arguments  $P \wedge \sim P \vdash Q$  and  $P \vdash Q \vee \sim Q$  constructed by substituting  $P$  for  $P \wedge \sim P$  or substituting  $Q$  for  $Q \vee \sim Q$  from the above argument, known as EFQ and EQT arguments, is evaluated as valid since they have no counterexamples. These two arguments are demonstrable by applying the rules of inference. However, natural intuition does not confirm the correctness and validity of these two arguments.

In the book *A New Outlook on the Elements of Logic*, the author has presented a new definition of the validity of an argument in response to this problem by adding two new conditions to the conditions for the validity of an argument (Hajhosseini, p. 22), which



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block the ways to prove the validity of these two arguments. This definition requires a revision of the evaluation of some evidence (arguments), the rule of substitution, the logical truth of the counterpart of a deduction, the method of determining the validity and invalidity of an argument, and the definition and procedure of the soundness proof and the completeness proof of Classical Logic. The article thoroughly discusses and provides adequate reasons to support each point. These changes have resulted in the founding of a truth-functional system for the basis of propositional logic that is free from the paradoxes and challenges of classical propositional logic. In the article "Hajhosseini's Truth-Functional Semantics," published in *Philosophy and Kalam*, 2023, Vol. 56, issue 1, Asadollah Fallahi, without specifying his position on the above arguments, criticized this theory by citing isolated points of criticism. In this article, we have categorized Fallahi's criticisms into four groups: "Ambiguity in some semantic concepts of the truth-functional system", "Validity, truth-preservation and model", "Implications of the definition of validity and invalidity of the argument", and "Soundness and completeness meta-theorems"

## Research Findings

Upon analyzing the EFQ and EQT arguments, it becomes evident that in the former case, substituting the conclusion with any formula, or in the latter case, omitting the only premise of the argument or replacing it with another formula would not be sufficient to generate a counterexample line. This substitution clearly indicates that these two arguments fall into the category of arguments where the conclusion is independent of their premise. Therefore, we can conclude that in classical logic, argument validity or invalidity is assessed without considering the independence of the premise(s) from the conclusion. However, in the truth-functional system of propositional logic, the new conditions prevent proving the validity of arguments whose conclusion is independent of their premise.

In this article, after introducing the semantic indicators of the truth-functional system of propositional logic and its implications, we have addressed each of Fallahi's criticisms in detail. Furthermore, we have demonstrated that, except for one criticism requiring the correction of a minor error that does not compromise the theory's principle, none of these criticisms is justified.

## Conclusion

Based on our responses to Fallahi's criticisms, it is evident that he has sometimes employed fallacies, criticized self-made accusations, exceeded the critique's requirements, delved into issues related to the non-truth-functional system beyond the article's scope, and occasionally reiterated criticisms previously addressed in another article, to which the author had already responded. Moreover, instead of formulating a correct and valid argument within the context of new conditions, he has coined specific conditions and considered them part of the argument. However, in referring to these conditions, he has deviated in proving the meta-theorems of soundness and completeness. We have also shown that with the correct formulation of the definition of correctness and validity of the argument, the process of proving these two meta-theorems in the book remains error-free.

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