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The Dialogical Stance on Meaning

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Abstract

The dialogical stance on meaning in the Lorenzen-Lorenz tradition is dynamic, as it is based on interaction between players, and it is contextual, as meaning depends on the set of rules adopted for the dialogical justification of claims including those implicit in linguistic practices. In the dialogical stance, use is not promoted to the role of an unexplained explainer. Grasping the meaning of an expression or an action amounts to identifying the rationale behind our verbal and behavioral practices. This knowledge is informed by the collective intelligence embodied within public criticism. Different aspects of meaning are made explicit within the game rules, namely within the particle rules for the meaning of logical constants, within the Socratic rule for non-logical constants, and within the structural rules in general, which set contextual meaning by shaping the development of a play. The level of plays is governed by these meaning-determining rules; validity (or proof) is built out of the plays; therefore, grasping meaning does not reduce to validity. The result is a framework that grounds language and logic in the dynamics of dialogical meaning, and which has proven fruitful for studying frameworks for the logical analysis of language, modern and ancient.

Keywords

dialogical logic; dialogue; dynamic meaning; interaction; language game; Lorenz; Lorenzen; pluralism; pragmatism; rules; temporality

Key points:

- Meaning is embedded in the dynamics of interaction (play level)
- Validity/proof comes from the strategy level which is built on the play level
- Dialogical pluralism
- Study of logics and argumentation from various times and cultures

Introduction

Contemporary ‘dialogical logic’ was first built and developed by Paul Lorenzen and Kuno Lorenz in the second half of the twentieth century.¹ It provides an overall pragmatist ‘dialogical framework’ for philosophy of language and logic, which combines game-theory and a dialogical take on Wittgensteinian language games.² It has proved capable of expressing many contemporary logics (see ‘dialogical pluralism’ below), as well as logics from different times and cultures, such as the ancient Greek tradition or the Indian traditions with particular emphasis on Jainism and Buddhism (see Lorenz, 1998, 2011).

The dialogical framework articulates a new pragmatist theory of meaning with an interactive stance on knowledge and logic. Semantic gaps occurring in epistemic and communicative contexts are not filled in a naïve Gricean approach, resorting to conversational implications while keeping model-theoretic semantics intact. Rather, the dialogical framework privileges the dynamic context of debate as the basis for a theory of meaning.³ Under this conception, the dialogical stance on meaning is rooted in the dynamics of interaction;

¹The main seminal papers for the dialogical framework are gathered in Lorenzen-Lorenz (1978). Since Lorenzen was based in Erlangen, the project was known as the ‘Constructivist School of Erlangen.’ It also encompassed history and philosophy of science, and historical developments on Plato and Aristotle.

²Lorenz (2010, chap. 4–5; 2021, chap. 13) included a semiotic, Peircean, understanding of language games; he first introduced mathematical game-theory (Lorenz, 1968).

³For instance, in the conjunction ‘he took his shoes off and went to bed,’ the naïve Gricean approach keeps the standard truth-conditional interpretation of conjunctions set in model-theoretical semantics (the conjunction is true if and only if the two conjuncts are true, regardless of the order) and uses communicative maxims to explain that temporal order is relevant in this context. The dialogical framework in the Lorenzen-Lorenz tradition does not keep the underlying model-theoretical semantics but completely recasts meaning in the dynamic fashion presented below, with particle rules (local meaning) and structural rules (global meaning). In this example, the particle rule for conjunction does not distinguish order, but a structural rule can specify how to deal with conjunctions that embark a temporal order, for

expressions can change depending on the context of interaction, and their specific meaning is made explicit through (a) rules that determine how a statement is challenged and how this challenge is answered (particle rules), as well as (b) rules that contextually determine the development of a play involving a certain statement called the thesis (structural rules). This is the ‘play level’ (see Section A), it is where meaning is constituted by determining how players can interact, and which choices they must face during a play; the play level also encompasses the players’ actual interaction and choices in a play.⁴ Validity (strategy level) emerges out of meaning and interaction (play level): a proposition is said to be valid when one of the players, the Proponent, has a winning strategy, i.e., he is capable of winning for any choice the other player, the Opponent, may make (see section B).⁵ The specific metalogical properties of inference that ensure the soundness of an argument and the validity of a thesis through the existence of a winning strategy are derived from the dynamics of dialogical meaning shaped at the play level, rather than the other way around (i.e., having meaning be determined by metalogical properties). In other words, grasping the meaning of an expression amounts to mastering the game of asking and giving reasons associated to a statement concerning this expression: meaning goes deeper than developing a winning strategy determining whether the statement is valid or proven.⁶ In this sense, a dialogical approach takes interaction as the answer to questions of meaning, of knowledge, and of inference.

A. Meaning as embedded in the dynamics of interaction (play level)

The dialogical framework distinguishes two levels of meaning, the local level and the global level, each determined by game rules detailed below.

Local meaning (particle rules)

Local meaning is governed by ‘particle’ rules, which are player-independent, i.e., they are the same for the two players. They provide the meaning of the logical constants by determining how players can act with regard to each kind of constant.⁷ The particle rules provide all at once (a) syntax by identifying the kind of expression that bears meaning, (b) semantics by providing the meaning of the constants and thereby the meaning of the propositions constructed, (c) pragmatics by determining how players can interact. Since the same rules combine these three aspects of meaning and logic, often separated in other frameworks, a characteristic of the dialogical stance is that it takes these three aspects to be so intimately linked that they cannot be dissociated without losing meaning.⁸

The particle rules determine, for each type of statement made by a player (labeled **X**), how it can be challenged by the other player (labeled **Y**), and how the first player (**X**) can answer the challenge. See Table 1 for the particle rules for the most common logical constants. Challenges can take the form either of requests (question mark) or statements (exclamation mark). Certain challenges or answers leave the players with a choice: in a play, they will have to choose and will be at liberty to act according to their best interest. At the strategy level (see Section B), all the possible choices of a player may need to be considered. The combination of (a) the type of statement, (b) the challenge, and (c) the answer, determines the meaning of each logical constant. This

instance by introducing an order in the challenges for such conjunctions. In this fashion, the dialogical approach should be contrasted with Recanati’s enrichment pragmatist theory (2010), with pragma-dialectics (van Eemeren & Grootendorst, 1992), and with the Perelman-style school of rhetoric (Danblon, 2013), which follow a Gricean way. It is also to be distinguished from Hintikka’s game-theoretical semantics (GTS) which keeps an underlying model-theory (Hintikka, 1973).

⁴ The dialogical framework can be used to analyze empirical arguments, but its core tenet is that the empirical content of these arguments is rooted in the dialogical rules specific to that content. If prominent theories of argumentation, such as those initiated by Barth & Krabbe (1982) and Walton (1984), were influenced by the dialogical framework, they remain distinct approaches. As Lorenz (2021, chap. 8) stresses, the dialogical framework is not a framework of argumentation theory; its main focus is not on examining empirical arguments or debates.

⁵ In this fashion, the dialogical framework in the Lorenzen-Lorenz tradition does not focus only, or even primarily, on questions of validity (strategy level); it is oriented towards meaning (play level) and it builds metalogical properties out of meaning. Other dialogical traditions are more strategy-oriented; see Felscher (1985), Dutilh Novaes (2020). Dutilh Novaes additionally combines a cognitive and rhetorical reading of sequent calculi with contemporary argumentation theory.

⁶ See Rahman et al. (2014); Shafiei (2019).

⁷ The player-independence of particle rules prevents pathological cases such as Prior’s ‘tonk’ (1960). See Rahman & Redmond (2016) and Rahman, McConaughy, Klev, Clerbout (2018). Piecha & Schröder-Heister (2012) provide an asymmetric approach in order to capture ‘implication-as-rules,’ though in Piecha’s entry for the *Internet Encyclopedia of Philosophy* (<https://iep.utm.edu/dialogical-logic/>), the particle rules at the play level are player-independent.

⁸ See in particular Lorenz (2010, chap. 7), who objects against the two main trends which pragmatize semantics or semanticize pragmatics.

meaning is local in the sense that the statements defined are not embedded in the greater interactive structure of a play, determined by the structural rules (see below).

<Table 1 here>

	Statement	Challenge	Answer	Choice
Conjunction	$X!(\phi \wedge \psi)$	$Y?\wedge_L$ $Y?\wedge_R$	$X!\phi$ $X!\psi$	Challenger (choice of conjunct, left or right)
Disjunction	$X!(\phi \vee \psi)$	$Y?\vee$	$X!\phi$ $X!\psi$	Answerer (choice of disjunct, left or right)
Implication	$X!(\phi \rightarrow \psi)$	$Y!\phi$	$X!\psi$	–
Negation	$X!\neg\phi$	$Y!\phi$	–	–
Universal quantification	$X!\forall x\phi$	$Y?\forall_{[x/c_i]}$	$X!\phi[x/c_i]$	Challenger (choice of constant)
Existential quantification	$X!\exists x\phi$	$Y?\exists$	$X!\phi[x/c_i]$	Answerer (choice of constant)

Table 1: The particle rules explicit the local meaning of logical constants

Global meaning (structural rules)

Global meaning is governed by ‘structural’ rules. As opposed to particle rules, these rules are player-dependent, they may specify to which player (Proponent or Opponent) they apply. The basic structural rules determine how a play starts, how it develops, and how it ends. There is also the ‘Socratic’ rule (also called the ‘Copy-Cat’ or ‘Formal’ rule) which compels the Proponent to ground his elementary statements on those of Opponent, thereby guaranteeing the formality of the play.⁹ In other words, Proponent must bring Opponent to make any elementary statement that he himself would need to make. By convention, Proponent is addressed as he/him, and Opponent as she/her. To keep things simple, the basic rules without repetition ranks are provided in Table 2.¹⁰

Introducing variants for the basic rules or adding new rules can switch the type of logic at stake. For instance, classical logic can be produced by liberalizing the development rule for the native intuitionistic logic; new particle and structural rules can generate predicate modal logics, relevant logics, and many other non-classical logics, which may each introduce changes in meaning and in focus (e.g. introducing necessity or temporality, switching to strict implication, etc.). A strongpoint of the dialogical framework is that the structural rules governing types of logic can be combined to yield, for instance, intuitionistic modal logics. The study of various logics in the dialogical framework and their combination is called ‘dialogical pluralism’ (Rahman & Keiff, 2005; Keiff 2007; Fontaine 2025).

Specific semantic content can be studied through ‘material’ (instead of ‘formal’) plays; this means introducing structural rules specific to the subject-matter under investigation (e.g. \mathbb{N}).¹¹ These rules are variants of the Socratic rule: they allow the Proponent to give an answer warranted by the meaning of the subject-matter, independently of whether or not the Opponent previously stated it or not. For further indications, see Rahman et al. (2018) or an outline in Clerbout & McConaughy (2022).

<Table 2 here>

Starting rule	The play starts with the Proponent making the first statement called the thesis.
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⁹ A play is formal when, in order to test the thesis, the Opponent (and not the Proponent) has the authority to make elementary statements. In this fashion, if the thesis holds in a play, either the Opponent made the elementary statements relevant for the constitution of the thesis, or she was brought to contradict herself.

¹⁰ For repetition ranks, see Clerbout (2014) and Clerbout & McConaughy (2022).

¹¹ To distinguish formal and material plays, take this implication: ‘if 5 is an even natural number, then 5 is an even natural number or it is divisible by 2.’ In a formal play, the statement is equivalent to $(A \rightarrow (A \vee B))$, and the Proponent has a winning strategy because he will simply choose the left of the disjunction, A , which the Opponent will have previously stated when challenging the implication. In a material play, the players will have to refer to the definition of an even natural number provided in the structural rules.

Development rule	After the thesis has been stated, each player, starting with Opponent, makes a move in turn, either challenging a statement made by the other player, or answering the last unanswered challenge launched by the other player, according to the particle rules.
Socratic rule	The Proponent cannot make an elementary statement before the Opponent has made that same statement.
Ending rule	The player who cannot make a move at his or her turn (either challenge or answer) loses. The other player wins.

Table 2: The structural rules provide global, i.e., contextual, meaning

Example of a play: $(\forall xPx \rightarrow (Pc_1 \wedge Pc_2))$

The game rules (i.e., the particle and structural rules) explicit meaning by determining how to engage in dialogical interaction. The play for $(\forall xPx \rightarrow (Pc_1 \wedge Pc_2))$ runs as follows (see Table 3 for the table format):

- move 0: Proponent states the thesis according to the starting rule.

It is Opponent's turn. She challenges the implication (thesis, move 0) in accordance with the particle rule:

- move 1: Opponent states $\forall xPx$ (the antecedent of the implication).

It is Proponent's turn. He is allowed either to answer the challenge on the thesis or to challenge Opponent's move 1. However, the development rule restricts players to answer only the last unanswered challenge; it is therefore in Proponent's interest to answer challenges when he can. (This restriction puts the players in the context of intuitionistic logic; liberalizing this development rule to allow them to answer any challenge whatsoever puts them in the context of classical logic.)

- move 2: Proponent answers the challenge from move 1 by stating $(Pc_1 \wedge Pc_2)$, in accordance with the particle rule for implication (stating the consequent).

It is Opponent's turn. She challenges the conjunction (move 2) by requesting one of the two conjuncts, the one she wishes (particle rule), say the left conjunct:

- move 3: Opponent challenges move 2 by requesting the left conjunct $? \wedge_L$.

Because of the Socratic rule, Proponent cannot yet answer the challenge: he would need to state the left conjunct, Pc_1 , which is an elementary statement which Opponent has not yet made. He must first bring Opponent to state Pc_1 before he can answer the challenge, it is left pending. However, Proponent can challenge the universal statement Opponent made move 1 by choosing a constant, say c_1 (particle rule):

- move 4: Proponent challenges move 1 by requesting the substitution of the bound variables with a constant, $? \forall_{[x/c_1]}$.
- move 5: Opponent answers the challenge by stating Pc_1 according to the particle rule.
- move 6: Proponent can now answer the pending challenge launched move 3 by stating Pc_1 .

Opponent has no move left, neither challenge nor answer, she loses and Proponent wins according to the ending rule.

The dialogical framework often adopts a table format as a visual aid very useful when building the plays. Each of the player's moves are written in their respective column, but the order of moves (in the lines) is that of interaction, which does not necessarily follow the order of the moves in the play: each answer is placed on the same line as its challenge so that any unanswered challenge becomes immediately visible. For instance, in the example, at move 5, the table looks like Table 3, with a blank space in front of the unanswered challenge move 3. Move 6 will consist in answering this challenge, on the same line (in the empty space). The number of the move is in the outer columns, the numbers in the inner columns refer to the move being challenged.

<Table 3 here>

Opponent		Proponent	
		$(\forall xPx \rightarrow (Pc_1 \wedge Pc_2))$	0
1	$\forall xPx$	0	$(Pc_1 \wedge Pc_2)$ 2
3	$? \wedge_L$	2	
5	Pc_1	1	$? \forall_{[x/c_1]}$ 4

Table 3: Example of a play in the table format. It is Proponent's turn to play, move 6.

With move 6, Proponent wins the play. However, this is not sufficient to determine whether or not the thesis is valid, which is a question for the strategy level and not the play level.

B. Meaning grounds validity or proof (strategy level)

The dialogical framework distinguishes between the play level (Section A), at which meaning is constituted, and the strategy level, at which validity or proof is constructed by means of a ‘winning strategy’ for the Proponent. The strategy level is entirely built on the play level, and in this regard, in the dialogical framework, the play level is fundamental: establishing validity (or proof) supposes grasping local and global meaning. In order to construct a winning strategy for the Proponent, all the relevant choices of the Opponent must be considered, and the Proponent must have a way of winning for each choice.

In the example above, to determine whether Proponent has a winning strategy, we must consider Opponent’s latest choice (namely, move 3, where she could choose between the left or right conjunct, see the particle rule) and open a new play which is identical to the first until that move, where she makes the other choice (requesting this time the right conjunct). The play then proceeds as usual. In this case, Proponent will ask for the constant c_2 at move 4, so Opponent will answer move 5 with Pc_2 , and Proponent will again be able to win the play at move 6. For a winning strategy, Proponent has to be able to win each and every play triggered by Opponent’s choices.¹² In the example, Opponent has no further choice, Proponent wins each play, he therefore has a winning strategy for $(\forall xPx \rightarrow (Pc_1 \wedge Pc_2))$.

Note that the strategy level in the dialogical framework is based on the play level, which is decidable. Even in first-order logic, where the strategy level is semi-decidable, the play level remains decidable because the plays are finite, they are humanly playable. The finiteness of the plays is an essential feature of propositions: propositions are defined as play-definite, they are what generates a play which ends after a finite number of moves following the game rules, one player winning, the other losing.¹³ This is another case illustrating how the strategy level is built upon the play level, and not the other way around. No metalogical property can be inferred from a player simply winning or losing a play; however, the fact that the play can be fully carried out to the end (whatever the outcome), is a proof that the thesis is meaningful and that the players understand its meaning.

C. Further developments: Immanent Reasoning

The dialogical stance takes meaning to be dynamically constituted, through the interaction between players, which is the core of the play level and on which the whole dialogical framework stands. In this fashion, meaning is embedded in a ‘game of giving and asking for reasons.’¹⁴ However, the standard dialogical framework presented above leaves most of these reasons implicit: the game rules outline these reasons and they can be grasped by reflecting on the plays carried out, but they are not explicitly built in the object-language. A recent development of the dialogical framework in the Lorenzen-Lorenz tradition expands the expressive power of the framework in order to fully explicit these reasons (Rahman et al., 2018). The dialogical variant produced is called ‘Immanent Reasoning’ as it stresses the key element of the dialogical stance, namely that reasoning and meaning are immanent to the dialogical activity.

Immanent Reasoning incorporates notation from Martin-Löf’s ‘Constructive Type Theory’ (1984) to explicit in the object-language the reasons players have for making their statements. These reasons can be of two types: either implicit, as in the standard framework presented above, and identified with an exclamation mark, or explicit. Explicit reasons are adduced to a proposition within a statement. In a statement $r : \phi$ made by a player, ϕ is the proposition and r is the explicit reason for stating that ϕ holds in a given context.¹⁵ These reasons are constitutive of meaning.

¹²For universal and existential quantification, as long as Opponent chooses a new constant each time she has the choice, we do not have to consider these as choices which open new plays.

¹³See Lorenz (2010, chap. 3; 2021, introduction and chap. 1) for the importance of the play level and the definition of propositions.

¹⁴See Brandom (1994, 2001) for ‘games of giving and asking for reasons’ and Marion (2010) for linking them to the dialogical framework. However, see Lorenz (2021, chap. 8) for a critical discussion.

¹⁵The reasons introduced are ‘local’ insofar as they depend on the context of utterance. They are to be contrasted with ‘strategic’ reasons, which correspond to the type-theoretical notion of proof-object. The local reasons can take many forms, allowing the development of a great variety of contexts in the dialogical framework.

To see how local reasons are constitutive of meaning, let us look at universal quantification. The Constructive Type Theory notation makes it possible to be much more precise, as the domain over which the variable ranges can be specified, and does not need to be a universal domain. In $(\forall x : A)B(x)$, x is an A , and B holds of all of the x , not in general, but all those that are A s. In this fashion, A and B can be considered as concepts which can be instantiated. As in the standard framework (section A), a universal statement is challenged by choosing an instance, but here, the challenger is committing to the fact that the instance is of a certain type, A , while the answer consists in stating that this very same instance is of type $B(x)$, whereby $B(x)$ is a dependent type defined over instances of type A (see Table 4).

<Table 4 here>

	Statement	Challenge	Answer
Universal quantification	X $(\forall x : A)B(x)$	Y $d : A$	X $e : B(d)$

Table 4: The particle rule for universal quantification in Immanent Reasoning

The structure of the particle rule can be justified through an additional set of particle rules, called ‘formation’ rules. Formation rules also govern the play level (they open ‘formation’ plays); they determine the various parts of a statement, the nature of these parts, and whether they are independent or dependent on other parts. For universal quantification, the formation rule specifies each part of the universal proposition (left and right): the left part is a set (or a proposition not dependent on another proposition), while the right part is a proposition which depends on the left part (see Table 5). This underlying formation rule for universal quantification explains the particle rule above, which enacts the choice of instance for the left part (chosen by the challenger) and the implementation of this choice in the right part by the answerer. It is the same instance because the right part of the quantification depends on the left part.

<Table 5 here>

	Statement	Challenge	Answer
Universal quantification (formation)	X $(\forall x : A)B(x) : \mathbf{prop}$	Y L_F^\forall	X $A : \mathbf{set/prop}$
		Y R_F^\forall	X $B(x) : \mathbf{prop} [x : A]$

Table 5: The formation particle rule for universal quantification in Immanent Reasoning

Arne Ranta’s Constructive Type Theoretical Grammar (CTTG) constitutes the foundation for the linguistic analysis of Immanent Reasoning. It might be useful to distinguish between this approach and cognitive approaches to linguistic practices, such as Construction Grammars (CxG). There are many links between the theories of CxG and CTTG: CxG’s theories take as basic units of language expressions encoding syntactic-semantic units in which slots occur and are filled in a contextually determined manner, which comes close to the way independent and dependent types are conceptualized in the CTTG framework. However, the standard presentations of CxG focus on empirical research without fully developing a formal system (Hilpert 2014); consequently, issues are left implicit, like linking variables by means of functions.¹⁶

Temporality in Immanent Reasoning

The introduction of ‘local reasons’ in Immanent Reasoning is a useful device for specifying meaning in various ways. They can for instance be contextualized in order to support temporal statements. Take a statement with a verb, like ‘Zayd laughs,’ $B(d)$, where d stands for ‘Zayd’ and B for ‘laughs.’ A local reason for this kind of temporal statement consists in actualizing the action type at a certain point in time. This requires a timing function, whose outcome is this temporalized statement. A temporal local reason thereby enriches a statement $B(d)$ with a monadic operator ‘@’ that contextualizes an action type, with elements t_i of the set of moments ‘ T ’ (for Time). We obtain $B(d)@t_i$, where $@t_i$ functions as an adverb of time: ‘Zayd laughs at (moment/period) t_i .’ The timing function τ associates performances of $B(d)$ with instants of time, such as $B(d)@t_i$. This means that temporal elements are not propositional connectives (as in Prior, 1957), nor

¹⁶ In CTTG, linking variables yield dependent types. Let us note that there more rigorous presentations of CxG such as Boas & Sag (2012), albeit linguists tend not to use them in empirical research.

arguments of a propositional function defined over time moments (as in Needham, 1981), which both tend to consider time as a substance, where moments are bearers of events, or events are properties of moments. Rather, Immanent Reasoning considers moments as ways of contextualizing the actualization of events and performances of action types at a certain time. Under this reading, $B(d)@t_i$ stands as an abbreviation for $(\exists x : B(d))\tau(x) =_T t_i$, ‘there is some actualization or performance x of d ’s B -ing which occurs at t_i .’¹⁷

Such an analysis provides the means of distinguishing between Recanati’s (2007) notions of temporal enrichment and of saturation. Within Construction Grammars (CxG), every unit has a slot to be saturated, so that the distinction between saturation and enrichment is difficult to explain in a rigorous manner (see Hilpert, 2014).¹⁸ In the context of Immanent Reasoning, saturation concerns propositional functions (or, more precisely, types dependent upon the type Time), whereas enrichment is about the possibility of temporalizing local reasons in the way just described. This treatment falls in line with the Aristotelian approach, for which time is not a substance, so that moments (as opposed to, say, individuals) are not bearers of events or of actions.

Conclusion

The dialogical stance on meaning in the Lorenzen-Lorenz tradition is dynamic, as it is based on interaction, and contextual, as meaning depends on the type of logic adopted. Dialogical pluralism shows how fruitful the framework is for studying and comparing many different logics. The interplay between the particle and the structural rules explicit the contextual and dynamic meaning.¹⁹ The level where interaction is carried out and meaning is established (the play level), is the fundamental level for the dialogical framework. It is from this level that strategies can be built, which determine whether a proposition is valid or proved.

The dialogical framework does not primarily study empirical dialogues, though the Immanent Reasoning variant provides the means for developing material logics, and the framework has proven effective in approaching logics and argumentation from various times and cultures.

According to the dialogical point of view, grasping the meaning of an expression or of an action amounts to identifying the rationale behind our verbal and behavioral practices. This knowledge is informed by the collective intelligence embodied within public criticism.

More generally, the dialogical stance on meaning counters the modern commonplace that pits history of philosophy against the formal analysis of logic and language; continental against analytic approaches. The dialogical framework teaches us that the emergence of conceptual thought, the constitution of knowledge and meaning across cultures and traditions are the result of a plural act of generosity towards the perspectives of the other.²⁰

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¹⁷ The abbreviated notation, $P@t$, was inspired by Blackburn’s hybrid logic (e.g. Blackburn, 2006), but whereas he makes the nominals modally or temporally index (or modify) the proposition, the dialogical approach makes it index the verifier of the proposition.

¹⁸ Some variants of CxG, such as Boas & Sag (2012, Chapter 3), use sigma types in the form of ‘records,’ which seem to be a variant of Ginzburg’s (2012) CTTG method with records: this method for enrichment implementation can indeed be applied to these CxG variants.

¹⁹ The particle rules provide ‘local’ meaning, while the structural rules provide ‘global’ meaning. An expression with the modal operator \Box can have a different meaning depending on whether the discussion is set in an ethical or deontic context, or rather in a metaphysical one. The specific meaning can be made explicit through the game rules (particle or structural).

²⁰ Rahman’s contribution to the present paper has been funded by the European Union in the context of the Synergy ERC project RevLog, <https://stl.univ-lille.fr/actualite/presentation-du-projet-revlogredux-leone-gazziero-shahid-rahman-joli-mois-de-leurope-2025>. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Council Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.”.

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