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# مجلهٔ فلسفه


## Majalle Falsafe

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# Contents:

# A Machiavellian Analysis of Italian Fascism

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## Abstract

This essay explores the connection between the "gentlemen" of Machiavelli and tyranny, arguing that Machiavelli's theory can explain fascism as an anti-republican ideology. Thus, this essay does not limit itself to the exposition of Machiavelli's theory of the state, but also includes an analysis of fascism as it was born after the First World War. The relation between the class structure of a state and its form of government is not a relic of the past. The gentlemen of today, namely capitalists, damage a republic for reasons like those Machiavelli gives. Thus, Machiavelli's analysis sheds light on capitalism

## Introduction

Machiavelli defines the "gentlemen" as people who "live abundantly on the incomes of their possessions, without caring either about cultivation or about other necessary exertions to live."[1] These gentlemen "are dangerous in every republic,"[2] according to Machiavelli, because a republic needs "an equal equity"[3] amongst the citizens. A state with a corrupt population and full of gentlemen would not be stable as a republic, so Machiavelli advises that it is necessary for a state to transform itself into a principality to maintain itself in those

1. Machiavelli (2018), p. 175.
2. Ibid.
3. Ibid., p. 173

conditions.[1]

But this principality would not be perfect. In fact, corruption would remain, and the gentlemen would not vanish. The function of the principality, then, is to formalize that corruption and that class structure.

If the corruption of the people would remain, which type of state would be best, according to Machiavelli? A republic. However, for Machiavelli, the republic is not a static thing-that is, there is a struggle between different classes in a republic. This struggle is not a grave or negative thing for him. He comments that "the animosity in Rome between the Senate and the Plebeians kept Rome free."[2] The tension is necessary to keep the republic free of corruption. Here, however, as Antonio Negri notes, the advice given is not to have a "neutral" government, that does not choose laws in favor of a specific class. On the contrary, Machiavelli and Negri emphasize that "the Plebeians are the guarantors of liberty"[3]-if the Plebeians "had not always constrained the nobles' ambition,"[4] Rome would have been reduced to tyranny much more quickly.

## The Ideology of Fascism and the Bienno Rosso

The anticommunism of the ideology of fascism expresses itself in its actions: it violently suppressed dissent from the left in Italy during the Biennio Rosso. But this anticommunism expresses itself also in the political economy of Fascist Italy. As Clara Mattei argues, liberal economists in the 20th century like Ricci and Einaudi influenced fascist economists like De Stefani and Pantaleoni. Both the groups helped to influence the political economy during Mussolini's reign-they lowered public spending for many industries, they privatized that which was previously public monopoly, and reinforced controls on taxes on the working classes but weakened these controls on the upper class.[5]

A document which represents the economic ideology of Fascist Italy is the 1927 Labor Charter. Article III of the document prohibits the right to legal representation for unions outside state control.[6] However, the Charter also prohibits labor controversies from going to a judge "if the corporate organ has not first undertaken an attempt at reconciliation."[7] Thus, the role of the fascist state here is to significantly limit worker power. The Charter also says, in Article VII, that Fascist Italy "considers private initiative in the field of production as the

1. Ibid., p. 175.
2. Ibid., p. 142.
3. Negri, Boscagli, and Hardt (2009), p. 67-8.
4. Machiavelli (2018), p. 142.
5. Mattei (2015), p. 6-9.
6. Mussolini (1927), III.
7. Ibid., X.

most efficient and most useful instrument in the interest of the Nation."[1] Article IX limits state intervention in the economy "only when private initiative is lacking or insufficient."[2] The fascist state, then, was a state that had as its end the interests of capital against labor.

These politics were clearly precedents of the economic program that today we call austerity. However, in Machiavelli's language, they are also a means to break the economic model that sustains the possibility of a republic. The end of these austerity programs is to establish an absolute reign, in which the Plebeians, whether peasants or proletarians, are excluded from government. In short, these politics were a method to establish in the Italian populace the corruption that, according to Machiavelli, a monarchy needs. In this sense, one should see the ascent of fascism in Italy as a process against the movements of the Biennio Rosso. The correct schema of the Biennio Rosso puts on one side the Italian worker's movement that, using both parliamentary and extra-parliamentary means, wished to establish a worker's republic, and on the other side fascism to establish a government in which the gentlemen could perpetuate themselves.[3]

Here there is a parallel between Italy in the 20th century and Ancient Rome-like the gentlemen of Ancient Rome, the fascists after World War I struggled against the multitudes. This struggle expressed itself both in terms of the base and superstructure. The economic austerity of the fascist state functioned like the resistance of the Optimates to the agrarian laws in Ancient Rome-that is to exclude the multitudes from economic life, and thus the struggle expresses itself in terms of the economic base. Also, the fascist dictatorship, in which parliament was dissolved, functions like the Optimates' resistance to the foundation of the Tribune of the Plebeians: to exclude the multitudes from legal and political life. Thus, the struggle also expresses itself in terms of the superstructure.

But let us return to Italy in the 20th century. Here, against Machiavelli, the economists viewed the lower classes-in this case, the proletariat-with antipathy. Both the liberal economists and the fascist economists said that people were moral only as *homo economicus*.[4] Thus, these economists thought that the poor should remain poor as far as the poor had vicious tendencies-a type of Social Darwinism applied to the economy. In natural life, according to these economists, the most frugal people would survive, but the poor would perish.

However, there was a problem for these economists. Italy after the First World War had created economic aid programs which, according to these economists, had disturbed "the natural order" of things. Thus, the economists supported the PNF for two reasons. First, they thought, because the PNF fought against the communists during the Biennio Rosso, they

1. Ibid., VII.
2. Ibid., IX.
3. Natoli (2012), p. 206.
4. Mattei (2015), p. 13-5.

would help destroy the economic reforms that the state had created during the First World War. Second, an authoritarian state would help fight the tendency in the proletariat to waste-a tendency that these economists thought was natural for the poor. In short, if the reductions in the public programs was not enough to combat the immoral tendencies of the Plebeians, an authoritarian state would have to apply the programs using repression. An authoritarian state was justified if that state would protect the free market. Moreover, these economists thought that these measures would be justified because, according to them, the general populace did not behave according to the model of homo economicus-the citizens "wasted" their money and ignored the economists. The wounded pride of the economists thus supported the PNF-it was inconceivable that the proletariat knew how to use money better than the economic models! Thus, a state like Fascist Italy was *necessary* to violently combat the "decadence" of the working classes.

There is a parallel between Italy after the First World War and Rome during the agrarian crisis. We have on one hand the Optimates and the economists, who wanted above all to combat the struggle for popular freedom. During this fight, it was necessary to destroy the republican tendencies of the Plebeians-to "make everything in that state again"[1] as an authoritarian principality. Thus, in Ancient Rome the Optimates fought every form of tendency to establish a universal republic, like the Tribute of the Plebeians.[2] In Italy after the First World War, the economists and the PNF fought not only against Parliament but also against the economic reforms, but only the superstructure but also the economic bast that supported it. On the other hand, there is the Plebeians and the proletarians of the 20th century, who prolonged the epoch of liberty. The Plebeians of Ancient Rome-in their agitation for agrarian laws and for the foundation of the Tribune of the Plebeians-elongated the life of the Roman Republic.[3] The proletarians of the 20th century elongated the epoch of liberty during the Biennio Rosso by fighting against the squadristi and the forces of reaction.

This should not be surprising. Machiavelli says that "in different peoples one often sees the same accidents"[4]-it is obvious that a problem that occurs many times is class struggle. In fact, this necessity of class struggle is at the base of Machiavelli's conception of the state. Every type of state-whether it be "Principality, Optimate [that is, oligarchy], [or] Popular"[5]-supports one class over another. The principalities and oligarchies support a reign in which there are gentlemen, but in republics without corruption there are absolutely none of them-it is for this reason that Machiavelli advises that one "construct, therefore, a republic where

1. Machiavelli (2018), p. 121
2. Ibid., p. 75-9.
3. Ibid., p. 142.
4. Ibid., p. 145.
5. Ibid., p. 65.

a great equality is or is made, and at the order meanings a principality where there is great inequality."[1] It is there where Negri develops the synthesis between liberty and equality-that "equality is the condition of freedom."[2] We have, then, an explanation for the economic base of fascism. Fascism chose an economic path of the Social Darwinist type because, according to Machiavelli and Negri, where there is not equality, there neither can be liberty. Thus, the motive for austerity was not only to "return" to a presumed natural state, but also the reverse: the economists used fascism to introduce austerity, but the fascists used austerity to destroy tendencies which could inculcate support for a proletarian republic in Italy.

But here there is something ironic that one must mention. As Umberto Eco recounts, Fascist Italy used rhetoric that clearly referred to class. For example, he recalls part of the propaganda in Fascist Italy claimed "that the English were the 'people of five meals': they ate more often than Italians, poor but sober. The Jews were rich and helped each other thanks to a secret network of mutual assistance."[3] The irony here is obvious: fascism condemned the ostensible decadence of wealth with one hand but introduced an economy which incentivized inequality with the other. Fascism used as a base of support "*the appeal to the frustrated middle classes*"[4] even though the political economy of fascism was against the welfare of the working classes.

To escape the irony, the fascist must embrace that which Eco calls "irrationalism."[5] In fascism, class struggle does not disappear, but is "sublimated," in Freudian terms. A fascist cannot hate the gentlemen of his own race but must transfer the hate onto a foreign enemy. This formulation of the political is a "ready-made" formulation in the sense that it is constructed without reference to present facts, but only to evade the problems that one encounters with the formulation. For example, instead of abandoning the schema of man as *homo economicus* after the First World War, the economists maintained it using fascism. Similarly, the fascist's sublimation onto a foreign enemy is only a schema that he uses to escape the reality of the fascist economy. But, as Machiavelli and Negri note, this "ready-made" ideology is incompatible with a republic, that always requires "new ordinances."[6] It is this that that Negri calls "constituent power."[7] The capacity to change in the face of changes in the present facts is necessary for a republic, but impossible for a fascist state.

1. Ibid., p. 177.
2. Negri, Boscagli, and Hardt (2009), p. 68-9.
3. Eco (2017), p. 41.
4. Ibid., 39.
5. Ibid., 37.
6. Negri, Boscagli, and Hardt (2009), p. 79-80.
7. Ibid.

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# A Modeling Account of Function

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## Abstract

The ascription of normal functions abounds in biology. Normal functions tell us what parts of a system *are supposed* to do and what parts that system is *supposed* to have. Functional explanation of this sort serves to construct models of the systems that comprise the domain of biology. In this paper, I present a novel descriptive account of normal function, the Modeling Account that satisfies a key *desideratum* for such theories, namely, being thoroughly consistent with the practice of ascribing normal functions in biology, including ascribing normal functions to what I call 'self-maintaining pathologies.'

## Introduction

The ascription of normal function abounds in biology. Normal functions tell us what parts[1] of a system *are supposed to* do and what parts that system is *supposed* to have (Neander, 1991). Functional explanation of this sort serves to construct models of the systems that comprise the domain of biology, namely, systems whose parts are organizationally differentiated and make differential contributions to their self-maintenance (Mossio et al., 2009). In this paper, I (§1) present the Modeling Account of function (MA) and (§2) argue that it satisfies a key desideratum for descriptive accounts of normal function, namely, remaining thoroughly consistent with the practice of ascribing normal functions in the biological sciences, including that of ascribing normal functions to parts of what I call 'self-maintaining pathologies.'

1. I use 'part' and 'trait' interchangeably to cover both system-level and subsystem traits, parts, components, phenotypes, characters, and in some instances genotypes.

# §1

Normal functions tell us what things *are supposed to* do. The most often cited example in the philosophy of biology: the normal function of the heart is to pump blood. Thus, that's what hearts *are supposed to* do. Moreover, that the heart is supposed to pump blood justifies the belief that systems of the relevant type, e.g., vertebrates, are supposed to have hearts. The dual explanatory role that normal function plays in biology has vexed philosophers for at least the last half-century. By playing both roles, the ascription and invocation of normal function threatens to be circular: a part is there in *order* to perform its function-a forward-looking explanation-and is there, already, *because* it performs its function-a backward-looking explanation. One way of avoiding circularity is to get clear on what kind of system the biological sciences study and on how they study systems of that kind. Vindicating the application of the concept of normal function in biology is thus a key desideratum for *descriptive* theories of normal function (cf. Millikan, 1984).

To satisfy that *desideratum*, I present the Modeling Account of function (MA). First, on the MA, biologists study types of organizationally differentiated dissipative systems (ODDS)[1] (Mossio et al., 2009). ODDS are systems that keep themselves from entering thermodynamic equilibrium, thereby maximizing entropy, by controlling the matter and energy that compose them and the environment in which they're situated. Importantly, what sets ODDS apart from other dissipative systems is that they impose control through the performance of distinct activities[2] by differentiated parts. The parts of a lit candle-a chemical dissipative system-don't make differential contributions to the continued existence of the flame-all changes in the system amount to fueling it. By contrast, the heart's pumping is distinct from the kidneys' filtering in chordates and each makes a differential contribution to the continued existence of those chordates. Finally, ODDS, like all dissipative systems, keep themselves from entering thermodynamic equilibrium by continuously setting up the conditions for their very existence, including the presence and activities of the very parts that compose them.[3] They thus maintain themselves.

1. I don't distinguish between singular and plural ODDS.

2. I use 'activity' to cover both processes and continuous states.

3. Self-maintenance allows for functional explanation, but not in terms of normal function. We can say that a function is whatever a part does that differentially contributes to a system such that it, in turn, contributes to the part that performs that function (Mossio et al., 2009). Thus, a part of a system that has a function is there *in order to* perform its function because the rest of the system, in order to maintain itself, produces and maintains that part with a view to its performing that function. And a part of a system that has a function is there *because* it performs its function inasmuch as its having done so contributed to the system's self-maintenance such that that system is now in a position to produce or maintain that part. The causal loop established by self-maintenance is sufficient to avoid the threat of circularity. Yet, it alone is insufficient to capture normal functions, since many individual ODDS may achieve self-maintenance through a variety of means, thus instantiating what Mossio et al. call "regimes of self-maintenance" (2009, p. 829ff.). The normal functions of a system pick out the regime that captures the type of system being studied, setting the norms against which we compare and judge individuals of that type.

Second, on the MA, biologists study ODDS by constructing models of them through the ascription of normal functions (cf. Neander, 1991). Individual ODDS of the same type may differ from each other in any number of ways, including not having some parts, having malformed or dysfunctioning parts, or having polymorphic or mutated parts. Such variation isn't easily accounted for by the construction or application of laws of nature. A fruitful explanatory strategy employed by biologists is to use models instead, where models are fictional entities or props which represent their targets by being like them or in some way systematically related to their activity (Godfrey-Smith, 2006; Levy, 2015).[1] We account for behavior of the target of a model in much the same way we infer the location of a building by use of a map. Ascribing normal functions helps us construct a model of a type of ODDS by isolating an activity of a part of a system as one whose contributory effect(s) on systems of the same type are such that systems of that type (re)produce or maintain that part (cf. Schlosser 1998). Thus, ascribing to the heart the normal function of pumping blood isolates one of many distinct activities of the heart as (the) one whose contribution to vertebrates is such that vertebrates have and continue to (re)produce or maintain hearts. Normal functions, by helping us construct models of types of ODDS with which to compare individuals, pick out types of activities of types of parts and justify the beliefs that individual ODDS *are supposed* to contain those parts and that those parts *are supposed to* perform those activities.

Without further ado, here's the account:

(MA) An activity, φ, of a trait, c, is a normal function and so c forms part of a model, SM, of a type of organizationally differentiated dissipative system, $S_T$, iff the presence of c across tokens of $S_T$ is due to the distinct contribution c's φ-ing makes to the self-maintenance of those tokens.

On the MA, the way ODDS of the same type maintain themselves is by (re)producing and maintaining a specific set of subsystems whose parts make a differential contribution to the continuing existence of those systems and, thereby, the (re)production and maintenance of those very parts. And it's because ODDS of the same type (re)produce and maintain parts of the same type that in turn make differential contributions of the same type that such systems are constituted as they are, namely, with those very parts.

Before applying the MA, it's worth noting that it presupposes type-individuation. While function ascription in general depends on type-individuation, it isn't a necessary condition on the ascription of particular normal functions. Rather, the MA, like much of biology, takes for granted that the systems being studied are historically situated, where this means that those systems are the product of a historical process of such systems acting on themselves

1. I remain neutral on the resemblance or similarity relation between model and target (Giere, 2004).

and interacting with others (Amundson & Lauder, 1994; Griffiths, 1994, 2006; cf. Rosenberg & Neander, 2009). Historical situatedness is an idealization and makes system individuation circular, but not viciously so. What's more, historical situatedness does not assume a selection history or that systems be the product of specifically evolutionary processes.

## §2

To test the account, I apply the MA to two examples of normal function ascription in biomedicine, a subdiscipline of biology. First, consider the heart as it exists in vertebrates. According to the MA, the pumping (φ) of the heart (c) is a normal function and, so, the heart forms part of a model ($S_M$) of vertebrates ($S_T$) iff the presence of hearts across vertebrates is due to the differential contribution its pumping makes to the self-maintenance of token vertebrates. Hearts contribute to nutrient intake, energy use, and waste disposal in vertebrates by aiding the delivery of materials to the relevant parts of the body by pumping. The hearts of vertebrates are supposed to pump so that the system can take in nutrients, use energy, and dispose of waste. What's more, nutrient intake, energy use, and waste disposal at the system-level are essential for self-maintenance. When achieved, they collectively promote the maintenance of the heart and its (re) production. Thus, vertebrates are, given their historical situation, *supposed* to have a heart. The activity of the heart is of explanatory relevance for understanding the type of system being studied. Thus, as the MA predicts, pumping is identified with a normal function and the heart is made part of the model of the vertebrate system.

Turning to the second example, I apply the MA to a type of system that's at once a pathology and an ODDS. Call such *systems self-maintaining pathologies*. Cancers are self-maintaining pathologies. As such, if biomedicine studies ODDS by constructing models of them through the ascription of normal functions and self-maintaining pathologies like cancers are a kind of ODDS studied by biomedicine, then we should expect the ascription of normal functions to self-maintaining pathologies like cancers. Indeed, this is exactly what we see. Peinado et al. (2012, p. 883) ascribes a normal function to a part of melanomas in modeling their progression towards metastasis. Applying the MA, delivery of a type of receptor tyrosine kinase for mesenchymal-epithelial transition (MET-RTK) to bone marrow progenitor cells (φ) by melanoma-derived exosomes (c) is a normal function and, so, exosomes carrying MET-RTK form part of a model ($S_M$) of melanoma ($S_T$) iff the presence of melanoma-derived exosomes carrying MET-RTK in melanoma is due to the differential contribution delivering MET-RTK to bone marrow progenitor cells makes to the self-maintenance of token melanomas.

Peinado et al. tested this hypothesized normal function by injecting marrow progenitor cells into irradiated mice. They found that marrow that had previously received MET-RTK from exosomes derived from highly metastatic melanoma cells-what they call highly

"educated" marrow-exhibited greater vascular structure dedicated to tumor growth and, unsurprisingly, greater and more rapid tumor growth. Individual melanomas that properly "educate" nearby marrow through exosome-based MET-RTK delivery exist longer, replicate more aggressively, and seed metastases more effectively. In other words, token melanomas maintain themselves in part by the differential contribution made by the MET-RTK carrying exosomes that they produce. Peinado et al. confirmed the hypothesis that it's a normal function of melanoma-derived exosomes to deliver MET-RTK to bone marrow progenitor cells. Their doing so explains the presence of MET-RTK carrying exosomes in melanomas generally by the distinct contribution those exosomes make to the self-maintenance of individual melanomas.

What's more, this example reinforces the claim that the ascription of normal function in biomedicine serves to construct models. Ascribing the normal function of MET-RTK delivery to melanoma-derived exosomes contributes to a partial model of melanoma that focuses on part of the cancer's microenvironment and its incorporation into the aberrant extracellular matrix. The "education" the marrow receives is an idealization of the change(s) progenitor cells in the marrow undergo in response to receiving MET-RTK from melanoma-derived exosomes. Idealizing changes in the readiness of bone marrow towards supporting metastasis as "education" is part of the practice of modeling melanomas. The ascription of a normal function to melanoma-derived exosomes that captures its role in the "education" process is part of that practice as well. Nonetheless, it's also an accurate representation of the causal relevance these exosomes have for token melanomas progressing towards metastasis. The ascription is therefore of explanatory relevance by accurately representing how a significant portion of individual late-stage melanomas achieve their system-level activities and come to be as they are, namely, with melanoma-derived exosomes carrying MET-RTK. Thus, the ascription justifies the belief that melanomas, if they're to progress, *are supposed to* have MET-RTK carrying exosomes that *are supposed to* "educate" progenitor cells.

To conclude, recall that a key *desideratum* for descriptive accounts of normal function is that they be consistent with the practice of ascribing normal functions in biology. Cancer research is riddled with examples of normal function ascription to parts of self-maintaining pathologies. As cancer research is a part of biomedicine, itself a biological science, we have at least prima facie reason to take the application of normal function language in modeling self-maintaining pathologies seriously. Thus, any adequate descriptive account of normal function must contend with the practice of ascribing normal functions to parts of cancers. I have argued that the MA can capture the practice of normal function ascription in cancer research as continuous with the practice of normal function ascription in biology, satisfying a key *desideratum* for accounts of function.

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# Avicenna's Proof for the Existence of God: Reading Against Davidson

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## Abstract

This paper argues that Avicenna's proof for the existence of God is ontological and a demonstrative syllogism. I defend this interpretation against Herbert Davidson's reading. Davidson finds that Avicenna attempts a new form of the cosmological proof. He thinks that Avicenna could not have given an ontological argument because his proof form differs from that of a demonstrative syllogism, and the structure of major and minor premises in a demonstrative syllogism is 'ontological' in nature. In contrast to Davidson, I argue that Avicenna does prove God's existence using a demonstrative syllogism.

In this paper, I argue for two adjoining claims about Avicenna's proof for the existence of God: the proof is ontological in nature and a demonstrative syllogism. The first part of the paper reconstructs the proof to ground an ontological reading. The second part of the paper argues that the proof is a demonstrative syllogism, against Herbert Davidson's 1987 interpretation of Avicenna. To conclude, I discuss consequences and possible implications of my argument.

The ontological proof endeavors analysis of the concept of God to establish God's existence as a necessary truth.[1] According to this paper's reading of Avicenna, his proof for

1. These definitions follow Herbert Davidson's, *Proofs for Eternity, Creation and the Existence of God in Medieval Islamic and Jewish Philosophy* Oxford: Oxford University Press 1987, 391.

the existence of God begins with the postulation of an a priori necessarily existent being, subsisting in itself. The proof proceeds by analysis of the concept of necessary existence to the conclusion that God, the necessarily existent, exists necessarily. Therefore, the proof is ontological in nature.

Aristotle's idea of a demonstrative syllogism is that of an argument producing scientific knowledge. Demonstrations are structured to grant knowledge in causal terms, informing the knower 'why' something exists. The structure of a demonstrative syllogism mirrors real causality; the first premise is a principle, the analysis of which causes the chain of reasoning to proceed through further premises.[1]

Davidson establishes a tie between the demonstrative syllogism and ontologica[l] proof, in that both endeavor to conclude with logically necessary truths. He thinks Avicenna could not have given an ontological proof or a demonstrative syllogism because the definition of God as "the necessarily existent by virtue of itself" precludes proceeding from cause to effect to establish existence.[2] Instead, he argues, Avicenna moves from effect to cause. If the claim in the second part of this paper is successfully defended, Davidson's characterization of the structural similarities between the two forms of argument bolsters my alternative reconstruction of the proof in the first part of the paper; the two sections of the paper will be mutually reenforcing.

## Ontological Reconstruction

Avicenna gives two formulations of a proof for the existence of God. The following reconstruction combines premises from T2 and T3.

P1 The Truth in Himself [God] is necessarily existent in itself.

P2 Every existent is either the necessarily existent in itself or contingently existent in itself.

P3 Everything that is contingently existent in itself is caused by something else.

P4 The contingently existent in itself cannot become necessarily existent in itself.

P5 The totality of a series is nothing more than all the individual units in a series put together.

P6 The totality of a series must have a cause, because every unit in the series is, by virtue of being an individual unit, caused by something else.

P7 The cause of the totality of the series must be necessarily existent in itself, otherwise the cause would merely be a unit in the series.

P8 The cause must be external to the series, because all of the units in the series are

1. Longeway, John "Medieval Theories of Demonstration" Stanford Encyclopedia of Philosophy 2005, Web, Accessed 25.4.2021.

2. Davidson 1987, 298-9.

contingent and the cause of the totality must be necessarily existent in itself.
P9 Everything that is contingently existent in itself is a unit in a series.
Conclusion: Every series terminates in the necessarily existent in itself, God.

This proof opens by defining God as the only being that is necessarily existent in itself, then proceeds, by demonstration, to conclude that God must be the only being that is necessarily existent in itself. In other words, the proof begins with a definition of God and then shows why that definition necessarily applies to God. The reason that God is the necessarily existent in itself is that all series, viewed as totalities, require a cause that is necessary in itself. If anything is necessary in itself, so the proof runs, by definition, that being must be God.

Avicenna's proof, constructed as I have done so above, is ontological because it proves the necessary truth of a concept of God. Herbert Davidson's definition of the ontological proof is worth quoting for clarity. He writes,

an ontological proof, whether or not it happens to use the term, will always undertake to establish the existence of a being necessarily existent [in the sense of existing by virtue of itself], and also necessarily existent in the sense that its existence is logically necessary, capable of being demonstrated as a necessary truth.[1]

According to Davidson, all ontological proofs endeavor to establish God's necessary existence in two different senses of the term. One sense pertains to God's concept: the proof tries to establish God's existence, where God's nature is to exist necessarily. The second sense of 'necessary existence' is logical, that God's existence is necessarily true. Avicenna's proof undertakes to establish the necessary existence of the necessarily existent in itself, fulfilling both criteria laid out by Davidson.

The rendering of P1 as God's definition might seem unfounded textually, based on the phrasing at the beginning of both T2 and T3. T2 begins with this statement: "Every existence, if you consider it in itself, not considering anything else, is either such that existence is necessary for it in itself, or it is not. If its existence is necessary, then it is the Truth in Himself…"[2] In T3, Avicenna first posits that "[u]ndoubtedly there is existence, and all existence is either necessary or possible. If it is necessary, then the existence of the necessary is true, which is the conclusion sought."[3]

In fact, the appearance of contingent existence at this early place in the proof supports my ontological reading for two reasons. In T2, contingent existence serves a definitional

1. Davidson 1987, 391.
2. Benevich, Fedor and Adamson, Peter "Heirs of Avicenna: Proofs for God's Existence T2-3" *The Heirs of Avicenna: Philosophy in the Islamic East from the 12th to the 13th Century (DFG funded project, 2016-21), 7.*
3. Adamson and Benevich 2021, 8.

function, which is to differentiate between God's existence and everything else. Contingent existence helps give the definition of God as the only being that is not contingent. In T3, the distinction between necessary and possible, or contingent, existence sets up the aim of the proof. The "conclusion sought" is necessary existence, following Davidson's criteria for the goal of ontological proofs.

## Against Davidson

Not only is Avicenna's proof for the existence of God ontological, the proof is also demonstrative. Aristotle detailed his concept of a demonstrative syllogism in the Posterior Analytics. This form of syllogism grounds scientific knowledge by establishing necessary truths. There are four key features of the demonstrative syllogism and all four features apply to Avicenna's proof. In the demonstrative syllogism:

1. Knowledge of the first premises is independent of demonstration.
2. There are at least two premises posited to serve as a foundation to the demonstration, because one term alone never leads to a necessary conclusion.
3. The logical connections drawn in the syllogism mirror real causal connections.
4. The conclusion is a necessary truth.[1]

The way that logical connections mirror real causal connections is by the structure of definitions within the syllogism and the placement of premises. The definition of a necessarily existent being contains the being's essence as the subject of the definition, whereas the definition of a contingent thing depends on factors external to the definition. Furthermore, in a demonstrative syllogism, posterior premises follow prior premises as necessary consequences. Logically, first premises 'cause' the premises and conclusion that follow.

Avicenna's proof rests on first premises that are independent of demonstration (1st feature of a demonstrative syllogism). The first premises in his proof are P1-P4, which state God's definition, the definition of contingent existence, the immutability of necessity and contingency, and the fact that everything that exists falls under one of the two definitions. The unfolding of the proof depends on these first premises, which must be accepted without further elaboration or proof. The four principles listed ground the reasoning for the rest of the proof (2).

Avicenna's proof is not only about causation, the subject matter of the proof is also demonstrated with causal reasoning (3). P1-P4, which establish a difference between contingent and necessary existence, show why P5-conclusion must be true. From the

1. Aristotle Trans. G.R.G. Mure *Posterior Analytics* Book I Parts 3 + 4, classics.mit.edu, Accessed 26.4.21.

definitions of contingency and necessity, a series has no totality, or no definition, without God's causing the series. All the individual units in the series and the totality of the series itself depend for their definition on God, just as God causes the existence of the individual units and totality. The proof provides information to show why God's existence is a necessary truth.

The conclusion of Avicenna's proof is a necessary truth (4). The conclusion states why the necessarily existent being exists necessarily, the reason being because all causal series must have a terminus. The chain of causal reasoning terminates in this necessary truth, once again mirroring real causality, where contingent beings necessarily depend on a necessary being.

Davidson argues that Avicenna attempts a new form of the cosmological proof. One of his reasons in support of characterizing the proof as cosmological is that the proof is not a demonstrative syllogism. "Since there is nothing prior to, and the cause of, the presence of actual existence in the necessarily existent by virtue of itself," he writes, "a demonstrative syllogism leading to the existence of the entity of that description is impossible."[1] In his argument against characterizing the proof as a demonstrative syllogism and in favor of interpreting the proof as cosmological, he makes three crucial errors.

The first error is that Davidson misunderstands the aim of the proof's demonstration. As Avicenna phrases T3, the conclusion sought by the proof is that "the existence of the necessary is true."[2] God's actual existence, which Davidson thinks the proof seeks to establish, is not a conclusion, but a prior premise. Instead, the necessary truth of God's existence is the conclusion of Avicenna's proof. This necessary truth gives a causal reason why God exists, by moving from prior to posterior premises. The conclusion can be caused by prior premises, as was shown, and therefore can be the conclusion of a demonstrative syllogism.

Davidson makes another error in his construal of the ontological proof, that of inconsistency. At the beginning of the paper, I cited a passage in the 1987 book where he defined the ontological proof. In that passage, he says that necessary truth, the goal of the ontological proof, commonly means truth that is logically necessary. He refers to Aristotle's concept of the demonstrative syllogism as a paradigmatic example of the kind of logical necessity evidenced in the ontological proof. In a different discussion, Davidson identifies the demonstrative syllogism and the ontological proof as both endeavoring to prove existence "in the external world."[3] His understanding of existence as external to the mind or concepts is misleading when related to the ontological proof. It is not clear how God's concept could be analyzed to prove existence in the external world, nor why the meaning of existence

1. Davidson.298-9 ,1987

2. Adamson and Benevich 2021, 8.

3. Davidson 1987, 298.

within God's concept should be applied to the external world. Davidson does not seem to think that the ontological proof is impossible to motivate-that the confusions raised in the previous sentence devastate the ontological proof-so I conclude that his first definition is more cogent and practical than his second. For the purposes of this paper, I accept one (the ontological proof endeavors to establish God's existence as a logically necessary truth) and not the other (the ontological proof endeavors to establish God's existence in the external world).[1]

Davidson's third error is failing to see the 'why,' in addition to the 'that,' supplied by Avicenna's proof. By Davidson's reading, Avicenna's proof reasons from effect to cause, contingent to necessary existence, and not vice versa. As a result, the proof is cosmological, not ontological or a demonstrative syllogism. The cosmological proof aims merely to establish that God's existence is true, without giving a reason why the proposition is true. Avicenna's proof cannot be cosmological by this standard. Without a reason why God's existence is true, that existence cannot be necessary. As I have argued, the goal of Avicenna's proof is to establish God's necessary existence, the necessity of which demands a reason as justification. The 'why' that Avicenna gives for God's existence is the causal dependence of all series on a single necessary being. Davidson's third error is the most damaging to his argument.

In contrast to Davidson, who finds that Avicenna attempts a new form of the cosmological proof, I have argued that Avicenna's proof for God's existence is an ontological proof and a demonstrative syllogism. The proof is grounded in first premises that state God's concept, then proceeds by conceptual analysis and causal reasoning to end with the establishment of necessary truth.

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# Debate of Ontology: A Verbal Dispute or A Case of Miscommunication? Against Davidson

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## Abstract

In this paper, I will attempt to demonstrate that the ontological debates over what sorts of entities exist are not genuine debates. Those are either verbal disputes or cases of miscommunication where disputants are unable to communicate with each other through their utterances successfully. In preparation for addressing this issue, I will take a (neo) Carnapian approach to the metaphysical claims by re-interpreting linguistic frameworks as conversational contexts. Based on this re-interpretation, I will examine how and why disputants can(not) engage in an ontological debate.

## Carnap's linguistic frameworks as cognitive organizations

Carnap, in his influential paper, "Empiricism, Semantics, and Ontology" (1950) (hereafter ESO), proposes an approach towards ontological expressions that enables an empiricist to use abstract entities such as numbers and properties in her language without ontologically committing to them.

Carnap distinguishes between two kinds of questions: internal questions, expressed within a linguistic framework, and external questions, expressed about the whole of a linguistic framework itself. While the answer to the internal questions such as 'Are there numbers (in the system of numbers)?' is affirmative and trivial, the answer to the external

questions is a matter of decision and acceptance. The answer to the external questions depends on pragmatic considerations, including simplicity and fruitfulness. So, the questions about the reality of entities like 'Are there really numbers themselves?' are pseudo-questions framework-independently.

Coincidence with the internal-external distinctions, there is another crucial distinction in ESO: *cognitive content and non-cognitive content*. Framework-dependent expressions have semantically complete and truth-evaluable content, so they do have cognitive content. However, ontological expressions like 'There are propositions' have no cognitive content in an external sense. A non-cognitive ontological expression with no *fertile content*, namely a logically semantically complete content, is not truth-evaluable. What makes the content of an ontological expression cognitive is its fertilization within a framework.

I believe this theme is one of the most crucial components of Carnap's project that centers around how an ontological expression can be cognitive. Carnap sought to provide semantics for the scientific (empiricist) enterprise. Introducing the linguistic frameworks, he proposes a strategy that enables us to produce cognitive expressions about entities without making any ontological commitments. The frameworks give us an organization under which ontological expressions can be produced cognitively without committing. So, the Cognitive Requirement introduced below is a crucial requirement in ESO.

### Cognitive Requirement

An ontological expression cannot be cognitive unless it is interpreted within a cognitive organization (e.g., linguistic frameworks) that can *fertilize* that expression. (*fertilization* is a process that makes incomplete contents complete and truth-evaluable.)

The key characteristic of a cognitive organization is its ability to *fertilize* the ontological expressions uttered within it so that they can be truth-evaluable.

Are linguistic frameworks the only cognitive organizations capable of providing ontological expressions with fertile truth-evaluable content? My answer is: no. Several alternatives I think might be there. I will introduce one of them in the following.

## Context as a cognitive organization

Ontological debates are conducted in everyday language. According to some philosophers, these debates can (or should) be run within the room of ontology, and, through Quinean regimentation, ontological expressions can be turned into formal sentences. On the other hand, others believe that ontological claims can (or should) be treated as expressions in everyday language (which have all the characteristics of everyday language). I am among those who hold to the latter view. It is not my intention here to discuss why it is crucial to

consider ontological debates taking place in everyday language. My only hope is that by the end of this paper, I have been able to convince you that the best and most fruitful strategy in approaching the ontology debate is through everyday language-the approach that I have adopted.

Now, suppose we want to extend ontological expressions uttered within formal languages to everyday languages. In that case, we need a less formal cognitive organization than Carnapian linguistic framework in formulating the ontological claims within everyday language. I introduce a novel cognitive organization: *context*.

In the following paragraphs, I consider some ontologically fertile expressions before attempting to give a loose definition of context in the Stalnakerian sense. Consider the following utterances:

1. There is only one even prime number.
2. I have a dream.
3. Jim Carrey bought Chaplin's famous cane.

There are already ontological claims presupposed within or derived from utterances (1) to (3). These utterances, respectively, have cognitive content within a *mathematical context, a folk-psychological context*, and *an ordinary-things* context. From (1), we can infer that a number like two exists, from (2) we can infer a mental experience like a dream exists, and from (3), we can infer a physical object like a cane exists.

Some information is already available or presumed between the utterers of (1)-(3) and their hearers. In utterance (1), the presumptions shared between interlocutors are about natural numbers and their properties (primeness and evenness); in utterance (2), the presumptions are about mental experiences; and in utterance (3), the presumption is about physical objects. Interlocutors are able to communicate successfully when these presumptions are in place. The ontological claims derived from these expressions are cognitive since they are interpreted within certain suitable contexts. The *common-ground contexts* shared between the utterers of (1)-(3) and their audience enables them to treat the content of (1)-(3) as fertile content and therefore cognitive.

Stalnaker defines this kind of common-ground context variously; however, the one I have adopted is as follows: "a body of information that is available or presumed to be available to the speaker and the audience, as a resource for communication (Stalnaker, 2014, p. 24)."[1] Now we have a robust cognitive organization in hand that satisfies Cognitive Requirement. Stalnakerian common-ground context can fertilize ontological expressions and allows us to

1. The other versions of common-ground can be found in a series of his works Stalnaker (1979 (Reprinted 1999), 2002, 2004).

formulate ontological claims through everyday language.[1]

So far, we have shown that some ontological expressions are context-dependent and thus cognitive. Nevertheless, one question remains unanswered, namely whether all ontological expressions are context-dependent.

Several works have been written about how context influences the content of ordinary utterances: minimally or maximally? Some argue that context plays a minimal role in determining the cognitive and communicable content of an utterance. Those who hold this view are called minimalists.[2] According to them, only a few sets of expressions are context-dependent, such as indexicals (like 'I,' 'here,' and 'now') and demonstratives (like 'this,' 'that'). The others claim that there are no utterances whose cognitive content can be truth-evaluated or communicated without completion by contexts. This group is known as *contextualists*.[3] I am a contextualist in this sense. All utterances, including ontological ones, are context-dependent and cannot be evaluated without being governed by context. I do not intend to argue for this view here. However, for the present purpose, I am dealing with certain ontological utterances (such as utterances that follows in the next section) that are actually context-dependent as will be explained.

By utilizing the cognitive organization formulated above, which renders ordinary ontological claims fertile and cognitive, we are able to examine how an ontology debate is conducted.

## Ontological dispute: genuine or verbal?

When does an ontological dispute occur? Let's consider the debate over the Special Composition Question.[4] Special Composition Question is "In what circumstances, do several things compose something?"

A Universalist answers to this question: "In all circumstances. Several things, regardless of what they are and where they are, always compose something." Universalists, for example, believe that there is an object composed of my paper and your nose.

According to an Organicist, the Special Composition Question can be answered as follows: "In those circumstances in which the activity of several things constitutes life." From an Organicist's point of view, there are only simples and organisms. There are no such

1. There are others as well who demand a Stalnakerian common-ground to address the issue of ontological disagreements. For example, Flocke (2021, p. 78) also draws on a Stalnakerian common-ground to elaborate on her own view. It is pertinent to note, however, that my appeal to Stalnakerian contexts differs significantly from Flocke's. According to Flocke, ontological expressions are *noncognitive* dispositions, whereas I believe they are *cognitive* when they are fertilized in common-ground contexts.

2. For minimalism, see Bach (1994, 2002),Borg (2004), Cappelen and Lepore (2005), and Devitt (2021).

3. For contextualism, see Sperber and Wilson (1995), Carston (2002), and Recanati (2004).

4. Several works have discussed this debate. The formulation I use is similar to that of Dorr (2005) and Hirsch (2011).

objects as chairs or gold ores.

Now, in what circumstances, can we claim that an ontological debate for example over the Special Composition Question is a genuine dispute, not a verbal? Let me put forth two conditions for a genuine dispute over ontological claims:

(i) The disputants communicate successfully with each other through their utterances.

(ii) They disagree over the truth-value of a controversial utterance.

Let's clarify condition (i). It is essential that before a dispute over ontology, the sides of the debate are able to communicate successfully through their utterances and understand each other. (Successful) communication between disputants is necessary to conduct a genuine dispute. A debate, whether ontological or otherwise, requires this condition.

According to Pagin (2008), we can define the requirement of successful communication as follows.

## Successful Communication (SC)

Through a communicative episode, communication is successful when the speaker and the hearer share the same content that is intersubjectively accessible to them.

In other words, if the speaker and the hearer cannot share the same content, their communication is not successful.

Now, given the conditions (i) and (ii), I will examine the Special Composition Question.

Here's an utterance that Universalists and Organicists might disagree over. For the Universalist accepts (4) expresses a true claim, while the Organicist rejects it.

4. There is something *composed of chair*-wise interconnected simples.

As shown in the previous section, (4) has a (fertilized) cognitive content when interpreted within a suitable context. In the Universalist context, (4) is fertile. The common-ground context consisting of presumptions about mereological sum makes this expression cognitive. Therefore (4) is true in the Universalist context.

What about the status of (4) in the Organicist context? There are two options that we can adopt.

(Option 1) To interpret (4), the Organicist sticks to the Organicist context.

(Option 2) To interpret (4), the Organicist modifies and updates her common-ground.

Given (Option 1), the Organicist cannot provide a suitable context in interpreting (4). In other words, (4) is infertile and therefore non-cognitive. Because of this and the requirement (SC), communication between Universalists and Organicists fails. On the one hand, (4) is fertile and cognitive when interpreted within a Universalist context. On the other hand, (4) is

misinterpreted within the Organicist context and remains infertile. These two contents cannot be the same. As a result, condition (i) is violated.

Given (Option 2), the Organicist struggles to find the best and most charitable common-ground context with the Universalist to interpret (4).[1] If the Organicist succeeds in finding the best interpretation, then utterance (4) can be fertile and thus express a cognitive content. Due to this, the communication between the Universalist and the Organicist can be successful, and condition (i) can be satisfied. Nevertheless, condition (ii) cannot be satisfied yet. For the Organicist, interpreting (4) in a similar context to what the Universalists do is the best and most charitable interpretation. So, if the Organicist interprets (4) within an updated context similar to the Universalist's, she evaluates the content of (4) as true. Therefore, although they can communicate through (4), they no longer disagree on that at all. In other words, the Universalist, by putting forth utterance (4), make salient some information that was not within the Organicist's radar in the past. Son, the Organicist can abandon her verbal dispute with the Universalist in light of updated common ground.

## Conclusion

The ontological debates occurred in an ordinary use need to be scrutinized by linguistic tools. I attempted to improve conversational contexts as cognitive organizations that produce cognitive ontological claims in everyday language. I am not at a position that claim that introduced contexts is the only cognitive organizations. One of my goals, nonetheless, was to show that applying Stalnakerian contexts as a cognitive organization how well helps us investigate the possibility of ontological disputes. My another purpose was to show that we should explore how the disputants can communicate with each other successfully through their utterances before engaging in a disagreement. These explores demonstrated that we need to accurately theorize a theory about communication prior to addressing disagreement.

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# In defense of a Unionist version of ZGA

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## Abstract

Grounding ground theories tries to stop the ground relation in fundamental facts. Else, the grounding theories would be fruitless and derivate facts are not be grounded in fundamental facts. Litland presents ZGA as a grounding ground theory for solving this problem. On the other hand, many grounding theorists like Wallner and Litland believes grounding and metaphysical explanation are the same (Unionism). However, Wallner believes ZGA is not compatible by Unionism. Without defending Unionism, I show Wallner's objections against ZGA are not valid. In addition, I show that if we accept his objection, there would be no room for any unionist grounding theory.

## Introduction

Grounding theorists try to depict the structure of the world. They start from derivative facts and they want to come to the fundamental facts. But one difficulty here is after finding most fundamental facts what could we say about the ground of them? One main concern to keep grounding alive is finding theories of ground of grounding sentences.

The second concern which follows after the first one is how does grounding ground relate to the metaphysical explanation? Are grounding ground and metaphysical explanation the same relation or not? Indeed, Litland believes his framework defines a grounding ground relation which is the same as metaphysical explanation (Unionism). On the other hand,

Wallner criticizes his view and claim that his theory do not present a grounding ground relation which is the same as metaphysical explanation.

In next chapters, I will briefly introduce ZGA of Litland and show that Wallner's objections do not refute ZGA being compatible with Unionism.

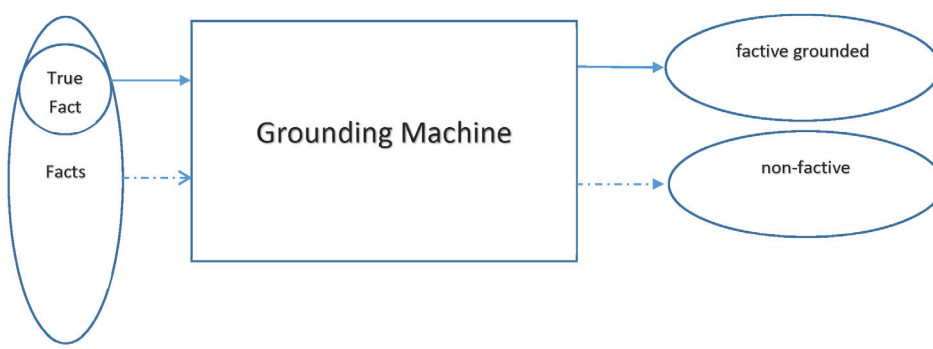
## Zero Grounding Account (ZGA)

Litland presents an account following Fine who differentiate ungrounded and zero-grounded sentences. He thinks grounding sentences are zero-grounded instead of being ungrounded. This could solve the problem of fundamentality although the regression is remained. Litland calls this system zero grounding account or ZGA, because it considers all grounding ground sentences as zero grounded.

I will show how he relates grounding and explanatory argument in three steps. Assume that there is a grounding machine which accepts some true sentences as input and provides something which is grounded in input as output. In idle mode, when the machine has no true sentences as input, it tries to simulate the process of grounding by assuming some sentences to be true.

For instance, assume in idle mode the machine tries to find the possible consequence of $\Gamma$ when it does not know their truth. If something like $\phi$ is grounded in $\Gamma$ if $\Gamma$ were true, then $\Gamma \Rightarrow \varphi$. Litland uses $\Rightarrow$ for non-factive grounding and define the relation between grounding (factive) and non-factive grounding as below:

if (each $\gamma$ in) $\Gamma$ is the case and $\Gamma \Rightarrow \phi$ is the case then $\Gamma < \phi$




In the second step, Litland develops a mathematical framework for the grounding machine. The machine could be mapped to a directed hypergraph. A directed hypergraph contains set of vertices (V), set of hyperarcs (A) and set of head (H) and tails (T) of hyperarcs. The vertices are equivalent to sentences. Each hyperarc is tantamount to a grounding relation between its tail and its head. A hyperarc without a tail models a non-factive grounding

relation.

In final step, Litland presents the heart of his framework. He makes clear what he means by grounding machine or the hyperarc from tail to head. What convinces us to conclude ground grounds the grounded is an explanatory argument from ground to the grounded. For this, he presents a logical framework for logical rules of ZGA.

## Wallner's Objection to ZGA

Wallner tries to refute unionist version of ZGA in different ways. I categorize his objection into three arguments. I will show no one works against unionism of ZGA.

## Trivial Cake-Truth

Wallner believes the ground and what explains a sentence should be the same if the grounding relation is metaphysical explanation. He presents trivial cake-truth as a sample:"I cannot eat my cake and simultaneously have it". This sentence follows from empty set of premises while something like law of non-contradiction plays a role in metaphysical explanation of it. As a result, based on sentences like the cake-truth it is concluded that ZGA and Unionism come apart.

I show sentences like the cake-truth could not exist in ZGA as a zero-grounded sentence. According to Litland's framework, generally sentences like $<\phi$ and $\Rightarrow\phi$ are permissible. However, every sentence could not be a substituent of $\phi$. Every zero-grounded sentences grounds a non-factive sentence or a sentence which itself is zero-grounded. I regard if something like the cake-truth could be held as a non-factive zero-grounded sentence in ZGA. This means in idle mode the machine should conclude the cake-truth from empty set.

Independent of what basic rules are for a logical system of grounding which should be compatible by limitation of ZGA, any sentence like $\Gamma\Rightarrow\phi$ could exist if $\Gamma<\phi$ could be concluded in the system when $\Gamma$ is true. This is followed from the relation between factive and non-factive sentences:

if (each $\gamma$ in) $\Gamma$ is the case and $\Gamma\Rightarrow\phi$ is the case then $\Gamma<\phi$

This means $\Gamma\Rightarrow\phi$ in the iterated grounding theory is equivalent to $\Gamma<\phi$ in the grounding theory. So if ZGA concludes the cake-truth as a zero-grounded sentence the cake-truth should be zero-grounded in the grounding theory, namely, $\varnothing<$(the cake-truth). Now, is it possible for formal logical systems to result a sentence which contains logical operators from zero? Of course not. All sentences which contain classical logical operators $\wedge$, $\vee$ and $\rightarrow$ should be followed from some of its parts.

## Second Argument

The second critique is based on below three premises which seems inconsistent:

(DE) $p \Rightarrow p \wedge p$ and $p \Rightarrow p \vee p$ have different metaphysical explanations.

(ZGA) All true, non-factive grounding claims are zero-grounded.

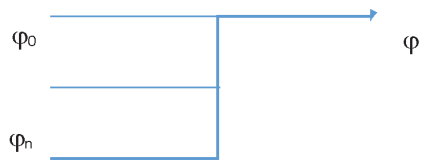
(U) Grounding is metaphysical explanation.

Wallner tries to find out possible response of Litland. The sentence $\Gamma < \phi$ can be comprehended in two senses. First, $\Gamma < \phi$ means input of the grounding relation $\Gamma$ completely determine what metaphysically explain $\phi$. Wallner calls this sense input-explanation. In the second sense, $\Gamma$ metaphysically explains $\phi$ in a special way. This way is determined by the explanatory argument from $\Gamma$ to $\phi$. This one is called rule-explanation by Wallner. Wallner believes Litland could reject the argument based on these two senses. Although $p \Rightarrow p \wedge p$ and $p \Rightarrow p \vee p$ have different metaphysical explanation in the second sense, they have similar metaphysical explanation in the first one. Litland could reject DE based on input-explanation sense. He could claim that both $p \Rightarrow p \wedge p$ and $p \Rightarrow p \vee p$ have the same explanation. Wallner rejects this solution because any account which claims $p \Rightarrow p \wedge p$ and $p \Rightarrow p \vee p$ have the same explanation is unsatisfactory after all. It seems the meaning of $\wedge$ and $\vee$ somehow play effective role in explanatia of $p \Rightarrow p \wedge p$ and $p \Rightarrow p \vee p$.

I think Wallner's solution is an appropriate strategy for Litland to defend unionist version of ZGA. Indeed, the first assumption DE is out of scope of ZGA. What Litland could reject is something in his theory. Only the second assumption comes from ZGA. Therefore, he could use strategy of Wallner to change or reject the second assumption. Obviously, from metaphysical explanation point of view the difference between $p \Rightarrow p \wedge p$ and $p \Rightarrow p \vee p$ are the rules used in arguments from premises to the conclusion. I claim that the rules are effective in the difference between grounding relation of $p \Rightarrow p \wedge p$ and $p \Rightarrow p \vee p$ when we follow the difference between $\varnothing < (p \Rightarrow p \wedge p)$ and $\varnothing < (p \Rightarrow p \vee p)$. Although someone could object that we are investigating the grounding relation between zero and $p \Rightarrow p \wedge p$ or $p \Rightarrow p \vee p$, I show that the grounding relation between p and $p \wedge p$ or $p \vee p$ determine the grounding relation between zero and $p \Rightarrow p \wedge p$ or $p \Rightarrow p \vee p$.

Let us examine the grounding machine. Litland develops the grounding machine based on graph theoretical foundation. The sentence $\Gamma \Rightarrow \phi$ means there is a hyper arc from $\Gamma$ to $\phi$ where $\Gamma$ is its tail and $\phi$ is its head. The hyper arc is tantamount to the explanatory argument from premises $\Gamma$ to the conclusion $\phi$. There is a set V of vertices which contains all propositions. If the theory is confined to only grounding sentences there is no need to expand V to comprise iterated grounding sentences. But if we want to have iterated grounding sentences, we must also add sentences like $\Gamma \Rightarrow \phi$ to our set of sentences V. We could not

simply add ⇒ to our set of operators and expand our well-formed formulas like what we do for other similar operators →, ∧ and∨. If we do this, it means we have entered iterated grounding sentences before having any meaning for them. We must define V inductively based on hyper arcs. If there is an argument from Γ to ϕ, then Γ⇒ϕ belongs to V. Wallner mistakenly assumes V contains Γ⇒ϕ before making graph theoretical picture. Finally, we have below subgraph as a formula in grounding machine:




Then Γ⇒ϕ is zero grounded means the above subgraph is the head of a hyper arc where its tail is empty. Now, Litland could claim that the hyper arc from Γ to ϕ is part of the relation between zero and Γ⇒ϕ. Because the hyper arc from p to p∧p and the one from p to p∨p are different, the grounding relation between zero and p⇒p∧p and p⇒p∨p are not the same. Therefore, ZGA rejects that all zero grounded sentences have the same ground zero. We could replace it by this:

ZGA) Every non-factive grounding sentences is zero-grounded in a different way.

## Final Argument

Finally, Wallner presents the main critique. He thinks that only appealing to the zero-ground cannot be a satisfactory account for metaphysical explanation of sentences like p ⇒ p ∧ p. He believes the response to below question make ZGA satisfactory account for a unionist version of grounding ground theory.

(Q) Why is there an explanatory argument from p to p∧p?

Wallner shows ZGA fails to respond (Q). Consider two sentences: p ⇒ p ∧ p and q→(p→p) where q is unrelated to p. ZGA could not show us why the argument from p to p∧p is explanatory while from q to p→p is not. Only by appealing to zero-ground ZGA could not show why the argument from p to p∧p is explanatory. ZGA fails to make sentences like p ⇒ p ∧ p different from the other sentences which contain an argument. As a result, ZGA is not an appropriate account for metaphysical explanation of sentences like Γ⇒ϕ if it claims grounding and metaphysical explanation are the same.

It seems Wallner objects a little vague. When he says:" So, what we seek in a metaphysical explanation of a grounding fact is an explanation of why the connection between the ground and the grounded is explanatory." Sometimes he means the ground of p∧p and sometimes

$p \Rightarrow p \wedge p$.

First, I assume he means ZGA could not respond why the argument from p to $p \wedge p$ is explanatory. He believes there is an argument from q to $p \rightarrow p$ which is not explanatory. ZGA should show us why the first one is explanatory and the second one is not. In this case, there is no need for ZGA to enter the zero-grounding account. ZGA needs zero-grounded sentences when it wants to determine the ground of grounding sentences like $\Gamma \Rightarrow \phi$. Therefore, that there is an explanatory argument from p to $p \wedge p$ is unrelated to the sentence $\varnothing < p \Rightarrow p \wedge p$. Now, it is very easy to find that why the argument is explanatory. Based on graph theoretical picture of ZGA, there is an hyper arc from p to $p \wedge p$. The hyper arc is tantamount to the argument from p to $p \wedge p$ and this contains inference rules from p to $p \wedge p$.

On the other hand, grounding machine does not produce $q \rightarrow (p \rightarrow p)$. Even if this sentence is true there is no hyper arc from q to $p \rightarrow p$. It seems Wallner mixes $\rightarrow$ up with $\Rightarrow$ in his sample. These two operator have different meaning in ZGA framework. It is not difficult for Litland to conclude that the argument from q to $p \rightarrow p$ is not explanatory.

Now assume Wallner means ZGA could not show that why zero ground $p \Rightarrow p \wedge p$ and does not ground $q \rightarrow (p \rightarrow p)$. He thinks that for responding this ZGA must answer why the argument from p to $p \wedge p$ is explanatory. As I show in the last paragraph it is because it uses explanatory inference rules to conclude $p \wedge p$ from p. Note that Wallner here implicitly approves that the grounding relation between p and $p \wedge p$ is effective in the grounding relation between zero and $p \Rightarrow p \wedge p$. Therefore, he also rejects the ZGA assumption in the second objection. Also there is no room for $q \rightarrow (p \rightarrow p)$ to be grounded in zero. Only subgraphs which contain an hyper arc could be zero-grounded. I mention this point that although $< \phi$ is a well-formed formula, we could not replace $\phi$ by every formula. The sentence $\phi$ should contain $\Rightarrow$ as a part. Inference rules which are explanatory confine such formulas.

## Is There any Unionist Grounding Theory?

Now let us have a sympathy with Wallner's approach. Wallner's objections have a common element. A grounding ground theory compatible with unionism should somehow differentiate between grounds of sentences which have different metaphysical explanations. For instance, different sentences ground $p < (p \wedge p)$ and $p < (p \vee p)$. Every unionist version of iterated ground should result different metaphysical explanation for these two sentences.

I show that if we accept Wallner's criterion, we would face the incompatibility in all grounding theories. Many grounding theory-not only grounding ground theory-result the same ground for sentences which have different metaphysical explanation. This means Wallner's critique is applicable on all grounding theories. Then, Wallner's criterion is tantamount to reject unionism.

Let us examine grounding theories in detail. There are inference rules accepted by all grounding theories which result different sentences to have the same ground. Consider the rules of ∧-Introduction. It seems based on this p grounds p∧p. I do not want to object that even here we could say p could not solely explain metaphysically p∧p. But this is a valid objection that the meaning of ∧ when it makes a sentence join with itself is effective in the metaphysical explanation of the sentence. Now consider another sentence p∧(p∨¬p). Again p grounds (p ∧ (p∨¬p)). Wallner's approach forces us to accept these two sentence p ∧ (p∨¬p) and p∧p have the same ground. The first one is grounded in p because it is joined to a true logical sentence via ∧ operator while the other one is grounded in p because it joins together a sentence with itself by ∧ operator. It seems these comments somehow determine metaphysical explanation of these sentences if we accept Wallner' approach.

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# Mill and Whewell on discovery and proof of scientific theories

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## Abstract

One obvious source of Mill's and Whewell's disagreement about the nature of inductive reasoning are their different underlying epistemological views. In this paper, I will try to explicate another source: their different meta-methodological commitments about the scope of aims of philosophy of science. I will argue that Mill thought that the role of philosophy of science is to provide normative criteria for proving scientific theories, while Whewell's theory can be seen as an early attempt at reconstruction of scientific development.

## Introduction

J. S. Mill and W. Whewell, both preeminent philosopher of science of the 19th century, disagreed strongly about the nature of inductive reasoning. One obvious source of their disagreement are their underlying epistemological commitments: Mill was an empiricist while Whewell presented a version of Kantian epistemology. But in this paper, I would like to focus on another source of disagreement, viz. their different understandings of the scope of the scientific method. Specifically, I will show that their disagreement is not methodological but a meta-methodological one: rather than accepting that Mill is an inductivist and Whewell a deductivist about the scientific method, I will argue that they differ in their understanding of philosophy of science, its scope and aims.

Proof and discovery

Mill's theory of induction focuses entirely on the proving, i.e., finding a logically rigorous method of verifying generalizations. He is not satisfied with a simple enumerative induction of the form "That F is G. That other F is G. Yet another F is G. All observed F are G. Therefore: All F are G" (Wilson, 2008, p. 257) but tries to establish a method of testing enumerative inductions and making them more plausible. These are his so-called "canons of the Inductive Logic" (Mill, 2011, p. 398), consisting of four methods,[1] designed to isolate a real cause of certain phenomena or, in present day terms, sufficient conditions for a phenomenon to arise (Wilson, 2008, p. 258). I will not present the four methods of the canons of induction in detail. However, it is important to understand that they are used for eliminating alternative generalizations of experimental data (ibid.). Let us say that a phenomenon A always co-occurs with phenomena $P_1$, $P_2$ and $P_3$. Simple enumerative induction only allows us to form a general statement "when P1, $P_2$ and $P_3$ occur, A will occur". Mill's method of agreement, on the other hand, can be used to design an experiment in which phenomena P1, $P_2$ and $P_3$ can separately be produced to observe in which cases A arises. If we establish that A arises only when both $P_1$ and $P_3$ are present, we can conclude that $P_1$ and $P_3$ are sufficient conditions of A. $P_2$ has therefore been eliminated as a partial cause of A, allowing us to formulate a much more precise and better tested general statement. Mill holds that by application of the canons of induction, scientists "can isolate causes and reveal the laws which govern natural phenomena" (Macleod, 2016).

In contrast to Mill's, Whewell's theory of induction accounts for both the discovery of appropriate concepts[2] ("the colligation of facts") and its verification. The latter is less rigorous then Mill's canons and it consists of three separate criteria: 1) prediction of the unknown facts, 2) "consilience of induction from different and separate classes of facts" (Whewell, 2014b, p. 238), and 3) coherence of scientific theory which can interpret new evidence without adjustments made to it (Snyder, 2008, p. 185). The first and third criteria are quite straight forward. When Kepler, for example, established that Mars' orbit is elliptical, this theory should be able 1) to predict other unobserved positions of Mars, and 3) to account for some future evidence of positions of other planes, without significant adjustments made to it. The second criterion, the "consilience of induction," requires some additional explanation. Whewell characterizes it as a process in which "inductions from classes of facts altogether different have […] jumped together" (2014b, p. 230). His central example of this

1. The methods are: 1) the method of agreement, 2) the method of difference, 3) the method of residues, and 4) the method of variation (Macleod, 2016).

2. Considering the example given in the previous paragraph, it might not be clear why exactly such concept is needed. The thing is that a given phenomenon usually does not co-occur with only three other phenomena, but with many more, most of which a scientist decides to ignore in an experiment. A concept (or a theory) directs her in this decision.

is Newton's theory of gravitation, which consolidated phenomena "such as planetary motion, satellite motion, and falling bodies" (Snyder, 2008, p. 186), under a more general concept of "phenomena caused to occur by an inverse-square attractive force of gravity" (ibid., 187). Newton's concept of the inverse-square attractive force did not only account for the facts colligated under it, but also for other facts that were before considered to be of a different class. In that way, he achieved a new level of generalization. Whewell saw consilience of inductions as conclusive proof that a theory is true (Whewell, 2014b, p. 233).

**An inductivist and a deductivist?**

Given these two accounts of scientific discovery, Mill's "theory of proof" was seen as promoting an inductivist approach to the scientific method, while Whewell's "theory of discovery" was seen as a hypothetico-deductivist one (most noticeably Buchdahl 1971; cf. Snyder 1997b, 581 for a more extensive bibliography). It is hardly controversial that Mill is indeed an inductivist. Although his account is sometimes characterized as presupposing several different hypotheses and then eliminating all but one (Wilson, 2008, p. 258), these "hypotheses" should not be understood as guesses or deductive statements, but as generalizations from observations. Mill's account, therefore, satisfies a criterion for inductivism, presented by Buchdahl (1971), namely, that a conclusion of inference must be drawn from the evidence, not just tested upon evidence. On the other hand, it is not clear if Whewell's theory satisfies this criterion. Arguing that superinducing a concept upon some fact and then checking, if it satisfies conditions of prediction, consilience, and coherence, equals to deductively establishing a hypothesis which is then tested upon facts, is not, at least at face value, in contradiction with what has been said about Whewell's theory.

However, labeling Whewell as a hypothetico-deductivist is not uncontroversial. One of the strongest opponents of this characterization is L. J. Snyder (Snyder, 1997a, 1997b, 2008, 2019; but cf. also Andersen and Hepburn 2020). She presents a convincing argument that Whewell's account of the scientific method cannot be described as hypothetico-deductivist (Snyder, 1997a). She presents two defining characteristics of a hypothetico-deductivist account of the scientific method: 1) "only evaluative criterion for hypotheses is that they entail true empirical consequences" (Snyder, 1997a, p. 163), 2) hypotheses can be discovered by "non-rational guesswork", i.e., without "any particular method" (ibid.). She is right to point out that Whewell would reject them both. He would argue 1) that consequential testing is not enough since hypotheses must be inferred from data, from which also follows that 2) the hypotheses cannot be randomly guessed. In other words, Snyder rejects the premise that superinducing a concept equals to deductively establishing a hypothesis about a set of

data, which is, in my view, justified.[1] Although Whewell sometimes talks about "guesses" that a scientist makes about observed data (2014b, p. 220), these guesses are not non-rational. Instead, they are based on two previous steps, that of "decomposition of facts" and "explication of concepts" (cf. Snyder, 2008, pp. 179-181; Whewell, 2014b, pp. 171, 199). Whewell holds that the mind always plays an active role in forming sensations, i.e., it provides ideas and concepts that are then used to unify sensations (2014b, p. 193). He makes an important observation that although a concept has at some point been deliberately used to unite a set of facts, this act of uniting facts in a particular way quickly slips out of notice (ibid., 217). Consequently, scientific observation must first be made possible by making the concepts involved in perception explicit and then by decomposing already unified facts to more simple ones. Therefore, it is not the case that Whewell argues for randomly producing different concepts that can be used to unite the facts. Rather, he argues that after a careful examination of facts, a scientist should try to find concepts that she deems most appropriate for uniting the facts. These concepts (or hypotheses) can then by tested using the criteria of prediction, consilience, and coherence.

Regardless of Whewell being a hypothetico-deductivist or not, a more general argument can be made against dividing the two philosophers along inductivist and hypothetico-deductivist lines: this distinction simply cannot capture what differentiates them. As I will try to show in this last part of this paper, they differ on a meta-methodological rather than a methodological level.[2] Whewell provides a comprehensive theory of scientific practice that consists of more than just normative standards for experimental testing. As Laudan points out, in writing about history of science Whewell "was concerned with tracing the development of science in terms of certain categories of narration" (1971, p. 385), provided by his theoretical framework. Furthermore, in his essay "Of the Transformation of Hypotheses in the History of Science" Whewell explicitly tries to answer a question of "how it is possible that, in subjects, mainly at least mathematical, and therefore claiming demonstrative evidence, mathematicians should hold different and even opposite opinions" (Whewell, 1856, p. [139]). That is, he understood that the development and especially success of scientific theories does not depend only on their ability to provide proofs but involves a more complex process of accounting for existing phenomena and successfully predicting new ones while remaining sufficiently simple. He saw that there is usually more than one scientific theory competing for dominance and argued that the one which satisfies his three criteria wins. Therefore, it can

1. Also, a more general point can be made: the frivolous "guesswork" suggested by hypothetico-deductivism again suggests a mind that is, although active vis-à-vis empiricist's passive observer, essentially unbounded by its background knowledge, assumptions, affiliations with a research program … I think this is an overly naïve way to look at developing a hypothesis and that it already was such for Whewell.

2. For the distinction between the two levels and a similar suggestion cf. Andersen and Hepburn (2020).

be said that Whewell provided a rational reconstruction of scientific progress.

What left Whewell vulnerable to Mill's criticism was his conflation of the criteria for a scientifically more desirable theory with a criterion for truth (cf. Lakatos, 1976, p. footnote 114). He states:

> "But when the hypothesis, of itself and without adjustment for the purpose, gives us the rule and reason of a class of facts not contemplated in its construction [i.e., when consilience of inductions happen], we have a criterion of its reality, which has never yet been produced in favour of falsehood" (Whewell, 2014b, p. 233).

The assertion that when a theory achieves consilience "we have a criterion of its reality" is not at all obvious. Contrary, it relies on two, rather uncertain, arguments. First, the fact that consilience "has never yet been produced in favour of falsehood", i.e., that it is well corroborated by history of science. But this cannot work as an argument: empirical facts about scientific practice cannot justify a normative criterion for evaluating truth-values of scientific theories. And second, the assertion relies on the idea that "MAN is the Interpreter of Nature, Science the right interpretation" (Whewell, 2014a, p. Aphorism I), which, however fundamental to Whewell philosophy it may be, clearly begs the question.

Mill, on the other hand, tries to provide a rigorous, logically sound, method of verification of generalizations. His account can still be seen as "capturing basic intuitions about experimental methods for finding the relevant explanatory factors" (Andersen & Hepburn, 2020), but it is too narrow as an account of scientific practice. Most importantly, his epistemological commitments prevent him to consider the description of a set of observations with a concept as a crucial, nontrivial part of science. Therefore, as Whewell complained (Whewell's letter to Herschel in Cobb 2011), Mill's theory of induction cannot be used to adequately reconstruct scientific discovery (cf. Cobb 2011 for a partial affirmation of this claim).

## Conclusion

I take this to show that the two philosophers cannot be accurately compared using a distinction between an inductivist and a hypothetico-deductivist approach to scientific method. Rather, when writing about induction, they have a different goal in mind. Whewell is interested in a theory that could be used to describe scientific practice, while Mill is primarily concerned with providing a normative standard of testing, to which scientists should conform. It can therefore be concluded that their theories of induction differ in their understating of the aims and the scope of philosophy of science.

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# Relevance and Vagueness: A Proof Theoretic approach to fuzzy relevance logics

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## Abstract

In scientific reasoning and in our everyday reasoning, the relevance between the premise of the argument and the conclusion is important. In this paper, according to two important categories in natural language and logic, namely "relevance" and "vagueness", I introduced and extended proof theatric systems, whose reasoning are both fuzzy and relevant, and they are called fuzzy relevance logics. Some Fuzzy relevant logic (such as **RM**) introduced with omitting constants 1 and 0, and some other without omitting them, are obtained. These systems are between the weakest fuzzy relevant logic (**RUL**) and the strongest relevant fuzzy logic (**RIUML**).

## Introduction

Fuzzy logic challenges the bivalence principle of classical logic and relevant logic challenges the barrier of classical logic and the category of material implication. The purpose of fuzzy relevant logic is, firstly, like relevant logic, to eliminate the paradoxes of material implication, and secondly, like fuzzy logic, to eliminate bivalence paradoxes such as the liar paradox and sorites paradoxes, etc., and finally to achieve logics that their reasoning is both relevant and approximate. The main task of fuzzy relevant logic, as defined by Priest, is to fuzzify relevant logics in order to achieve logic or logics that contain fuzzy and relevant

reasoning (Priest, 2008, p.231).

First, the relevant logics **R**, fuzzy relevant logic **RM** and its extensions, and semi-relevant fuzzy logic **UL** and its non-t-norm extensions were studied. I now discuss how to present propositional axiomatic and (hyper) sequent calculi for fuzzy relevant semantics, and I seek to construct and expand logics whose argument are both fuzzy and relevant. Then the metatheorems of these logics such as soundness and completeness (or incompleteness) *w.r.t.* ordered linear algebras (matrices) and Yang's *ARM* semantics will be proved.

In this paper, I consider two meanings of the relevant logic (Yang, 2015, 471-472):

*Old sense*: Weak relevant principles (Anderson and Belnap; and Michael Dunn)

- Anderson and Belnap (1962): A logical system is relevant if the strong relevance principle (SRP) is true:
  " $\phi \rightarrow \psi$ is a theorem, if and have a shared propositional variable."
- Michael Dunn (1970): A logical system is relevant if the weak relevance principle (WRP) is true:
  " $\phi \rightarrow \psi$ is a theorem, if either and have a shared propositional variable, or ~ and $\psi$ are theorems."

*New sense*: Young's relevant principles (2013)

- New Strong Relevance Principle (NSRP):
  " $\phi \rightarrow \psi$ is a theorem, if and explicitly or strong implicitly have a shared propositional variable."
- New Weak Relevance Principle (NWRP):
  " $\phi \rightarrow \psi$ is a theorem, if either and $\psi$ have a shared propositional variable explicitly or implicitly, or ~ and are theorems."

Strong implicitly" in the above definitions means that (Yang, 2013, p.780):

and share a propositional variable used in NSRP meaning with a strong implicit

The propositional constant(s) in and are strongly meta-definable in metalanguage.

The "strong definability of a constant in metalanguage" in an L logic means that it can be defined in metalanguage, but not in the object language of that logic. For example, t and f in $\mathbf{R}^{\mathbf{t}}$ and **T** and **F** in $\mathbf{R}^{\mathbf{T}}$ are strongly definable in metalanguage.

One of the main differences between the two meanings of relevant logic is that, according to Anderson and Belnap and Dunn, the relevant logics with propositional constants will not be relevant (such as the relevant logics in Galatos et al. (2017) and Restal (2000)), But by Yang's criterion, those logics are considered relevant.

In this paper, based on the "Yang meaning" of relevant logic, I first develop Yang (2015)'s works in this issue and then introduce and extend the relevant complements of uni-

norm based logics (**UL** and its extensions in Metcalfe and Montagna (2007)) (as relevant fuzzy logics), such as **FR**, **FRW**, **FRM**. Then the fuzzy complements of the relevant logic **R** without distribution and with relevant implication and its neighbors (as fuzzy relevant logic), such as **RUL**, **IUL**, **UML**, **IUM**. Then, the algebraic structures and linear ordered algebraic semantics corresponding to these systems are defined. Then I introduce and extend fuzzy relevance logics that satisfy the principles introduced by Yung (2015).

## Relevant Fuzzy Logic

Fuzzy logics based on t-norm (**MTL** (monoidal t-norm logic), and its extensions, like **BL**, **Ł**, **G**, **Π**, aren't a type of relevance logic, because while such logic proves the weakening (W) $\phi \rightarrow (\psi \rightarrow \phi)$ , an arbitrary logic with (W) and modus ponens admits of a theorem $\phi \rightarrow \psi$ such that $\phi$ and $\psi$ are irrelevant to each other. (Yang, 2015, p.471)

Weakening-free uninorm based logics, as well as some logics in the **R** neighborhood, meets Yang's new relevance principles and are considered relevant logics. **UL** fuzzy logic is also a semi-relevant logic first introduced by Metcalfe (2004). Yager and Rybalov (1996) showed that Sugihara's algebra with identity on the unique interval of real numbers [0, 1] is a uninorm.[1]

**UL** embraces tautologies of left-continuous conjunctive uninorms and their residua, as a weakening of **MTL** and a strengthening of **MAILL** (multiplicative additive intuitionistic linear logic). **MAILL** is in fact an extension of **FLe** which is obtained by adding $\bot$ with the principle $\rightarrow \phi$ to $\mathbf{FL}_{e}$ and it is also shown as $\mathbf{FL}_{\bot e}$ (Amikhteh, 2021, p. 47).

3 important extensions of **UL** are:

*Involutive uninorm logic* (**IUL**): **UL** + $\neg\neg \phi \rightarrow \phi$ (DN)

*Uninorm mingle logic* (**UML**): **UL** + $(\phi \& \phi) \leftrightarrow \phi$ (ID)

*Involutive uninorm mingle logic* (**IUML**): $\mathbf{RM}^{t}$ + $t \leftrightarrow f$ (FP)

and $\mathbf{RM}^{t}$ is obtained by adding constants 1 and 0 and their corresponding axioms to **RM**. All these logics are substructural, and also all of them (except **IUL**) are complete standardly w.r.t. [0,1]. **IUL** Sugihara matrices as a semantic for IUML need have a fixed point on [0, 1], for example, $\frac{1}{2}$ in the standard involutive negation 1-x, and so **IUML** requires the corresponding axiom tf (Metcalfe and Montagna, 2007, p.837). Also, Sugihara matrices with an odd number of Dunn's elements (1970) have a fixed point corresponding to (FP) (Dunn, 1970).

Relevant logics such as **R**, **RM**, **E** and **T**, are lack of structural rule of weakening (and so are weakening-free). Also, $\mathbf{RM}^{t}$ and **UL** are weakening-free, and are both fuzzy and relevant. But, are all the weakening-free uninorm logics introduced in Metcalfe and Montagna (2007)

1. Uninorm is a generalization of t-norms in which the identity can lie anywhere in the interval [0,1]

are relevant? The answer to this question is negative based on the *old sense* of relevant logic (Anderson's, Belnap's and Dunn's sense), and positive based on the *new sense* of relevant logic (Yang's sense).

According to the *old sense*, **R** and its relevant extensions are strong relevant logic (by satisfying SRP) and **RM** logic is weak correlation logic (by satisfying WRP). But **UL** is neither strong relevant logic nor weak relevant logic. Because a formula likes α is provable in it:

$$\alpha: (\phi \wedge \neg \phi) \rightarrow (\psi \vee \neg \psi)$$

Also, none of the weakening-free uninorm logics, even **IUML**, aren't relevant logic, based on *old sense*. But according to *new sense*, all of the weakening-free uninorm logics are relevant, because they satisfy either NSRP or NWRP.

The main aim of this paper in this section is finding or introducing logics that are fuzzy in the Cintula's sense, and, are relevant at least in the new sense, although many of them also may be relevant in the *old sense*.

A strategy to introduce the substructural fuzzy logical systems lacking structural rules like weakening or contraction, that be relevant in the *old sense*, is to eliminate constants 0 and 1 and their equivalent axioms.

IUML, despite the provability of α, seems to be a weak relevant logic in the *old sense*, because it proves $\phi \vee \neg \phi$ (EM), and therefore both $\neg(\phi \wedge \neg \phi)$ and $\psi \vee \neg \psi$ are theorems. But because the following formula (β) is provable in **IUML**, in the *old sense* it cannot be considered even a weak relevant logic:

$$\beta: [(\phi \rightarrow \phi) \wedge \phi] \rightarrow \psi$$

Weakening-free uninorm logics in which EM is provable, are relevant in the *old sense*, if the constants 0 and 1 and their equivalent axioms be omitted. In weakening-free uninorm logics without EM, it is sufficient to add EM to their axioms. **RUL**, and its extensions (such as **RIUL**، **RUML** and **RIUML**) are obtained by this strategy, and they are relevant fuzzy logic in both *old sense* and *new sense*.

## Fuzzy Relevant Logics

One of the first fuzzy relevant logic is **RM** with the addition of relevant conditional and the Mingle axiom (**M**) to **R**), which Dunn's 1970 paper proved **RM** capturing the tautologies on denumerable infinite sets of truth values and showed that **RM** is complete w.r.t. linearly ordered Sugihara matrices. Cintula also proved in 2005 that logic with weak implication is a fuzzy logic if it is complete w.r.t. linearly ordered matrices. So **RM** is a non t-norm "fuzzy logic" in Cintula's sense, and therefore a fuzzy relevant logic.

A syntactical strategy to fuzzyify relevant logics is by adding an axiom ensuring prelinearity (PLt) together with (EM), to relevance systems. Some of these logics were

introduced in Yang (2015), such as **FRW** (the fuzzyified **R** without contraction), **FR, FRM**, and their distributivity-free extensions, as **LRW, LR**, and **LRM**, respectively.

$$PL_t: (\phi \rightarrow \psi)_t \vee (\psi \rightarrow \phi)_t$$ [1]

## Axiomatic systems

Some fuzzy relevance logics introduced and extended by the above strategies are "non-t-norm" and even "non-uninorm". also, the principles of NWRP and NSRP ensure that some weakening-free uninorm logics are relevant.

The Axiomatic systems of some fuzzy relevant logics are introduced and extended firstly in Yang (2015). He first introduced the Axiomatic system for fuzzy relevance logic (**RMAILL**) as the basic system of fuzzy relevance logic, and then extended other systems based on it (Yang, 2015, pp.474-475)

I merely introduce **RMAILL** axiomatic system. The Language of this system, $\mathbf{L}_{\mathbf{RMAILL}}$, is:

- The countable and infinite number of variable propositions
- Punctuation signs: ), (
- Main connectives: $\wedge$, $\vee$, &, $\rightarrow$ and the constants t and f
- Definitions:
  $\neg\varphi \stackrel{def}{=\!=} \varphi \rightarrow f$
  $\phi \leftrightarrow \psi \stackrel{def}{=\!=} (\phi \rightarrow \psi) \wedge (\psi \rightarrow \varphi)$

RMAILL's deductive system is:

- Axioms:
  $A_1: \phi \rightarrow \phi$
  $A_2: ((\phi \rightarrow \psi) \wedge (\phi \rightarrow \chi)) \rightarrow (\phi \rightarrow (\psi \wedge \chi))$
  $A_3: (\phi \wedge \psi \rightarrow)\phi, (\phi \wedge \psi \rightarrow)\psi$
  $A_4: \phi(\rightarrow \phi \vee \psi), \psi(\rightarrow \phi \vee \psi)$
  $A_5: ((\phi \rightarrow \chi) \wedge (\psi \rightarrow \chi)) \rightarrow ((\phi \vee \psi) \rightarrow \chi)$
  $A_6: (\phi \,\&\, \psi) \rightarrow (\psi \,\&\, \phi)$
  $A_7: (\phi \,\&\, t) \leftrightarrow \phi$
  $A_8: (\phi \rightarrow (\psi \rightarrow \chi)) \leftrightarrow ((\phi \,\&\, \psi) \rightarrow \chi)$
  $A_9: (\phi \rightarrow \psi) \rightarrow ((\psi \rightarrow \chi) \rightarrow (\phi \rightarrow \chi))$
  $A_{10}: \phi \vee \neg\phi$
- Rules:
  MP: $\phi \rightarrow \psi, \phi \vdash \psi$
  Adj: $\phi, \psi \vdash \phi \wedge \psi$

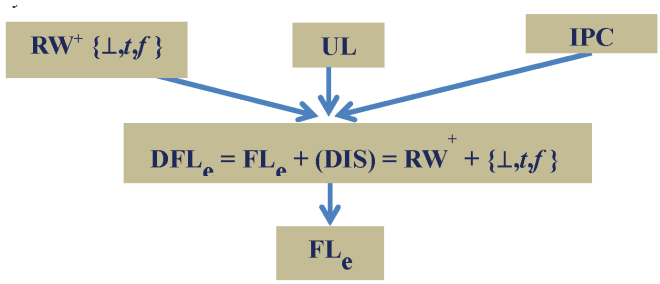
1. $\phi_t \stackrel{def}{=\!=} \phi \wedge t$

Other fuzzy relevance logics obtain by extending this system. For example:

$$\mathbf{RUL} = \mathbf{RMAILL} + \mathrm{PL}_t$$

## Hypersequent calculi

Based on the sequent calculus of **FLe** and **UL** and many substructural fuzzy logic and relevant logic near to UL, such as $\mathbf{RW}^+$ or **RW**, (hyper)sequent calculus for fuzzy relevance logic will be introduced. The purpose of introducing such calculi is to give simpler and less complex computational fuzzy relevant methods than the axiomatic method.




In this paper, I shortly introduce a fuzzy relevant hypersequent calculus that Metcalf and Montagna (2007) referred to it briefly, but did not address it. This calculus is obtained by addition *CL* rule to **GUL** and **GIUL** hypersequent calculus.

GUL is a single-conclusion and **GIUL** is a multi-conclusion hypersequent calculus. If Γ and Δ, are two finite multisets of formulas, and $\mathbf{\Gamma \vdash \Delta}$ is a sequent ($\Delta \neq \emptyset$), a hypersequent is a finite multiset of sequents, like this:

$$\mathbf{\Gamma_1\Delta_1 \mid \Gamma_2\Delta_2 \mid \ldots \mid \Gamma_n\Delta_n}$$

And we know | means extensional disjunction ($\vee$) between sequents. $\wedge$, $\vee$, $\odot$, $\rightarrow$, f, t are connective and constants.

*Initial sequents:*

$$\frac{}{A \Rightarrow A}\ (ID) \qquad \frac{}{f \Rightarrow}\ (f,l) \qquad \frac{}{\Rightarrow t}\ (t,r) \qquad \frac{}{\Gamma, \bot \Rightarrow \Delta}\ (\bot) \qquad \frac{}{\Gamma \Rightarrow \top, \Delta}\ (\top)$$

*Logical rules:*

$$\frac{G \mid \Gamma \Rightarrow \Delta}{G \mid \Gamma, t \Rightarrow \Delta}\ (t,l) \qquad \frac{G \mid \Gamma \Rightarrow \Delta}{G \mid \Gamma \Rightarrow f, \Delta}\ (f,r)$$

$$\frac{G \mid \Gamma_1 \Rightarrow A, \Delta_1 \quad G \mid \Gamma_2, B \Rightarrow \Delta_2}{G \mid \Gamma_1, \Gamma_2, A \to B \Rightarrow \Delta_1, \Delta_2} (\to, l) \qquad \frac{G \mid \Gamma, A \Rightarrow B, \Delta}{G \mid \Gamma \Rightarrow A \to B, \Delta} (\to, r)$$

$$\frac{G \mid \Gamma, A, B \Rightarrow \Delta}{G \mid \Gamma, A \odot B \Rightarrow \Delta} (\odot, l) \qquad \frac{G \mid \Gamma_1 \Rightarrow A, \Delta_1 \quad G \mid \Gamma_2 \Rightarrow B, \Delta_2}{G \mid \Gamma_1, \Gamma_2 \Rightarrow A \odot B, \Delta_1, \Delta_2} (\odot, r)$$

$$\frac{G \mid \Gamma, A \Rightarrow \Delta}{G \mid \Gamma, A \wedge B \Rightarrow \Delta} (\wedge, l)_1 \qquad \frac{G \mid \Gamma, B \Rightarrow \Delta}{G \mid \Gamma, A \wedge B \Rightarrow \Delta} (\wedge, l)_2$$

$$\frac{G \mid \Gamma, A \Rightarrow \Delta \quad G \mid \Gamma, B \Rightarrow \Delta}{G \mid \Gamma, A \vee B \Rightarrow \Delta} (\vee, l) \qquad \frac{G \mid \Gamma \Rightarrow A, \Delta \quad G \mid \Gamma \Rightarrow B, \Delta}{G \mid \Gamma \Rightarrow A \wedge B, \Delta} (\wedge, r)$$

$$\frac{G \mid \Gamma \Rightarrow A, \Delta}{G \mid \Gamma \Rightarrow A \vee B, \Delta} (\vee, r)_1 \qquad \frac{G \mid \Gamma \Rightarrow B, \Delta}{G \mid \Gamma \Rightarrow A \vee B, \Delta} (\vee, r)_2$$

The following structural rules are common in **GUL** and **GIUL**:

$$\frac{G \mid \Gamma \Rightarrow \Delta \mid \Gamma \Rightarrow \Delta}{G \mid \Gamma \Rightarrow \Delta} (EC) \qquad \frac{G}{G \mid \Gamma \Rightarrow \Delta} (EW)$$

$$\frac{G \mid \Gamma_1, A \Rightarrow \Delta_1 \quad G \mid \Gamma_2 \Rightarrow A, \Delta_2}{G \mid \Gamma_1, \Gamma_2 \Rightarrow \Delta_1, \Delta_2} (CUT)$$

Avron's communication rule is as follow in **GUL**:

$$\frac{G \mid \Gamma_1, \Pi_1 \Rightarrow \Delta \quad G \mid \Gamma_2, \Pi_2 \Rightarrow \Sigma}{G \mid \Gamma_1, \Gamma_2 \Rightarrow \Delta \mid \Pi_1, \Pi_2 \Rightarrow \Sigma} (COM)$$

and is as follow in **GIUL**:

$$\frac{G \mid \Gamma_1, \Pi_1 \Rightarrow \Sigma_1, \Delta_1 \quad G \mid \Gamma_2, \Pi_2 \Rightarrow \Sigma_2, \Delta_2}{G \mid \Gamma_1, \Gamma_2 \Rightarrow \Delta_1, \Delta_2 \mid \Pi_1, \Pi_2 \Rightarrow \Sigma_1, \Sigma_2} (COM)$$

Now, fuzzy relevant calculi **FRGUL** obtained as follow:

Single-conclusion **FRGUL**: **GUL** + *CL Rule*

Multi-conclusion **FRGUL**: **GIUL** + *CL Rule*

$$\Rightarrow (\Lambda)$$

$$\frac{G \mid \Gamma, A, A \Rightarrow \Delta}{G \mid \Gamma, A \Rightarrow \Delta} (CL)$$

## Algebraic semantics

Many of above fuzzy relevance logics with prelinearity axiom are complete w.r.t. linearly ordered algebras. For example, UL has such completeness, because **UL** is extension of **MAILL** by addition of $PL_t$:

$$\mathbf{UL} = \mathbf{MAILL} + PL_t$$

But some logics are not complete with $PL_t$. (Such as **psBL** and **psMTL**)
Yang (2021) suggested a new algebraic semantics for fuzzy and relevant logic. This algebraic Routley-Meyer-style semantics is ARM, and firstly include both ternary Fine and Urquhart semantics, and secondly the valid sentence (a) that is valid in Urquhart and Fine operational semantics, and isn't provable in the distributive substructural logic R of relevance, is provable and valid in all of fuzzy relevant logic by ARM.

$(a)\ ((A \to (B \vee C)) \wedge (B \to C)) \to (A \to C)$

ARM is the better semantics than algebraic Kripke (AK) semantics, and is the best semantics for fuzzy relevant logic and other core Fuzzy Logics. In ARM we have a new ternary interpretation from Fine and Urquhart operational conditionals (Yang, 2021, p. 2).

## Conclusion

Researches in fuzzy relevance logics, i.e. logics with both approximate and relational reasoning, has a little history and there are many open problems in this issue, which in this paper I have tried to answer some of them by extend previous works. In this paper, I introduced new fuzzy relevance axiomatic systems and (hyper)sequent calculi. Also, I studied about soundness and completeness of these logics in algebraic approach, by Sugihara linear ordered matrices and ARM semantics.

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# Scrutinizing Anti-exceptionalism about Logic*

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## Abstract

In this paper, I argue against present accounts of anti-exceptionalism about logic, while preserving some of their insights. I will do that by offering objections against the anti-exceptionalists' claims that revisions happen in the same way in sciences and in logic, and that the methodology of logic involves abduction simpliciter.

## What is Anti-exceptionalism?

Following Russell (2018), I would classify any position which holds that logic is not exceptional as an anti-exceptionalist view. Such an account consists of believing in logic being a posteriori, or contingent, or non-normative, or requiring an abductive methodology. On this account it is sufficient for one to hold at least one of the mentioned requirements to be called an anti-exceptionalist. You might believe that evidence for a logic should be a priori, but the epistemology for logic is abductive. That said, anti-exceptionalism about logic would be an extremely diverse family of views according to which logic is not special as the main kernel. Despite this classification, the majority of the advocates share these two tenets: 1. That logic does not require its own epistemology, and 2. Its methodology is continuous with science.

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## Abductive Anti-exceptionalism

All abductive anti-exceptionalists believe that abduction explains how logic makes progress, and argue for their favored logic on that basis. For abductive anti-exceptionalists, theory selection in logic, like in science, involves a balance of adequacy to the data, simplicity, consistency, power, avoidance of ad hoc elements, etc. as criteria for theory choice. Based on the criteria, anti-exceptionalists argue in favor of their favored logic. Priest (2016) applies this method to argue for a non-classical (paraconsistent) logic. Hjortland (2016) uses it to motivate his global pluralism. Finally, Da Costa and Arenhart (2018) argue that if we adopt a thorough anti-exceptionalist view, local logical pluralism will account better for the data. Aberdein and Read (2009) is also a good instance. They examine four reform proposals. Those are systems which are rivals for classical logic, namely intuitionistic logic, quantum logic, relevant logic, and paraconsistent logic. They clearly associate logical theories with observation theories in science and they seem to take the data to be the vernacular inferences. They claim that in the case studies they have considered, the time has not yet come for the revision to take place as the programs are still in progress, and they are inclined to accept a kind of global pluralism to be the preferable position to take. Here we should distinguish between the normative methodological claims on how logic should progress, and the descriptive claim that how logic actually proceeds. Anti-exceptionalists seem to make both kinds of claims. Read (2019) has argued that there are a lot of cases within the history of logic that shows abduction is how logical theory choice proceeds. On the other hand, Williamson, Priest, Hjortland, Da Costa, and Arenhart all claim that in addition to the descriptive claim, based on their arguments how logic should proceed is the passage they have argued for.

Logical abductivism, the thesis that theory choice in logic occurs by abduction, can be seen as a promising option for anti-exceptionalists. It is in fact a convenient way for anti-exceptionalists to explain revisions in logic. Logicians adopt a new logical theory, only if the theory does better in enough important respects than their old theory. The following requirement expresses a rather weak necessary condition for abductivism in logic:

**Requirement A** : logic A does better than logic B and will eventually replace it, only if ceteris paribus, logic A solves the problems that logic B solves, and on top of that does better with respect to a problem which logic B does not solve.

Anti-exceptionalists often argue in this way:

> the three-valued logic has all the virtues of classical logic. it explains the presence of the various logical properties, does so in a simple, unified fashion etc. but it also accounts for some difficult cases where classical logic says nothing. So on balance she thinks it better... (Russell 2014, 172).

By problem, I mean lack of satisfying an abductive criteria, or solving important logical puzzles. Requirement A clarifies, and simplifies what anti-exceptionalists mean by revisionism. Note that being revisable, and a posteriori are two independent properties for logic. Logic can be revisable, but a priori. Equally, logic might be a posteriori, but unrevisable (Cohnitz and Estrada-Gonzalez 2019, 141). If logic is revisable in the sense that anti-exceptionalists suggest, requirement A will hold, since it is basically the heart of Priest's model of rational theory selection. Priest has argued for revising classical logic based on a quantitative model. It has also qualitative versions. In addition, if requirement A holds, logic is revisable. Requirement A is a necessary requirement for abductive anti-exceptionalism. Requirement A follows from incorporating abduction in the methodology of logic. As a result, anti-exceptionalists expect that a logic which does best on abductive grounds, will eventually replace the prevalent logic. In the next section, I will offer some objections to Requirement A and show that it cannot be a good description of how the development in logic actually progresses.

## Objections to Abductive Anti-exceptionalism

### Requirement A

As mentioned in the previous section, Requirement A is clearly a necessary condition of an abductive methodology. Here, I will rebut Requirement A as a requirement for the methodology of logic. This will undermine abductive anti-exceptionalism. My first line of argument is that applying this requirement in the theory choice in logic is too simplistic. It simply overlooks the pros of logics. There might be equally salient logical problems , and which render Requirement A indeterminate. In fact, Priest (2016) has explicitly claimed that in case of a tie for best logic, the choice will be indeterminate and this will not be a problem for anti-exceptionalist. Priest (2020) has mentioned that the reason this does not deter the anti-exceptionalists is that this does not happen regularly in science and hence in logic. This may be true for science, nonetheless the fact that even anti-exceptionalists like Williamson, Priest, Hjortland, and Da Costa in spite of agreeing on the criteria for theory choice prefer totally disparate logics/accounts suggest otherwise about logic. Another concern that arises with Requirement A is that it overrates the practical applications of logic, such as what Williamson calls being fundamental to different domains of knowledge. Williamson has a striking argument in which he uses the quality of being fundamental as a pro for classical logic. According to him, classical logic is fundamental, since it is integral to mathematics. One can suggest an argument in line with his argument, by substituting another characteristic in place of being integral to mathematics, claiming that the new characteristic is as essential. As an instance, consider Inductive Logic. One might conclude that since inductive arguments

are essential to science, as classical inferences to mathematics, it should be considered using Williamson's term fundamental. Again, this kind of pluralism might be a promising option here abductively; since it will allow for several applications. However, with the plethora of important applications this will not be an orthodox logical pluralism. To put it more clearly: If logic is necessary to the practice of domain this will be considered an advantage in its favor. If logic is necessary to the practice of domain that will be equally considered an advantage in its favor. If logic is necessary to the practice of domain that will be considered an advantage in its favor. According to abduction, we will have to consider an unorthodox extreme pluralistic account of logic. An account which is not an orthodox pluralism, but it is all about pragmatics, and it violates topic-neutrality. This leaves us with an account which nobody likes. Therefore, to maintain abduction as a part of the methodology of logic we have to either rule out practical applications as a criteria, or embrace meaning variance. To sum-up, despite having abductive motivations in mind, scoring a logic best based on the overall criteria for theory choice would face serious flaws, since it is too simplistic for logic, and matters cannot be settled simply based on practical applications of logic.

## Revision in Science vs. Revision in Logic

Anti-exceptionalism claims that there is an analogy between revisions in logic and science. This analogy is explicit in Read's, Priest's, Williamson's and Hjortland's works. In this section, I argue that this analogy is misleading. The underlying idea behind my argument is that the developments in logic are different from science. I use the terms 'consensus shift' to describe a change in consensus and 'revision' to describe a widely accepted change in a theory. I do not use consensus in a strict sense here; I merely mean that a theory is generally accepted and taken for granted in a discipline. I take it that even though disagreements are inevitable in science, they are different from disagreements in philosophy and logic. There are three aspects of logic in which logical theories may compete, and be revised. These stem from what we might consider the subject matter of logic: 1. the mathematical frameworks 2. the conception of validity 3. logical vocabulary The first aspect refers to the formal aspects of logic. This includes features like soundness, completeness, categoricity, strength, subformula property and etc. The second aspect revolves around theorizing validity. Many consider validity and logical consequence as the subject matter of logic. Nonetheless, there is no consensus among logicians what logical validity is. Like validity, there is no agreement on logical constant's demarcation. I will show now that for all aspects how logic advances differs from science. With respect to the formal aspect, logic is considered as a part of mathematics. In this respect, logic moves forward as part of mathematics. And, evidently it does not resemble science at all; unless we consider mathematics a science. Apparently

Williamson does this. Such a move seems to be not acceptable for all. There are some philosophers like Lakatos who see mathematical methodology in line with science in that both are a posteriori, and revisable. At the very least anti-exceptionalists like Williamson will carry the burden of proof that a transfer of Lakatos's methodology of research programs from science to modern mathematics is possible. As Corfield (1998) has mentioned "any model of the development of modern mathematics will require more sophistication than a simple transfer of Lakatos's methodology of research programs from science to mathematics" (Corfield 1998, 297-298). The second face of logic is more philosophical. The discussion around which logic captures validity better is a philosophical discussion. So, if there is some answer to this, it will be through a pertinent philosophical discussion. But, if this is so, how could consensus shifts and revisions happen? Consider the case that philosophical discussion D leads to the proposition that L is the best logic, and later, another philosophical discussion E leads to logic J being the right logic, based on the abductive criteria. Assume the metalogic behind the discussions is M. If we want to revise L, by J, we have to consider revising M by J, as well. It follows that arguing by logic J, logic J is the best logic. Therefore, the dilemma becomes more complicated with M entering the game. We have more than three options now. Choosing either L, J, or M. We have the options $L \vee J$ , $M \vee J$, $L \vee M \vee J$, or staying put, as well. This becomes more intricate when we are comparing more than two logics. Priest (2020) has claimed that this problem won't be prevalent, as it is not prevalent in science. The lack of agreement between anti-exceptionalists proves this to be wrong. According to Priest's solution, we can either stay put with the already accepted logic (which is not clear which), or accept the disjunction of logics. But, some of the positions are not specific logics. They are rather an account. For instance, Da Costa, and Arenhart's local pluralism is rather an account. It is not clear what a disjunction would be like when we have local pluralism as a disjunct. This is a similar problem to the well-known problem of logical partisanhood first introduced by Jack Woods. It requires "both the proposed alternative and our actual background logic must be able to agree that moving to the alternative logic is no worse than staying put" (Woods 2018, 1). So far, I have shown that anti-exceptionalism fails to explain how logics compete over formal aspects, and capturing validity without facing several worries. It remains to explore how anti-exceptionalism looks at competing accounts of logical vocabulary. Here again the problem of background logic pops up: Suppose an anti-exceptionalist is deciding between set of logical constants and set of logical constants based on abductive criteria. Assume that the background logic she is using employs set of logical constants. The set will enter the competition. The anti-exceptionalist has to show that using as the background set, is the best choice. She also has to show that using as the background set, will be inferred as a better logic on abductive grounds. The worry that emerges now is

that while choosing between , and what background vocabulary the logician may use. Is it one of the aforementioned sets, or is it a new set ? If it is one of the mentioned sets, it could be considered a case of begging the question, and by favoring a different set, regress threatens. Another worry is that by changing the background set the anti-exceptionalist is talking past herself while deciding between the three options.

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# The Relation Between Being and Language in Early Heidegger

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## Abstract

Jacque Derrida challenges the relation between "Ideal meanings" and their expressions in language, which he perceives as the foundation of Edmund Husserl's phenomenology, in a fundamental criticism. Martin Heidegger, in *Being and Time* defines "discourse" as "the articulation of intelligibility." With equating ideal meanings with "the being of beings" and lingual expression with "discourse", in *Being and Time*, this criticism can be applied to *Being and Time* as Derrida's criticism on "the relation between Being and language in Heidegger's early thinking." Evaluating such an application, I show its illegitimacy.

## Derrida's criticism on Husserl

Being atemporal and spaceless have typically been considered as essential descriptions of representations and meanings in the history of philosophy. This causes a platonian gap between spatio-temporal-changeable language and atemporal-ideal meanings. Based on this, Derrida in Speech and phenomena casts an important criticism on Husserl's Logical investigations. Derrida says Husserl's essential distinction in the first paragraph (Husserl, 1970: 183) rigorously commands all the subsequent analyses:

Sign[1] as expression[2]

1. Zeichen
2. Ausdruck

Sign as indication[1]

Husserl believes that sign as indication expresses nothing unless it "fulfills"[2] a meaning too. Despite Husserl's emphasis on both functions, expressing and indicating, in communal discourse[3], he wants to save pure logical meaning. Derrida thinks that the whole problem of language and its history should be entirely rethought. Instead of trying to capture and retain a pure presence, we must conceive signification from the start as a movement away from self-presence. Meaning as a movement of difference is not just prior to conceptions like self, presence and meaning, but gives rise to them. Meaning is constantly on the way and never can it be considered without its linguistic, semiotics or historical context. Each such context is a system of reference. We stand within language, not outside it. But "by choosing the logical character of signification as his theme, Husserl engaged in just one of the modifications of the structure of Zeigen (Sign): Hinzeigen and not Anzeigen" (Derrida, 1973: 24).

## Applying Derrida's criticism on Being and Time

In order to consider the criticism with regard to *Being and Time* we need to go back to the *Theory of Judgment in Psychologism* (1913) and even his Recent Research in Logic (1912). In this article, in his doctoral thesis and his work on Dans Scotus (1915), Heidegger walks three steps toward a specific approach to language:

First, in *Recent Research in Logic* influenced by Emil Lusk separates decisively logical reality from psychical (and thereby spatio-temporal) reality. He says: "This realm of the valid must now be fully brought out in its own proper essence principally against sensuous being just as much as against the supersensuously metaphysical." (Heidegger, 1978: 24).

Second, in *The Theory of Judgment in Psychologism* depicts his own theory of judgment in opposition to those of Lipps, Marty, Wundt, Meier and Brentano. He thinks of "Relationality" as the essence of the domain of logic: "The concept of the copula means the being-valid of the latter for the former. … Being here does not mean real existence or any other such relation, but being-valid." (Ibid: 178). he also adds: "… it [copula] is the most essential and specific element of the judgement, for the plausible reason that in a relation the relation, though co-determined by them, represents the essential moment before the members."

Third, in his work on Dans Scotus he turns toward Husserl. The focal point of such a turning is the role of meaning-bestowing acts. He differs logical judgments from Psychological processes. The act of judgment and its content, despite their close relation, are separated from

1. Anzeichen
2. erfüllt
3. mitteilender Rede

each other. He says: "Only inasmuch as I live in the valid do I know anything that exists." (Ibid: 280). Taking "the valid"[1] as the standard is definitely along with Husserl's thought in this period of time which focuses exclusively on the conditions of showing phenomena in the consciousness.

Then, on one side, Heidegger, under the influence of Lask, makes difference between psychic-metaphysical and logical, and, on the other side, he follows Husserl about intentional status of judgment and is against Lusk. Heidegger believs that language has an interface status: "These logical formations have their own reality, even if they are not expressed in language. They are something prior, do not require language for their constitution, their validity." (Ibid: 291). Subsequently, he confirms an ontological difference between language and meaning (Ibid: 292-3).

Matthew Rampley (2014) believes that Heidegger keeps this distinction in *Being and Time*. Dasein is the theme of investigation in *Being and Time*. This of great importance to know that Heidegger in the end of his thesis states that "One will not be able to see logic and its problems in its true light unless the context from which it is indicated becomes a translogical one" (Ibid: 406). Due to this, in Being and Time, he bases the phenomenon of language in the existence of dasein. Rampley says that "the talk of logical content in opposition to linguistic form, has been displaced by the single term 'Rede '." (Rampley, 2014: 215). Rede (discourse) is one of dasein's existentials. Heidegger says: "*Discourse is existentially equiprimordial with state-of-mind and understanding*." (Heidegger, 2001: 203). Discourse is the articulation of intelligibility and because of this we understand system of signs. Rampley believes that the distinction between meaning and discourse leads to the distinction between discourse and language and eventually is related o the ontological difference between Being and beings because meaning presents "something articulable" (Ibid: 195) whereas discourse constitutes the actual articulation itself (Rampley, 2014: 216).

I think this criticism is basically Derrida's mentioned one about Husserl. Derrida's criticism is on the relation between language and logic in Husserl's thought. It can be investigated regarding *Being and Time*. So, it will be Derrida's criticism on the relation between language and Being in Heidegger's early thinking. Therefore, if we actually accept that Heidegger maintained language-meaning distinction in Being and Time in the meaning which Derrida believes Husserl in Logical Investigations did, it is needed to read *Being and Time* based on this criticism.

1. gültig

## Evaluating the criticism on *Being and Time*

Beside the fact that Derrida's criticism, assumed applicable, is later Heidegger's one on early Heidegger, in other words, self-criticism, I think such a criticism is illegitimate.

What in Rampley's analysis is vital for his conclusion of Being and Time is the phenomenon of "equipmordiality"[1] of attunement, understanding and discourse. I think he did not considered this phenomenon properly. There is no separate realm, because there is no metaphysical distinction. Just as we can not, based on Heidegger's hermeneutical phenomenology, talk about the realm of "consciousness," as phenomenologically valid, there can not be any space for discourse in distinction of dasein's being. Heidegger says: "Equiprimordial with it [state of mind] in constituting this Being is *understanding*. A state-of-mind always has its understanding, even if it merely keeps it suppressed. Understanding always has its mood." (Heidegger, 2001: 182). If we take this as a measure, as I think Rampley does, there is nothing of discourse here, where Heidegger is talking about most fundamental way of dasein's being. It seems as discourse is an element in separation of dasein which later must be add to its being. In order to see discourse along with other Heidegger's early writings we need a distinct realm. I think discourse has had such a status in writings prior to *Being and Time*, but not in Being and Time. I try to show what language is in *Being and Time* in the following:

In *Being and Time*, language is essentially a way of dasein's being which is prior to all elements called "language." Language belongs to dasein's world which is being-in-the-world with others. Elements like expression, structures and… are not some properties taken from empirical language: "They are existential characteristics rooted in the state of Dasein's Being, and it is they that first make anything like language ontologically possible." (Ibid: 206). Heidegger, himself, after a discussion concerning the essence of language, clearly states that discourse must be placed in parallel with other dasein's existential says: "We can make clear the connection of discourse with understanding and intelligibility by considering an existential possibility which belongs to talking itself-hearing. Ifwe have not heard 'aright', it is not by accident that we say we have not 'understood'" (Ibid). Heidegger rejects the common theory that initially meanings come to our mind and then, we transfer them to others by means of words. Speaking is not firstly an expression of mental meanings or representations, but is a kind of action. We need to exposit discourse based on state of mind and understanding:

*State of mind*[2]: those moods which dasein finds itself existing in the world in terms of them for the first time. State of mind is my primordial way of being in the world. It is not

1. Gleichursprünglichkeit
2. Befindlichkeit

a theoretical deduction about my being. In the state of mind a state becomes discovered to dasein which is bot itself and the world (Ibid: 176).

*Understanding*[1]: state of mind discovers world to dasein and understanding discloses it to the possibility and future. Understanding is to project on a specific possibility. Understanding is going through state of mind, but not as an event after it. We are always in a state of mind.

Although discourse is a human existential but it is not a convention of her own, because its story begins with the state of mind. That is why discourse is not necessarily speaking, but it is also silence and hearing. The single evidence in Being and Time which brings something like a separate realm for language to the mind are Heidegger's questions:

> In the last resort, philosophical research must resolve to ask what kind of Being goes with language in general. Is it a kind of equipment ready to-hand within-the-world, or has it Dasein's kind of Being, or is it neither of these? What kind of Being does language have, if there can be such a thing as a 'dead' language? What do the "rise" and "decline" of a language mean ontologically? We possess a science of language, and the Being of the entities which it has for its theme is obscure. Even the horizon for any investigative question about it is veiled (Ibid: 209).

How should we understand these sayings? I think, these questions, which investigating them is later Heidegger's task, can not be regarded in any way as his going backward to thoughts before *Being and Time*. The prior position essentially changes and understanding this change properly is possible only by understanding Being and Time's unique question.

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1. Verstehen

# Time is Simple: Abūʾl-Barakāt's (anti?) Avicennan Account

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## Abstract

In this paper I argue that for Abū'l-Barakāt, time is epistemically and metaphysically primitive (*awwaliyyan*). One consequence of this is that Abū'l-Barakāt will say that time is not to be explained by motion or space; the reason for this is not that time is ontologically prior and thus is substantial or has hypostatic-bearing qualities. The significance for this is that Abū'l-Barakāt's idea that time is magnitude of existence (*miqdār al-wujūd*) will lead him to say that time also measures God. What this phrase may mean is what I explore in this paper.

Abū'l-Barakāt's account of time is often summarized as the declaration that time is the magnitude of existence (*miqdār al-wujūd*); once we take a look a further look in his *Kitāb al-Mu'tabar*, however, things become more complex. In this book he accounts for time twice: once in his Physics, and again in his Metaphysics. These accounts are not reiterations of each other. Rather, his metaphysical account will build on his account in physics. In his *Physics*, Abūʾl-Barakāt seems to deny that Time is a species of quantity:

*Mu'tabar, Physics* II.1.18 (77:24-78:10):

> So time is continuous in its essence and discrete in its existence; that is, it is not either two species of quantity which they have mentioned; nor is it like motion, for movements differ in speed and slowless and in distance and direction. But this [time]

> does not differ, however one may look at it or in whatever state it has; rather, time is one thing which does not multiply except through the relations and links it has to what is in it. So it is said "a time of equity," "a time of tyranny"; "a time of plenty" or a "time of want" and the like.
>
> So the considered, concrete definition is called the "now", and it is said that the "now" is a division between two times; as for the natural, it is between past and future; as for the accidental, it is between any two times you might have in mind. So the 'now' is in the extension of time, like the point is in a line. And it is said that the Now is that part of time that exists, and it is said that time does not exist as a whole: that is, the thing which renews itself over two 'nows' does not differ in existence, but rather [time is the] the being of the one 'now' after the next 'now' via sequence. This being isn't divisible from time just as the point isn't divisible but rather is the beginning and the end.

Here, time is continuous in essence but discrete in existence. By this terse statement Abūʾl-Barakāt is drawing attention to the fact that time is spoken of in terms of duration, extension, and magnitude in order to create an analogy or image; e.g. time is like a line, and the "now" or present is like the point on this line. He wants to keep Ibn Sina's account in his Physics as an account for what time is like or seems like, rather than what it is per se-as it is for Ibn Sina. Time as a "now" is correct, then, but only as it relates qua other physical phenomena like motion. That said, it still strikes one initially as odd that he would, in doing this, also have the intuition that time cannot be any species of quantity since it is both continuous and discrete. In fact, it is especially odd given that he also compares time and the present to a line and point, as noted above.

He gives us a sense for what he ultimately intends, however, when he also says that "the Now is the part of Time that exists." My suggestion here would be that he is drawing on Ibn Sīnā's concept of an non-integral disposition: what this meant for Ibn Sīnā was that time's components could never fully co-exist: being in the past rules out being in the present and future, and so on. So when Abūʾl-Barakāt explains the now and its relation to time via the Aristotelian analogy of a point being on a line, he is stating an additional claim: the Now is not a separate piece of time sitting on top of Time's arrow, as it were, but rather is precisely this. The "Now" is time as it exists. Abū'l-Barakāt accepts this; but the context in which he does is significant. When one takes time to be a quantity, one is only thinking of time in relation to or qua something else, namely, physical occurrences. Time as it exists in this context is segmented, as Philoponus noted. But this does not, for Abū'l-Barakāt, have clear implications for what time is per se.

The motivation for Abūʾl-Barakāt in rejecting the notion that time is a species of quantity is this: doing so plays into the idea of taking time as being metaphysically primitive. This is an addition to the inference drawn above that time is epistemically primitive. When I say time is metaphysically primitive for Abū'l-Barakāt, I mean that for him time helps account for motion or helps us distinguish motion, but time is not explained by other concepts like motion in turn. Abū'l-Barakāt gives an account of time both in his *Physics* and *Metaphysics*, then, in part because if time is a metaphysical primitive, it would follow that time, like being and necessity, is extended to include both temporal and eternal things. So, we account for Abū'l-Barakāt's treatment for time in *physics* as an account qua physical phenomena; in metaphysics, he treats time *qua* in itself and qua God's activity. This suggests that for Abū´l-Barakāt, the metaphysical account of time comes closer to describing what time is in its essence or considered in itself, with the important caveat that this metaphysical account cannot be understood until the reader first works through time considered qua physics and motion. Abūʾl-Barakāt makes the case that time is primitive in his metaphysics:

*Mu'tabar (Ilāhiyyāt)* III.1.8 (39:22-40:7)

> Just as two is nothing but one and one, in the same way the great is nothing except a collection of small and small, and the relation of the great to the small; for quantity is a consideration in the mind. But that which is in existence is what is large, rather than Largeness, just as that which is in existence is the ennumerated rather than Number; and likewise time measures existence, not in that time is a integral accident in existence, but rather in that it is a mental consideration in respect to what is more in existence to what is less in existence. For people will say, based on what they know, that existence is both everlasting and not everlasting, long and short, that is, long in duration and short in duration; just as it is said of body that it is large and small, that is, large in magnitude and small in it. And exceeding and falling short is not in a measure of one thing abstracted from another, but rather it is through a body that exceeds or falls short; and just as the mind does not conceptualize anything when existence is removed, so too the mind does not conceptualize anything when time is removed.

I take this to be the crucial passage for my argument that time is metaphysically primitive for Abū'l-Barakāt. Here, I think, too is Abūʾl-Barakāt's clearest departure from Platonic concepts of time (such as Abū Bakr al-Rāzī's) that make it substantial. Abū'l-Barakāt rejects the idea that time is a self-subsisting substance. Rather, its existence, or ontological status, is similar to that of quantity and other secondary substances. Time seen through notions like quantity is understood as a mental notion: but time is not merely so. It is still primitive in

a metaphysical and epistemic sense. For Abūʾl-Barakāt, time is not a substance that needs to be explained in terms of causation, substance, or accident; it is not predicated of things the same way that colors or other attributes rare. Rather, as we saw above, time is essential to beings. The consequence of this view is that time therefore is more basic, on some level, than motion, and so has a wider extension than motion. Time applies to all existents; motion, conversely, applies only to things that are possible in themselves. Note that this does not make time a substance, but rather a metaphysical primitive like being, necessity, and thingness.[1]

I think we are in a position now to understand Abūʾl-Barakāt's full statement of time as *miqdār al-wujūd*: this phrase points to the distinction between existential and metaphysical priority. Motion measures time and thus is explained by time; yet, time does not exist as a self-subsisting substance. So, whereas Abūʾl-Barakāt's Physics and his account of the Now tells what about time in relation to motion, metaphysics tells us, upon reflection, a different story: motion and time are not determined by each other at all, since different motions and speeds can happen in the same time. Instead, time like existence is prior to conceiving particulars and applies uniformly across all things:

*Muʿtabar (Ilāhiyyāt)* III.1.8 (39:17-22):

> Were it said that time is the magnitude of existence, then this would be better than saying that it is the magnitude of motion, for it also determines (measures?) rest, and that which is at rest and that which is in motion both partake in existence. It was also said in the *Physics* that the magnitude for body is not an external thing from body, for large bodies surpass smaller bodies via body-ness, not via quantity since quantity is a mental-thing of how excess relates to lack. For quantity is knowledge about how the larger relates to the smaller, just as it is about how the more relates to the less; the latter is discrete, the latter continuous.

Here Abūʾl-Barakāt gives his reasoning for changing the description he gave of time in the Physics as a non-integral accident that is continuous in essence but discrete in existence. First, time is clearly not a substance for Abūʾl-Barakāt, on the grounds that, since time is a measure (*miqdār*), it cannot exist outside what it measures. Time is a mental albeit important notion. Conversely, it follows that things do not exist in time either, since time is a relative that is understood when two objects are compared. Abūʾl-Barakāt's main innovation, here, is thus not a Platonic reaction to Avicenna, since time does not have, as the (Neo-)Platonist

1. A list taken from Ibn Sīnā's own account of the transcategoricals mentioned in *Shifāʾ, Metaphysics* III.10. Further work is needed to see if these transcategoricals function in the same way that transcendentals do in Latin Scholasticism or the general notions (*al-umūr al-ʿāma*) in Avicennian Philosophy.

might wish, independent existence. Instead, time compares objects based on the duration or magnitude of these objects' existences. One basis for this claim, for Abūʾl-Barakāt, may be the intuition that one might find in Philoponus' notion of paratasis: time comes alongside things, and thus measures the duration of their being even in cases where we conceive of the being of things abstracted from motion and change. Eternity like time is an extension. Abūʾl-Barakāt makes the additional move of observing that it is therefore impossible to think of any extant thing without using both the concept of existence and the concept of time. Time therefore is not ontologically prior or posterior to God or to human beings (it is not a cause nor is caused), but rather is a primary concept like existence. It therefore falls under the same rules of causation, predication, and epistemic primitiveness that existence (*wujūd*) does. For instance, since God is a cause considered qua necessity, his existence (*wujūd*) does not sufficiently distinguish him from other existents (his necessity does). Since time applies to all things, time cannot help us distinguish between the nature of one thing or another. It is with time's universal application in mind, I think, that Abūʾl-Barakāt denies that time per se is a species of quantity; one might better say that we grasp what quantity is through our concept of time. This need not entail that time is more substantial; but it does imply that time is more epistemically primitive to our experience of the physical world and thus, for Abū'l-Barakāt, is metaphysically (but not existentially) prior to individual things.

# IV. Conclusion

Abū'l-Barakāt's metaphysical definition of time as *miqdār al-wujūd* takes time to include necessary and contingent beings because he avails himself of Ibn Sīnā's account of magnitude (*miqdār*). That said, Abūʾl-Barakāt's doctrine of time has less bearing on questions about divine knowledge so much as divine causation; Abūʾl-Barakāt does not at all share Abū Bakr al-Rāzī's (or perhaps Plato's) idea that time is a substance: epistemic or metaphysical primitiveness does not imply existential priority. Instead, time measures both God and creatures because time, as Ibn Sīnā showed, is a magnitude, and as such for Abū'l-Barakāt is a primitive term that is the basis for us understanding quantity and motion. Time as the magnitude of existence, therefore, is a concept that implies time's metaphysical priority over motion, rather than any ontological priority. Since Abū'l-Barakāt's account of time argues for its metaphysical rather than ontological priority, it is misleading to characterize Abū'l-Barakāt's account as Platonizing or anti-Aristotelian. Time, rather, is a concept we use to point to things that last longer than other things or, in the case of God, which has and will last longer than all things. In this way Abūʾl-Barakāt position to the Greek and Arabic tradition is closer to Proclus and Philoponus' view, but mediated through Ibn Sīnā,

rather than being a throwback to Abū Bakr al-Rāzī[1] or other accounts that tend to take time as a substance rather than accident. Instead, Abū'l-Barakāt's argues that time is neither a substance nor an accident. His originality lies in claiming that time is epistemically prior to physical phenomenal, metaphysically primitive, and in denying, consequently, that there could be anything beyond its grasp.

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1. Dag 1970 in several places suggests that Abū Bakr al-Rāzī and Abū'l-Barakāt intersect with one another in respect to their doctrine of time. (Dag 1970:202). For Dag, to say time is the *miqdār al-wujūd* is to say that time is real. However, as I hoped to have shown, this account is complicated by the fact that though he does argue that we are immediately aware of time and thus time is somehow prior to motion, Abū'l-Barakāt does not explicitly conclude that it therefore is a substance *(jawhar).* To be a substance *(jawhar*) is to be real in the strictest and truest sense for the *falāsifa.* A more likely reading, as I have suggested, is to take Abū'l-Barakāt as saying that time is metaphysically prior the way *wujūd* is prior to both God and creatures. This kind of priority has no implications for the existence or non-existence of whatever term we have in mind, although it may have metaphysical implications, and thus ought to be contrasted with notions like necessity. For instance, necessity clearly does imply for the Avicennian that something does exist with this feature, namely, the necessary-in-itself.