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Dynamic schematism and the cognitive semantics of language

For Wolfgang, who knows all this, with
admiration and affection

According to a tentative but practically viable cognitive line of thought that I will call a structural phenomenology¹, the human mind is a multi-consciousness² activity, a multiple-stage theatre, in the sense that when it is awake and working, it easily holds (accessible to consciousness) simultaneously a rich array of different ideations – scenarios, mental spaces, themes of thought, or whatever we wish to call them. These include a perceptual present-reality scenario and a parallel imaginary system, contrasting or supporting the former. The imaginary system can in its turn hold 'referential' scenarios – staging the things we are presently thinking about and mentally occupied by – and an interchangeable mass of memory-based views or 'presentations' of aspects of or analogies to these scenarios. The referential scenarios and their variable mental presentations offer us variable representations or versions of the topics we 'have in mind'.³ This amazing plastic plurality is even increased by structural nestings, through which such imaginarily enriched representations can again serve as referential or presentational 'inputs' in other parts of the imaginary system, or mesh with sensory percepts. In order for representations to be 'compressed' and nested, and then appear on the line with primary themes, such contents are, I claim,

¹ What I call structural phenomenology is a philosophical project aiming at exploring the regularities of experienceable meaning. The basic methodological claim of structural phenomenology in this sense is that experience is analysable; experiencers' verbal accounts are in principle reliable and, if critically assessed and structurally interpreted, give valuable access to such regularities of experienceable meanings. Both verbal accounts (of 'introspection') and experimental observations contribute to the elaboration of data making a systematic empirical study of human phenomenology possible.

² I import this view from Semir Zeki, who advanced the notion of 'micro-consciousnesses' in the different instances of perceptual integration.

³ The notion of representation is still not welcome in most current accounts of the cognitive mind, but I think this is mainly due to a philosophical inhibition.

stabilized by linguistic forms. Here is thus where language comes into the picture: when mental representations are actualized by something perceptual, they are echoed and backed up by linguistic representations. When something around us make us think, we attend to the same things at least twice, as it were, with and without language. We dispose through language of a set of cognitively meaningful syntactico-grammatical 'phrasing' structures, based on schematic templates built into the syntactic forms of the languages we are able to use expressively and mentally. The bodily exteriority of linguistic performance helps in itself to stabilize our thoughts – with or without other external triggering objects. Our imagistic representations are in these cases more or less automatically repeated and stabilized by these syntactico-grammatical forms.⁴ They support our focalised and maintained attention to our profiled thoughts, helping us to elaborate and share them through communication, and also to memorize them. Expressing and remembering mental contents are closely related endeavors. So in this view, language is the 'natural pedagogy' of the mind; it shows and 'teaches' us what it is we are thinking at specific moments, and helps us retain, consider, remember it, communicate it, learn from it, and first of all, helps us determine the degree and genre of reality (modality and domain) to associate with it.

This close relation between expression and memorization may be an important key to the understanding of human culture as such. We 'see', believe, and remember things expressed and received by others better than those that we just 'tell' ourselves. Shared ideas become more salient in our individual minds, and therefore make an important part of our personal recollections interpersonal and cultural. External symbolization – externalized by language or by objects that evoke language to us ('monuments' of all sorts) – gives rise to clearer recollections, and therefore to more salient thoughts and feelings, than pure internal imagination.⁵ Language significantly supports this method of 'clarification' and mental amplification.

⁴ This is of course why language can at all inform us about the structure of ongoing thought.

⁵ Cf. Merlin Donald's view of the origin of culture, Donald 2001.

It is characteristic of human language as such that it comprises two all-purpose 'syntaxes', one being a phonemico-syllabic lexicalizer, a phono-tax, and the other a grammatical phrase-and-sentence-maker, a semio-tax, if you allow such tactic terms. Accordingly, the two universal basic entities in human language are words and sentences. Just as a spoken or signed language has one rather uniformly structured lexicalizing phonology in this sense, it has one rather uniformly structured syntactic grammar.⁶ It is not the case that a language changes phonology and grammar according to what it is used for thinking or talking about; instead, it can apparently mold any conceptual topic in essentially the same phono- and semiotactic shapes of any other topic.⁷ Neither is it the case that a language expresses by the complexity of its structures the degree of intelligence of its individual user. It is easy to see that the phonotactic lexicalizer and the semiotactic grammar are discourse-independent and also mutually independent instances whose interaction with the cognitive mind and with each other is therefore variable. When they cooperate smoothly, as in average adult mother tongue speech, a morphology of flexions forms a rather stable bridge between words, phrases, and sentences. When they are in conflict, as in most non-native-language performances, the lexical filling of the grammatical structures gets 'sloppy' and morphologically 'incorrect', or the grammar that connects the chosen words gets sloppy, though the resulting expressions are often still surprisingly intelligible.

The fundamental grammatical syntax of a human language is a combinatory as firmly organized as that of its phonology. This syntax constitutes a regular, canonical process of saturation of a structural sentence frame, one which is also active in many forms of non-verbal gesturing.⁸ The structural frame in question seems in turn based on embodied motion patterns acquired by the infant and forming a procedural repertoire of thinking and uttering, from which

⁶ The phenomenon of pidginization shows that this double uniformization is only a general tendency and a *principle of optimality*, which can be opposed by other types of pressure, e.g. toward an optimization of oral on-line communication.

⁷ This is a feature of 'Cartesian grammar' in Chomsky's sense, but does not necessarily lead to Chomskyan technicalities. in the modelling of these 'syntaxes'.

⁸ Current research on deaf-blind children's communication appear to offer clear cases of such gesture-based or purely gestural - but not signing - 'talking-and-thinking' (Ask Larsen 2003).

language eventually derives its default constructions. The paradoxical and challenging fact about these procedural patterns, or schemas, is that they are structurally autonomous and isolated but still semantically compatible with most other things going on in the mind. They are interpretively active, oriented toward the total mass of imagery and occurring perceptions and representations of our conscious mind, and prepared to 'read them off' and interpret them. They make it possible for us to recall representations from long term memory, and even, when hearing or reading language, to 'build' representations out of nothing but verbal instructions and still to mentally 'see' them in the same way as everything else is mentally 'seen'. These schemas have meaning in themselves, in so far as they organize conflicts of forces and thus constitute dynamic forms, but this autonomous meaning paradoxically borrows figurative clothing from the less autonomous meaning stemming from perception, communication, memory or imagination, that they transcribe. We can say that they have an inherent and stable schematic meaning functionally integrated with representational meanings of all kinds. Whereas representations can be utterly diversified in many respects, as to degree of abstraction, complexity, semantic domain origin, enunciational value, etc., schemas is homogeneous and indifferent to what they are 'about' at all: therefore, as Descartes had seen, a human language can speak of anything and use the same formulae without distinction for the most divergent contents.

I am aware of the philosophical difficulty of the idea that there are two sorts of meaning, or two semantics, a schematic semantics and a representational semantics. The reader may need to think of or remember what it is like to read a difficult poem (or to write one). The schematic meaning of certain lexicalized syntactic parts, local constructions, may be perfectly clear and accessible to the reader (or the writer), whereas the whole, or the consistency of lines and sentences, as utterances, may remain opaque and obscure; the substantial construal of the global content may remain inaccessible. Constructions stay local, while construals integrate and globalize over utterances, texts and discourse in general.

The structural frame that determines grammatical processing and thus defines 'constructional semantics' can be studied as a stepwise architecture of processes of intra-sentential integration, a schematic 'logic' of complementation.

Complements are applied to primitives, and then to the complemented primitives, the applicative results⁹, which we will call nodes. A phrastic frame, or stemma, has a heading primitive term, a head, and a series of complements forming complement nodes, that eventually make up the saturated phrasal, clausal, and sentential whole we understand as a potential utterance. The phenomenology of 'school grammar' can be interpreted as a corpus of spontaneous reports on how this whole and its parts are experienced when occurring in prominent constructions of a language.

According to standard grammatical phenomenology and pedagogy, the core set of meaningful nodes of complementation of sentences in a given language – whereby it forms part of a general grammar – consists of applications whose schematic meaning includes such things as, roughly listed:

- Event or State (something being the case or happening)
- Agentivity and Act (some doing, and the doer)
- Predicativity (... endowed with some property)
- Transitivity (... reaching something in some way)
- Directionality (... aiming at or moving toward something),
- Projectivity (... coming from or bringing forth some instance)
- Locativity (... in some situation, place or space)
- Modality (... to some extent, in some mode or temporal frame)
- Connectivity (... leading to or stemming from something else)

Each of the nodes in this set¹⁰ corresponds to a (dynamic) schema in our mind. In order to study them one by one, we will have to find ways to model their particular meaning. But instead of theorizing these and related semantic node principles as simply competing schematic patterns, we need to acknowledge their systematic cooperation in a procedure of semantic nesting executed by the series of applicative operations. Initially there is, in my view, a grounding superordinate schema that makes nesting and integration possible, and which

⁹ The historical 'applicative grammar' was on the right track in this respect, I think. Cf. Brandt 1973, chapter 1.7.

assures the theatrical design of the result as a scenario. This superordinate framing scenario is (virtually) grammatically maximal, but it is a minimal unit of the narrative thinking-in-time that textual analysis encounters as a basic condition. Our problem is how to model this transitional instance linking sentence and text. (It can be conceived as a dynamic basic unit, a narrative dyneme.)

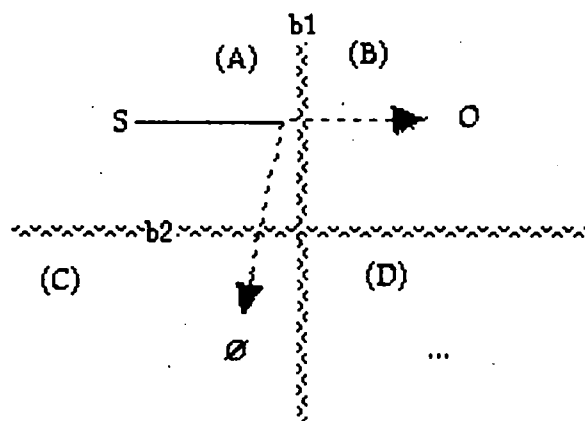
Let me sketch out a possible model of this 'dyneme' and a diagrammatic presentation of such a model. It contains prototypically an animated, intentional being, let us call it a Subject, and a topography, a situational surrounding of this Subject. The salient features of the physical surroundings are seen as more or less relevant (significant) in the light of the Subject's constitutive modalization: the Subject is staged as being attracted to some state of affairs, typically implying some salient Object, in such a way that a 'Subject-Object' binding determines a volitive orientation (wanting to act), and a rich set of other modal orientations (epistemic, deontic...).¹¹

In terms of forces and barriers, this dyneme is – according to the model suggested here – a situational schema in which a mobile, animated, and conscious entity S is situated in a section A of a space of crossing barriers, thus separated (disjoined) from an object of attention O located in section B of that space, and from a lethal danger in section C.¹² Fig. 1:

¹⁰ Noun phrases can be just as structurally rich as verb phrases (clauses), and can be shown to use almost the same semantic nodes. This is why nominalization of verb phrases occur so promptly.

¹¹ In the framework of human evolution, semio-syntax is seen as grounded in intentional imagination.

¹² Section D is inactive in this primary schema, but maybe active in narratives with an action path A-C-D-B, where D could be a 'trap': an agent makes S believe D is B and catches S in it as a cage. There is no elementary catastrophe offering 4 minima, so its dynamic modelling would imply a patchwork of simpler topologies. - If D is eliminated from the model, the barriers form a simple bifurcation: $b \rightarrow b_1 / b_2$. This may a preferable schematic representation.



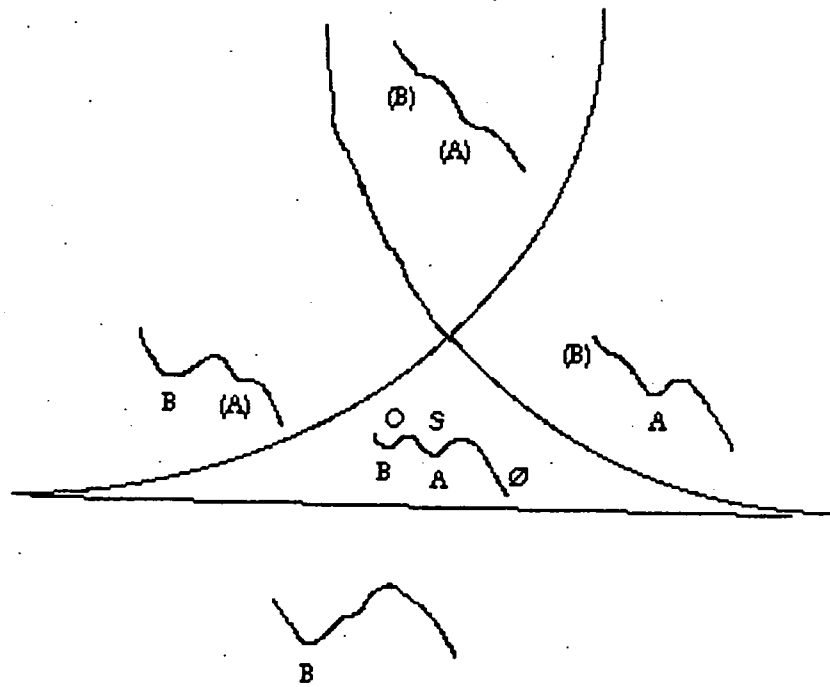
S "intends"¹³ to go from A to B and thus to access (be conjoined with) O, but is separated from B by the barrier b1, which it will have to overcome. If S fails to do so, it will either stay in the A state or be 'lured' into C by a lowering of the barrier b2; S would then face annihilation, death (Ø).

The dynamic structure of this dramatic topography¹⁴ is that of a Thomian swallow tail catastrophe (germ $x = y^5$), offering two minima (attractors) and an infinite descent, and two maxima (repellors, corresponding to our boundaries). The above can then be mapped onto the catastrophe topology by identifying the space sections with the attractors. Fig. 2:

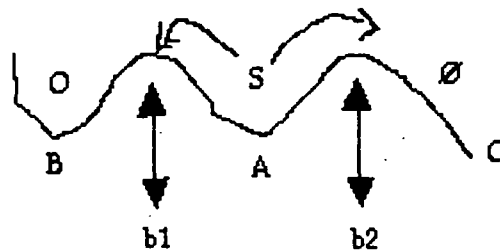
¹³ Intending presupposes animacy in the Subject; in the basic and archaic human cognition, such instances S – mobile actants subjected to the play of surrounding forces – are probably conceptualized as living beings, conscious animals, and entities rather like ourselves. Only lately have we learned to eliminate this animated feature and to think more 'scientifically'.

¹⁴ This analysis was first sketched out in my doctoral thesis (1987) 1992, "La charpente modale du sens".

Swallow tail catastrophe:

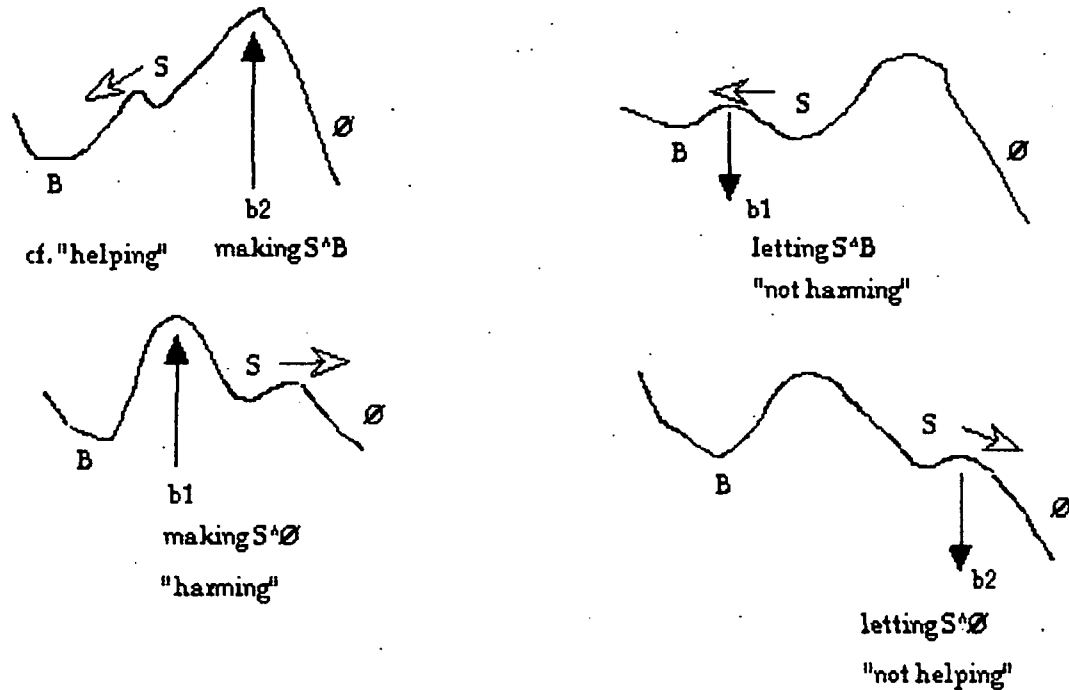


Central potential:



S and O are systems determined by the local attractors or states A and B; O is 'heavy' and stationary in B, whereas S is 'light' and mobile in A. An event will correspond to a change of place of S, the 'desired' S(A → B) or the 'undesired' S(A → C). Such a change can be brought about by an act, signed by S or some other agent, namely by 'letting' a change happen through suitably affecting the quantitative magnitude of the barriers b1 or b2. If some control variable lowers

b1, it in fact 'lets' S go from A to B; if it raises b2, it will thereby 'make' S go from A to B, namely by 'pushing'; and inversely: if it raises b1, S will be 'made' (pushed) to go to the dysphoric non-state C, and if instead it lowers b2, it will 'let' the same thing happen.¹⁵ Fig. 3:



In this view, an agent is a controller of a barrier, and in catastrophe terms, an external variable controlling a maximum adjacent to a minimum inhabited by the system acted upon. This system S must be 'nervous' enough to be able to overcome or 'stumble over' small barriers just by displaying an internal locomotor force; the relative size of the change of barrier force compared to the given 'nervosity' value of S determines the efficiency of the agent's 'doing'.

¹⁵ The 'letting' and the 'making' are prominent basic forms of causation that any force-dynamic analysis will encounter. Cf. Talmy 2000.

There is no univocal¹⁶ relation between the dynamic construction-semantic complement roles and the figurative construal-semantic factors of these dynamic forms, but my claim is that there is at least a significant relation between these roles and forms. Agents are very often abstract conceptual entities (b1, b2) with limited figurative presence. The stationary content O of B is likewise very often an abstract conceptual property or quality, so that S^X will correspond to a resultative and predicative idea ("S is X-ized", "S is [made] X", etc.). Most of what the adverbial part of sentence syntax adds to the situational core scenario refers to inter-scenario connections. E.g.: something happens 'because of' something else. In particular, an event in one scenario can change the control variables in another scenario and thus cause or make possible an event there. This extremely important cognitive fact – which underlies all 'logical' connections and representations in thought and language – is the main challenge to semantic analysis of all types, since it seems in itself irrepresentable! How can an internal variable in one scenario be an external variable in a different scenario? In other words, how do humans 'cognize' this strange relation and form imaginary¹⁷ representations of such interdeterminations? In other words, what does a phenomenology of natural logic look like?¹⁸

Let me finally offer a speculative contribution to the solving of this problem. If causal forces within a situational scenario are imagined as barriers (catastrophic maxima), then a significant raising or lowering of these barriers could be mentally seen as the agentive effect of levers operated outside the scenario in question. Such an imaginary lever could be staged as a pair of scales; the iterative filling of one scale would then suddenly give rise to the lifting of the other end of the balance, corresponding to changing the force of a barrier. A

¹⁶ One and the same dynamic event can be manifested figuratively in many ways – but not in completely arbitrary ways; *inversely, what we see or imagine is dynamically invested, but not necessarily in only one way.* The relation between figurativity and dynamics is what I call significant.

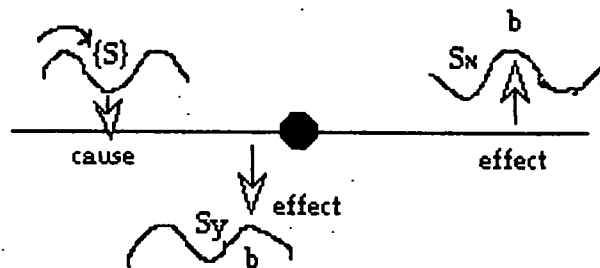
¹⁷ The first chapter of Wildgen 1999 offers a fascinating historical rhapsody of 'imaginal' attempts to account for natural logic.

¹⁸ A naive embodiment-inspired hypothesis is that humans conceptualize 'causing' or 'acting' in metaphorical terms of 'pushing', 'pulling', 'throwing', and the like. The basic 'effect' of such 'causing' would thus be kinetic: moving an object. It is more difficult to think of causation in terms of change-affecting-change, but it is more useful.

simple causal process would then start by an achievement $S^{\wedge}O$ in Scenario 1, and this event $E1(S^{\wedge}O)$ would affect a barrier in Scenario 2, so that an event $E2(S^{\wedge}O')$ would happen. In this sense, which might simulate the way in which our mind conceptualizes the connection, $E1$ would cause $E2$. This hypothesis could help us escape the difficult idea that persons are both seen as staged subjects S and as barriers ($b1, b2$) opposing subjects. If a cause is also embodied in a person, then it is the act (cf. $E1$) of that person that is cognized as somehow being that cause. The lever hypothesis would work as well in negative as in positive cases, since causing something not to happen (by raising $b1$ or lowering $b2$) and causing it to happen (by lowering $b1$ or raising $b2$) are equally instances of barrier change.

Fig. 4:

Lever causation:



Intentional causing – cf. "I did P because I wanted to achieve Q" – is a conceptual structure involving an imagined event $E(\text{non-}Q \rightarrow Q)$ and a simple causal belief that P could, may or must bring about E - through a levering connection to a P-scenario (where $\text{non-}P \rightarrow P$ is possible). Then the properly intentional goal $S^{\wedge}Q$ of the intentional subject S – the intending person in question – motivates an immediately feasible $S^{\wedge}R$ which levers the actualization of the cause ($\text{non-}P \rightarrow P$), so that P can realize the effect Q. This is at least how intentions are often phrased.

Here is an example of intentional causation as manifested by the conjunction because:

The British mountaineer George L. Mallory (1886 – 1924) was asked by the New York Times (1923) why he wanted to climb Mount Everest, and memorably answered: "Because it's there."¹⁹

There is a mountain unclimbed²⁰ non-Q calling for E(non-Q -> Q). Of course, Mount Everest does not address British gentlemen, but a mountaineer must feel that it does, in an 'as-if' mode that the journalist picks up as a significant litotes. Here, the climbing itself (P) is evidently an act of overcoming a difficult barrier in order to reach a locus; then, P causes E, in the sense that the mountain loses its apparently irresistible virginity – even if it is "there" as ever, the mountaineer can stay away from it, since P -> Q will have happened, and Q will already be achieved and 'consumed' (consumptus est!). Typically, P has multiple immediate prerequisites ({R}), and P itself (to 'climb' is bodily iterative) is a complex activity ({P}) which is only 'telic' (cf. to 'climb something'), goal-directed, if the intentional catastrophe E is included in its volitive programme.

Exactly the same dynamic structure is intended when we say that the tourist's interest in seeing X is that it leads to a significant Y = having seen X.

The general iconic turn of the cognitive sciences, guided by the idea that the human mind is not a symbolic machine but is rather an iconic machine, has ignored or neglected a detail that we now need to reconsider: any functional symbolism has both operators and arguments; $f(x,y)$ means that f elaborates through some operation a certain result or output, from the inputs x and y . So f 'forces' x with y to yield some result z . The problem with icons is that they do not imply any such operator and so do not yield any result. They let us 'see' some state of affairs, and that is about all there is to 'see'. It is obvious that the human mind represents things by mental icons, as well as it does so by external iconic signs; but it is much less obvious how any operative thinking can be based on this representational style alone. What I am suggesting here is that the opposition iconism/symbolism is less important theoretically than it is to seize the distinction between figurative and dynamic representations, whether iconic or

¹⁹ The Oxford Dictionary of Quotations, 1996.

²⁰ Don Juan could use the same ontological explanation for his desire of seducing women. He just wanted to demonstrate intentional causation.

symbolic. The 'icons' of the human mind must be dynamic, if they are to do the jobs of human thinking; they have to be able to operate on one another in order to create the new ideas we can have and experience having. The importance of a theory of dynamic schematism, a dynamic semiotics of cognition, is that of offering a technically accessible way to modelize this absolutely crucial operativity of the mental creations our ancestors called ideas.

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