

STUDI

Coping with informational atomism – one of Jerry Fodor’s legacies

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Abstract Fodor was passionately unwilling to compromise. Of his several commitments, I focus here on informational atomism. Fodor staunchly rejected semantic holism for two conspiring reasons. He took it to threaten his commitment to the nomic character of psychological explanation. He also took it to pave the way towards relativism, which he found deeply offensive. In this paper, I reconstruct the strands of Fodor’s commitment to the computational version of the representational theory of mind that led him to informational atomism. I take issue with three features of informational atomism. First, I argue that it deprives content from its expected causal role in psychological explanation. Secondly, I take issue with Fodor’s claim that only informational atomism can meet the requirements of the principle of compositionality. Finally, I argue that informational atomism yields a bloated or unwieldy category of nomic properties.

KEYWORDS: Informational Atomism; Representational Theory of Mind; Psychological Explanation; Principle of Compositionality; Jerry A. Fodor

Riassunto *Fare i conti con l’atomismo informazionale: uno dei lasciti di Jerry Fodor* – Fodor è stato fortemente maldisposto al compromesso. Tra le molte cose di cui si è occupato, intendo qui concentrarmi sull’atomismo informazionale. Fodor ha coerentemente rifiutato l’olismo semantico per due ragioni convergenti. Lo vedeva come minaccia per il suo impegno verso il carattere nomico della spiegazione psicologica e come porta aperta verso il relativismo, cosa che considerava profondamente minacciosa. In questo lavoro, intendo riprendere le fila dell’impegno di Fodor verso la versione computazionale della teoria rappresentazionale della mente che lo ha portato all’atomismo informazionale, chiarendo tuttavia che non sono d’accordo con tre aspetti dell’atomismo informazionale. In primo luogo, mostrerò come questo sottragga al contenuto il suo ruolo causale nella spiegazione psicologica. In secondo luogo, non sono d’accordo con l’affermazione di Fodor per cui solo l’atomismo informazionale possa soddisfare i requisiti del principio di composizionalità. Illustrerò infine come l’atomismo informazionale ceda il passo a un insieme di proprietà nomiche ampio o difficile da gestire.

PAROLE CHIAVE: Atomismo informazionale; Teoria rappresentazionale della mente; Spiegazione psicologica; Principio di composizionalità; Jerry A. Fodor

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I hate relativism. I think it affronts intellectual dignity. I am appalled that it is thought to be respectable. But, alas, neither my hating it nor its affronting intellectual dignity nor my being appalled that it is thought to be respectable shows that relativism is false. What's needed to show that it is false is to take away the arguments that purport to show that it is true. The argument par excellence that purports to show that relativism is true is holism. So this book is an attempt to take away holism. Hate me, hate my dog.

J.A. FODOR, *A theory of content and other essays*

Introduction

JERRY FODOR DIED ON NOVEMBER 29, 2017 at the age of 82. In addition to being one of the leading forces among the naturalistically inclined philosophers of mind and language of his time, he made major theoretical and empirical contributions to semantics and psycholinguistics. He was described by Noam Chomsky as «one of the founders of cognitive science» whose «computational-representational theory of mind has for years been the gold standard in the field». ¹ He also regularly wrote insightful and funny, sometimes abrasive, reviews of others' works. ²

Fodor's writings have unquestionably shaped the agenda of naturalistic philosophy of mind and language of the past forty years. The time has come to cope with Fodor's intricate legacy. Fodor's overarching metaphysical goal was to naturalize intentionality. Following his epoch-making book, *The language of thought*, ³ Fodor has persistently committed himself to the computational version of the representational theory of mind (CRTM). This commitment in turn flowed from his twofold conviction that (a) any naturalistic theory of mind must include an account of mental *processes* and that (b) the best prospect for a naturalistic account is to construe mental processes as ordered sequences of *mechanical* (i.e. *non-intentional*) operations that map mental symbols or representations as inputs onto new mental symbols or representations as output (on the model of the sequence of computations performed by a Tu-

ring machine). Over the years, Fodor has come to see that CRTM ought to be completed by an atomistic informational account of the contents of *primitive* (or undefinable) concepts.

In this paper, I have chosen to focus on one aspect of Fodor's legacy: informational atomism – a topic I addressed years ago. ⁴ In the first of four sections, I provide some background about some of Quine's legacy that Fodor has inherited and that is relevant for understanding why informational atomism became appealing to Fodor. Secondly, I spell out how informational semantics is supposed to fill a gap left wide open by CRTM. Next, I directly address the question why Fodor further endorsed an atomistic version of informational semantics? Finally, I argue that informational atomism faces at least three severe challenges.

1 Fodor's deep ambivalence towards Quine's legacy

There are basically two separable strands in Quine's legacy that are relevant to Fodor's project: Quine's famous ontological dilemma ⁵ and his even more famous attack on the positivist distinction between analytic and synthetic truths. ⁶ I will briefly address each in turn.

1.1 Dealing with Quine's ontological dilemma

Fodor's goal of naturalizing intentionality can only be understood against the background of Quine's famous ontological dilemma. Quine argued that one must choose between a materialist (or physicalist) ontology and intentional realism, i.e. a realist interpretation of what Brentano famously called "intentionality". ⁷ Unlike Brentano, Quine opted for materialism and rejected intentional realism. As a result, Quine dislodged the intentional idiom from the austere scheme of scientific notation whose *extensionality* is required for the purpose of «limning the true and ultimate structure of reality». ⁸ Although Fodor did not fully accept Quine's dilemma,

it made an appreciable impact upon his broad metaphysical outlook.

Fodor was primarily a philosopher of psychology and the cognitive sciences: his primary concern was to secure a respectable scientific status to psychological explanations. Quine's dilemma made Fodor acutely aware of the peculiar status of psychology and the cognitive sciences (a fortiori, the social sciences) in relation to the natural sciences. Unlike psychologists and other cognitive scientists, natural scientists (physicists, astronomers, cosmologists, chemists and biologists) do *not* explain phenomena by ascribing content (or intentionality) to the entities with which they deal.⁹ Quine concluded that the intentional idiom was unsuited for science. Fodor took it as a challenge to demonstrate that the notation of science must accommodate the *intensionality* (or referential opacity) of the intentional idiom. While Fodor's early work was deeply rooted in the philosophy of psychology, his later work increasingly shifted into controversial materialist metaphysics.

As a result of Quine's dilemma, Fodor and most materialists worried that by endowing a device's internal states with content, they, as Dan Dennett put it years ago, "take out a loan" of intentionality that they won't be able to pay back.¹⁰ As Fodor has put it, «if aboutness is real, it must be really something else»: intentionality is not one of the «ultimate and irreducible properties of things» that could be part of the catalogue compiled by the physicists.¹¹ Unless the gap between the intentional and the non-intentional can be filled – unless one can tell which of its non-semantic properties confers onto a belief state token (i.e. a brain state token) its semantic property –, one will be drawn to the view which Hartry Field has nicknamed "semanticalism",¹² i.e. the disreputable view that semantic facts are primitive or surd facts.¹³

However, unlike Quine and the materialist philosophers who, like him, rejected intentional realism, Fodor was dissatisfied with two features of Quine's resolution of his di-

lemma, both of which reflected Quine's own deep irresolution about materialism. Quine did not really choose between the eliminativist and the non-eliminativist version of materialism.¹⁴ For eliminative materialists, mental terms and concepts stand to neuroscientific terms and concepts in the same relation as "phlogiston" stood to "oxygen" in the history of chemistry. When the concept expressed by "oxygen" became available, chemists construed "phlogiston" as an empty term devoid of reference. In the minds of non-eliminative materialists, the identity between mental and physical states, events and processes is best interpreted on the model of physical and chemical identities, such as "Water = H₂O". The identity is taken to increase (not decrease) one's confidence in the existence of mental states, events and processes.¹⁵ Nor did Quine really choose between the behaviorist and the non-behaviorist version of materialism, in spite of the fact that Quine had first-hand knowledge of both Chomsky's linguistic work and its contribution to the demise of behaviorism in the cognitive sciences.¹⁶

Unlike Quine, Fodor took Chomsky's work in linguistics as foundational for cognitive science and rejected both the behaviorist and the eliminativist versions of materialism. He argued for a non-behaviorist and non-reductive version of token materialism compatible with functionalism.¹⁷ The net result of Fodor's dissatisfaction with Quine's irresolution about materialism was that he did not accept Quine's dilemma. Instead, he set himself the goal of naturalizing intentionality, i.e. to try and show that intentional realism is compatible with materialism after all. To see what is at issue, suppose that token materialism is true. If so, then an individual's mental state (e.g. belief) token is just one of the individual's brain state tokens. To naturalize intentionality is to show that the content of an agent's mental state can both have physical causes and physical effects. As it turns out, it is an open question whether a single notion of content can meet the two challenges.

1.2 The legacy of Quine's critique of the analytic/synthetic distinction

Apart from collaborative work on semantics (in the early 1960's) with Jerry Katz, who staunchly defended the analytic/synthetic distinction, Fodor has fully accepted the legacy of Quine's famous attack on the "two dogmas of empiricism". According to the first dogma, analytic truths include truths of logic and mathematics and they are true exclusively in virtue of the meanings of their constituent terms (or concepts). Quine's attack on the first dogma was two-pronged: it targeted synonymy and the conventionalist account of logical truth.¹⁸

In criticizing the first dogma of empiricism, Quine's primary concern was to cast doubt on the widespread view that there is a special class of non-logical "analytic" propositions, whose truth is supposed to depend merely on the meanings of the constituent expressions, at the expense of the way the world is. The content of an analytic proposition is taken to depend entirely on the contents of its constituent concepts, i.e. on the meanings of the words comprising the sentence whose utterance expresses the proposition in question, whatever way the world turns out to be. In his criticism of the first dogma, Quine argued that the best prospect for a definition of analyticity is likely to rest on a proper definition of *synonymy* (i.e. sameness of meaning).

The starting point of Quine's argument against analyticity is the division of analytic truths into logical and non-logical truths. Quine took for granted the existence of a "repertory of the logical particles" (or logical vocabulary) and defined a logical truth as true under all reinterpretations of its components other than the logical particles. On this basis, he questioned the positivist claim that a non-logical truth, such as (2), can be further defined as *analytic* on the grounds that it smoothly reduces to a logical truth, such as (1), by replacing one expression in (1) by a synonymous expression.

(1) No unmarried man is married.

(2) No bachelor is married.

In a nutshell, Quine pointed out that while the purported positivist definition of analyticity rests on the appeal to synonymy, there is so far no non-circular definition of synonymy that does not appeal to intuitions about analyticity.

Quine also attacked the *conventionalist* interpretation of logical truth, advocated by many positivists.¹⁹ Quine argued that it is one thing to select by an *explicit* convention a finite set of axioms from which to derive an infinite set of arithmetic or geometric theorems.²⁰ It is another thing to claim that a proposition (e.g. an axiom) is *made true* by an explicit convention. He demolished the latter claim by arguing that truth could only be assigned to a *finite* set of propositions by *explicit* conventions. As a result, logical laws would be required to derive the infinite set of arithmetical or geometrical truths from the finite set of propositions to which truth had been assigned by a set of explicit conventions. In short, the conventionalist account of logical truth begs the question: it presupposes logical truth.

According to the second "reductionist" dogma of empiricism, a synthetic (non-analytic) scientific proposition can provide reliable information about the world only if it can be confirmed (or disconfirmed) by an experimental or observational test. Against the second dogma, Quine appeals to confirmation holism earlier championed by Duhem. As Quine famously puts it on behalf of confirmation holism:

statements about the external world face the tribunal of sense experience not individually but only as a corporate body.²¹

In fact, Quine goes one step further than Duhem and argues that all statements, including logical laws, are fallible or revisable. Conversely, any statement can also be held

true «come what may», if we are willing to make appropriate adjustments elsewhere in the web of our beliefs. As Quine has insightfully observed, «the two dogmas are at root identical»: analytic statements can be viewed as a limiting case of statements that are «vacuously confirmed [...] come what may», i.e. as unrevisable.²² On Quine's holistic picture of confirmation, analytic truths can be seen to occupy the center of our web of beliefs together with mathematical truths and core scientific laws.

Fodor was deeply impressed by Quine's critique of both dogmas of empiricism. Starting with Quine's critique of the second dogma, Fodor took confirmation holism to be a constitutive feature of the abductive or inductive processes of ordinary belief fixation (which he also called "central thought processes").²³ In other words, his acceptance of confirmation holism placed severe limits on the scope of his thesis of "the modularity of mind," since Fodor took modularity to be a property of input systems, i.e. the periphery (not the center) of the mind.

As it will turn out in section 4 of this paper, Fodor fully accepted Quine's attack against analyticity and took it to support informational atomism. Fodor's informational atomism can be construed as a psychological version of Quine's thesis that there are no analytic truths. Fodor took Quine's argument against analyticity to show that there is no semantic connection between any pair of *concepts*. As Fodor put it on several occasions, even though it is a necessary chemical truth that water = H₂O, you can have the concept WATER without having the concept H₂O. Even though it is a necessary truth of arithmetic that two is a prime number, you can have the concept TWO and lack the concept PRIME. Whereas Fodor described his project as an attempt «to square intentional realism with Quine's being right about analytic/synthetic»,²⁴ a few years later, Fodor went so far as proposing that the truth of informational atomism could purport to *explain* «why Quine was right about there not being an analytic/synthetic distinction».²⁵

2 Fitting informational semantics within CRTM

The computational version of the representational theory of mind (CRTM) can be construed as a conjunction of five theses, the most fundamental of which I take to be the first one, i.e. the computational approach to mental processes:

- (i) Mental processes are computational processes (*computationalism*).
- (ii) Computational processes take mental symbols (or representations) as inputs and output (*representationalism*).
- (iii) The contents (or meanings) of complex symbols systematically depend on the contents of their constituents and syntactic rules of combination (*semantic compositionality*).
- (iv) Mental symbols are bearers of primitive or underived intentionality (*underived intentionality*).
- (v) Psychological explanation is both (a) nomic and (b) intentional, i.e. it subsumes psychological events under law-like generalizations that appeal to the contents of an agent's psychological states (*nomicity of psychological explanation*).²⁶

Fodor has repeatedly argued that no theory of the mind would be acceptable unless it made room for genuine mental *processes*.²⁷ Furthermore, several other of the defining assumptions of CRTM — in particular, the representationalist approach to mental states and psychological explanation (RTM) as encapsulated by assumption (ii) — can be seen to flow from assumption (i). As it turns out, what underlies Fodor's endorsement of CRTM is his deep commitment to a *mechanistic* picture of the mind, mental processes and psychological explanation, where the relevant notion of a mechanism is taken to mir-

ror the ordered sequence of operations performed by a Turing machine.²⁸

According to CRTM, the main job of psychology is to supply a causal explanation of an agent's intentional behavior by subsumption under psychological intentional laws. On this view, the causal explanation of an agent's intentional behavior is nomic: psychological laws are both intentional laws which refer to the contents of the agent's mental states and they are *ceteris paribus* causal laws. Whether intentional or not, what makes the laws of the special sciences (which by assumption are not fundamental laws of basic physics) *causal* laws, is that they hold in virtue of some underlying *mechanism*. (By contrast, the fundamental laws of basic physics do not hold in virtue of any underlying mechanism because there is none.)

On the computational version of RTM, the underlying causal mechanisms responsible for the implementation of intentional psychological laws are computational (i.e. formal) processes. In fact, in Fodor's own version of CRTM, the content of an agent's mental state reduces to the semantic property of a formula (or symbol) of the individual's *language of thought* (or *mentalese*). Mental formulae have both semantic and syntactic properties. Mental processes are formal processes: they detect only the syntactic properties of mental symbols, not their semantic properties. So although psychological laws refer to the contents of mental symbols, mental processes, which implement psychological laws, are purely computational.

Assumptions (i), (ii) and (v) of CRTM shed light on how content is expected to matter to psychological laws and thereby to contribute to psychological explanations. Assumption (iii) makes room for the *compositionality* of conceptual contents: the contents of primitive concepts (e.g. BLUE and COW)²⁹ must combine so as to form the contents of both complex concepts (e.g. BLUE COW) and propositional attitudes (e.g. Mara's belief that cows are blue or Mara's desire that cows be blue), of which they are constituents. Fi-

nally, according to assumption (iv), any time an agent entertains a token of some propositional attitude with the content that *p*, this agent is expected to stand in a relevant computational relation to a mental symbol (in her language of thought) that means *p*. Thus, by assumption (iv), CRTM is committed to the metaphysical, or at least the nomological, priority of the semantic properties of mental symbols over the semantic properties of an agent's propositional attitudes (and a fortiori over the semantic properties of the utterances used by a speaker to express her thoughts).

One crucial question left wide open by the five assumptions of CRTM is: what is the origin of the contents of primitive concepts (e.g. BLUE and COW), which, by assumption (iv), must be primitive symbols in the language of thought? For the last thirty years of his life, Fodor's persistent answer has been: *informational atomism*, i.e. a sharply restricted version of informational semantics. To understand why Fodor has willingly trapped himself in what he has described as "the wall of this cage",³⁰ it is important to mention first the reasons why he endorsed informational semantics at all and secondly to see how concept atomism results from his acceptance of two controversial conditions of adequacy on a naturalistic approach to content.

For thirty years, Fodor has advocated a pure informational semantic approach to the naturalization of the contents of primitive concepts, to a large extent because he has vehemently objected to any teleosemantic appeal to biological evolutionary *functions*.³¹ According to Dretske's³² seminal treatment of informational semantics, the *informational mind-world* relation is the converse of a *nomological world-mind* relation. A token of a mental signal (symbol or vehicle) *S* (e.g. DOG in the language of thought) carries information about instances of property *F* (e.g. instances of doghood) if and only if tokens of *S* are nomically dependent on instantiations of *F*, i.e. if it is a natural law that instantiations of *F* (doghood) cause tokenings of *S* (DOG).

Thus, informational semantics faces the

notorious problem of *misrepresentation*, also called the *disjunction* problem or the problem of *imperfect correlations*.³³ If the fact that the concept HORSE means the property of *being a horse* is taken to be *constituted* by a nomic connection between the property of horses of *being horses* and their property of *causing tokenings of HORSE*, then how could any token of HORSE ever misrepresent something that is not a horse as a horse? As a matter of fact, perception being fallible, my HORSE concept stands in actual correlations not only with horses (instances of the property of *being a horse*), but also with donkeys (instances of the property of *being a donkey*) seen at a distance or in poor lighting conditions. In short, tokens of my HORSE concept are more reliably correlated with instances of *either* the property of being a horse *or* the property of being a donkey than with instances of being a horse. However, any token of my HORSE concept triggered by a donkey should count as a misrepresentation of a donkey as a horse, not a veridical representation of a donkey as a donkey.

To solve the disjunction problem, following Millikan,³⁴ many philosophers, including Dretske,³⁵ Neander,³⁶ have appealed to the biological teleological function of the mechanism producing beliefs about e.g. horses.³⁷ Not Fodor. Fodor³⁸ instead has appealed to what he calls the “Asymmetrical Nomic Dependency Condition,” which stipulates that the correlations between tokenings of HORSE and instances of the property of being a donkey asymmetrically depend on the correlations between tokenings of HORSE and instances of the property of being a horse. This is a *higher-order* asymmetrical nomic dependency between pairs (or among n-tuples) of *lower-order* nomic correlations or dependencies. In other words, *donkeys* would not nomically cause tokens of my HORSE concept, unless *horses* had nomically caused other tokens of my HORSE concept, *and the converse does not hold*. Another way to put the Asymmetrical Nomic Dependency Condition is to say that non-veridical tokenings of a concept depend on its veridical tokenings,

and not vice-versa.

When seen in this light, it becomes, I think, an open question whether Fodor’s asymmetrical higher-order nomic dependency condition between lower-order world-mind nomic dependencies does not beg the question against basic naturalistic constraints on intentionality, by presupposing the availability of the *semantic* distinction between veridical and non-veridical tokenings of a concept. In short, it is an open question whether Fodor can reject the teleosemantic appeal to biological functions without begging the question against naturalism.³⁹

3 Why informational atomism?

Fodor’s aversion towards teleosemantics explains why he endorsed *informational* semantics. But why did he further endorse an *atomistic* version of informational semantics? Fodor’s atomistic account of concept possession is a version of what Loewer & Rey have called pure *locking* theory:⁴⁰ to possess a concept (e.g. ELM) is to have one’s brain *locked onto* the property (e.g. *elmhood* or *being an elm*) represented or expressed by the relevant concept. According to pure locking theory, one’s possession of the concept ELM nomically depends on instantiations of elmhood, and nothing else. The contents of other concepts such as TREE, LEAVE, ROOT, PLANT and/or BEECH cannot make any contribution to the content of ELM.

To understand why Fodor has willingly trapped himself in “the wall of this cage,” it is crucial to further understand two of his converging motivations, the first of which is his deep *holophobia*, as Elisabeth Pacherie has called it.⁴¹ Fodor’s second motivation flows from his aversion towards concept *pragmatism*, part of which reflects his deep commitment to a *mechanical* picture of mind, mental processes and psychological explanation, and part of which reflects his deep conviction that *semantics* is not part of *epistemology*.

What Fodor calls *semantic holism* is the view that the content of *any* of an agent’s psychological state depends on its inferential

relations to *all* her other psychological states. Fodor has argued that, on the plausible assumption that no two individuals are likely to share *all* the same psychological states at any single time (nor is a single individual likely to share all the same psychological states at different times), the truth of semantic holism is an unbearable threat to the *nomicity* of psychological explanation. As Fodor put it,

at the limit of holism, two minds share any of their intentional states only if they share all of them. And since, of course, no two minds ever do share all of their intentional states [...] the putative generalizations of intentional psychology fail, de facto, to generalize.⁴²

By assumption (v) of CRTM, psychological explanation is both nomic and intentional: it is supposed to subsume psychological events under law-like intentional generalizations, which appeal to the contents of an agent's psychological states. But if semantic holism is true, then no pair (let alone n-tuple) of individuals is likely to share different tokens of one and the same belief type. This is supposed to show that the truth of semantic holism is incompatible with there being intentional psychological laws subsuming the intentional behaviors of different individuals in virtue of the contents of their mental states. Since Fodor further takes it that the only alternative to semantic holism is semantic atomism, he is therefore led to endorse semantic atomism by his desire to protect the *nomicity* of psychological explanation. Fodor's passionate rejection of semantic holism was further reinforced by his conviction that it also paves the way towards relativism, which he *hated*.⁴³

In some of his earlier intentional realist hyperbolic diatribes against eliminative materialism, Fodor described the putative "collapse" of folk psychology respectively as «the greatest intellectual catastrophe in the history of our species»⁴⁴ and as «the end of the world».⁴⁵ In much of his later work, he has

persistently waged a war against a view of concept possession which he called *concept-pragmatism*, according to which to have a concept is to have some *epistemic capacities*, and which he described as «the defining catastrophe of analytic philosophy of language and philosophy of mind in the last half of the twentieth century».⁴⁶

There are two major reasons why Fodor strenuously rejects the concept pragmatist account of concept possession as epistemic capacities (or dispositions). The first is that it is inconsistent with his commitment to a *mechanical* picture of mind, mental processes and psychological explanation. If concepts were dispositions, then the tokening of a concept could not have causal powers. While fragility is a disposition of a glass, it is not a direct cause of anything. Only events can be causes: what caused the breaking of the glass was an event, not a disposition of the glass. Similarly, an agent's disposition to behave is not a cause of the agent's behavior. An agent can be disposed to act or behave and do nothing. Only a mental event can be a cause of the agent's behavior, on Fodor's mechanical picture of mental processes. What the mechanical picture requires is that tokens of a concept type be construed as mental particulars or events with causal powers. The reason why tokens of a concept type must have causal powers, is that tokens of a concept type are *semantic constituents* of tokens of types of an agent's propositional attitudes. And tokens of a type of an agent's propositional attitudes can be causes of the agent's intentional behavior.

Secondly, Fodor has raised a strong objection against the view that an agent's epistemic dispositions or capacities, such as the capacity to discriminate instances of a concept, could *exhaustively* amount to concept possession.⁴⁷ Consider the case of a pair of distinct, though necessarily coextensional, concepts such as TRIANGULAR and TRILATERAL. Any triangle is necessarily a trilateral object. Consider the task of sorting out and assembling all the triangles into one pile from e.g. all the

rectangles to be assembled into another pile. Since all the triangles in one pile are also necessarily trilateral objects, sorting all the triangles from all the rectangles will result in sorting all the trilateral objects from all the rectangles. Nonetheless sorting out triangles from rectangles is a different cognitive activity from sorting trilateral objects from rectangular ones.

So the questions arise: what difference in an agent's epistemic capacities could distinguish her mental activity of sorting triangles from the mental activity of sorting trilateral objects? What could distinguish one mental activity from the other in light of the sameness of the assembled pile?⁴⁸ Fodor's conclusion is that short of appealing to the distinction between *thinking* of triangles (or having TRIANGLE) and *thinking* of trilateral objects (or having TRILATERAL), one would be unable to distinguish the two sorting activities, whose outputs are extensionally indistinguishable. (Exactly the same conclusion extends to the capacity to draw inferences).

Just as Fodor takes the alternative between semantic holism and semantic atomism to be exhaustive, he takes the alternative between informational atomism and concept pragmatism to be exhaustive. So he endorses concept atomism as an alternative to concept pragmatism.

There are two sides to Fodor's claim that semantics is not part of epistemology or that it is a mistake to derive semantic conclusions from epistemological premises. First, I will consider an exegetical question: Fodor has persistently called his informational atomistic account of primitive concepts *Cartesian*.⁴⁹ Why? The answer cannot be that Turing's model of thinking as a mechanical process fits Cartesian ontological dualism. After all, Descartes argued for ontological dualism, precisely because he espoused a strictly mechanistic account of the behavior of physical things or events (based in particular on the prohibition of causal interactions at a distance) and he rejected a mechanistic account of thought.

The answer rather lies in Fodor's diagnosis about the underlying motivation of concept *pragmatism* – «perhaps the worst idea that philosophy ever had».⁵⁰ According to Fodor, concept pragmatism is best seen as an alternative to the Cartesian introduction of the *veil-of-ideas* (i.e. the veil-of-mental representations) between the world and the mind, whose upshot in turn is taken to make knowledge of the world prey to skeptical doubts.⁵¹ As Rorty has famously expressed the pragmatist worry, «the Cartesian mind simultaneously made possible veil-of-ideas skepticism and a discipline devoted to circumventing such skepticism».⁵² As Putnam has further expressed this pragmatist worry, what is *disastrous* is «the idea that there has to be an interface between our cognitive powers and the external world».⁵³ The suggestion is that pragmatists feel the irresistible urge to reject the Cartesian veil-of-ideas because they think that accepting it would deprive them of the capacity to rebut skeptical doubts about knowledge of the “external” world. And they take the refutation of skepticism to be one of their fundamental epistemological tasks.

Fodor's response is to reject the subordination of semantics to epistemology: it is a deep mistake to derive semantic conclusions from epistemological premises. For example, it is a mistake to dissolve the mind/world interface and reject a correspondence theory of truth for the sake of refuting skepticism about knowledge of the external world. Similarly, it is a mistake to switch from thinking «of thinking as being *about* the world» to thinking «of thinking as being *in* the world».⁵⁴ On Fodor's view, it is sheer epistemological hybris (i.e. a cognitive illusion) to believe that by relinquishing the Cartesian veil-of-ideas, pragmatists will be able to rebut skepticism about knowledge about the external world. In short, Fodor heralds his own informational atomistic account of concept possession as a commitment to the Cartesian veil-of-ideas in order both to keep semantics at a distance from epistemology and to highlight

his own skepticism about the pragmatist prescription for exorcising the threat of skepticism about knowledge of the external world.

Fodor's insightful epistemological treatment of so-called *deferential* concepts sheds light on the second facet of his claim that semantics is no part of epistemology. On the face of it, deferential concepts are concepts expressed by words (e.g. "elm" or "arthritis"), whose meanings an ordinary naïve speaker partially understands and about whose extension she can have false beliefs. Many influential philosophers have argued that what enables such naïve ordinary speakers to competently use words whose meanings they partially understand is that they are members of a social linguistic community including experts who have a more accurate understanding of the meanings of these words.⁵⁵ In short, deferential concepts have widely been taken to be paradigm cases in favor of *social externalism*, i.e. the view that what others (e.g. experts) think is constitutive of the contents of many of an individual's thoughts.

By endorsing informational semantics, Fodor of course endorses a strongly *externalist* view of the contents of concepts and mental states, but it is a *non-social* version of externalism. In fact, Fodor proposes to resist the standard argument for social externalism. Typical social externalist accounts of deferential concepts argue for the claim that an individual's concept of e.g. an elm (or ELM concept) is constituted by what botanists in his or her community think and say about elms on the basis of two premises: (i) all English speakers possess the concept expressed by the English word "elm" and (ii) whether or not a naïve English speakers who are not a botanists can't tell an elm from a beech or not. Fodor proposes to reject the social externalist conclusion by casting doubt on the second premise: it is not true that a naïve speaker who is not a botanist and lives in a community including botanists cannot tell an elm from a beech. If she wants to tell an elm from a beech all she has to do is: ask a botanist. As Fodor characteristically put it:

what philosophers call "linguistic deference" is actually the use of experts as instruments; not Marxist division of labor in semantics, but capitalist exploitation in epistemology.⁵⁶

According to informational semantics, what is constitutive of an agent's ELM concept is the nomological dependency between the agent's brain and instances of elmhood. According to Fodor, it is a mistake to draw semantic conclusions from epistemological premises: the social externalist conclusion rests on an *epistemological* fallacy, more precisely a *verificationist* fallacy. Botanists' thoughts about elms do not constitute the meaning of the English word "elm" any more than telescopes constitute the meaning of the English word "star". Telescopes contribute to securing the reliability of the covariation between tokenings of individuals' thoughts about stars and instantiations of *starhood*. Telescopes help confirm or disconfirm the truth of thoughts about stars; they don't constitute the meaning of "star". Botanists' thoughts about elms contribute to securing the reliability of the covariation between tokenings of non-botanists' thoughts about elms and instantiations of elmhood; they don't constitute the content of the concept expressed by the word "elm".

■ 4 Three challenges for informational atomism

In this section, I will highlight three challenges for informational atomism. First, I will argue that it does not seem able to satisfy assumption (5) according to which the contents of an agent's propositional attitudes ought to be responsive to the demands of psychological explanation, i.e., that the content of an agent's belief may contribute to producing its effect in virtue of its content. I will then call into question Fodor's argument against concept pragmatism based on compositionality and finally his informational atomistic account of intuitions about analyticity.

4.1 Modes of presentation cannot be Fregean senses

Ever since Fodor endorsed informational atomism,⁵⁷ he has given up his earlier content dualist response to Putnam's famous thought experiment, whereby my beliefs about water (or H₂O) on Earth and my Putnamian twin's belief about twater (or XYZ) on Twin-Earth have different *broad* contents and the same *narrow* content.

This move amounts to giving up the Fregean assumption that two tokens of mentalese can have the same *reference* and different *senses*. Fodor may still distinguish two coreferential (a fortiori two necessarily coreferential) concepts (e.g. WATER and H₂O) in virtue of the syntactic (non-semantic) differences between two modes of presentation (or mentalese symbols) of one and the same substance. For example, one may have the concept WATER, but not the concept H₂O if one lacks the constituent concepts H and 2. WATER and H₂O are distinct *vehicles* with the same content. As Fodor has put it, WATER and DOG have different contents (which reflect the difference between the properties *being water* and *being a dog*);⁵⁸ WATER and H₂O have the same content and yet both concepts present the same property under different modes of presentation.⁵⁹ But if two necessarily coreferential concepts share the same content and have different modes of presentation, then modes of presentation themselves cannot be senses: they are pure *syntactic* objects without a semantic role. By embracing semantic (or conceptual) atomism, Fodor is driven towards one of two undesirable consequences or both. Either he must give up the constraint according to which content must be responsive to psychological explanation, in accordance with assumption (v) of CRTM; or he must espouse an implausible view of so-called Fregean cases; or both.

Consider a typical so-called Fregean case, i.e., the case of an agent (e.g. Oedipus), who has two distinct propositional attitudes about one and the same object (e.g. a mug). Suppose that Oedipus believes that the mug con-

tains water. That is why he drinks water from it. But he does not believe that the mug contains H₂O (arguably because he lacks the H₂O concept). Although Oedipus's belief that the mug contains water has exactly the same content (or truth-conditions) as the belief that the mug contains H₂O, the two belief states are different from each other because one could have the former, not the latter, without having the concept H₂O. But if the difference between two belief states with exactly the same content arises from a non-semantic difference, then Fodor's own approach to the role of content in psychological explanation becomes hardly distinguishable from Stich's purely *syntactic* theory: content becomes entirely irrelevant to psychological explanation.⁶⁰

Alternatively, Fodor has unexpectedly argued that Frege cases are *exceptions* to psychological laws. In fact, Fodor has committed himself to the astonishingly strong claim that

any intentional psychology [...] has to take for granted that identicals are generally de facto intersubstitutable in belief/desire contexts for those beliefs and desires that one acts on.⁶¹

In effect, this claim amounts to the denial of the *opacity* (or aspectuality) of the beliefs and desires on which an agent acts. Fodor cannot be right when he assumes, as he does, that belief-desire psychology is «committed to treating Frege cases as aberrations», i.e. as instances of irrationality. Not knowing an identity is just lacking a piece of knowledge; it is not the same as being irrational. In fact, the assumption that an agent can be rational and yet ignore an identity is built into Frege's argument for the distinction between sense and reference.⁶²

4.2 Does compositionality rule out concept pragmatism?

One of Fodor's weapons in his war against concept pragmatism is his argument against

the existence of so-called recognitional concepts, based on the principle of compositionality. Regarding conceptual compositionality, Fodor assumes – and I assume that it is common ground – both that conceptual content is, as he calls it, productive and systematic and that the explanation of the productivity and systematicity of conceptual content derives from the compositionality of primitive (or undefinable) concepts. According to Fodor’s definition, a recognitional concept is a concept whose possession requires the ability to recognize its instances. In fact, recognition is merely one among a number of potential epistemic properties of concepts. Color concepts, e.g. RED, are paradigmatic instances of recognitional concepts. Fodor sets up an argument for the claim that there are no recognitional concepts based on two premises. The conclusion purports to be broad enough so as to encompass the claim that no *epistemic* property can be a constitutive property of concept-possession.

First premise: concepts are compositional, i.e., a complex concept (or “host”) derives its content (or semantic value) from the contents (or semantic values) of its constituents.

Second premise: recognitional capacities (or epistemic properties in general) are not compositional.

I will grant Fodor his second premise. As Fodor points out, there are many reasons why recognitional capacities might not compose: you might be an expert at recognizing pets and at recognizing fish. And still you might be poor at recognizing instances of pet fish. Alternatively, the conditions for recognizing instances of one constituent might be inappropriate for recognizing instances of the other constituent. For example, consider Fodor’s fanciful example of the Night-Flying Bluebird,⁶³ namely a blue bird that sings after dark: the favorable conditions for recognizing instances of one constituent are never favorable

for recognizing instances of the other and vice-versa. Fodor’s conclusion is that no concept can be recognitional or that no epistemic property can be constitutive of any concept.

The question is: given the second premise (which I accept), which version of the compositionality principle could rule out of existence (primitive) recognitional concepts? As several philosophers have pointed out,⁶⁴ according to the *standard* (or simple) version of the principle of compositionality, the semantic value of a complex or host concept must be a function of the semantic values of its constituents. If one accepts a Fregean view of content, then the principle of compositionality will apply at two distinct levels of content: the sense of a complex concept (or expression) is a function of the senses of its constituents and the reference of the complex concept is a function of the references of its constituents.

Suppose it is a possession-condition on the constituent concept BLUE that one be able to recognize instances of blue things. On the standard version of the compositionality principle, one could not have the complex (or host) concept BLUE DOG unless one could recognize instances of blue things. In order to form the complex concept BLUE DOG in accordance with the standard version of the principle of compositionality, what is required is the capacity to put together the constituent concepts BLUE and DOG. Whatever is part of the possession conditions for the constituent concept BLUE must be satisfied if one is to have the concept BLUE. If one did not possess the concept BLUE, then one could not combine it with some other concept (e.g. DOG). But what the simple compositionality principle requires is merely that the semantic value of the BLUE be combined (or composed) with the semantic value of the concept DOG. The simple principle of compositionality does not also require that one possess a *complex recognitional capacity*, which is itself a joint product of the separate recognitional capacities required for having the constituent concepts.

But Fodor does *not* merely accept the *standard* version of the compositionality principle according to which a complex concept inherits its semantic value from the combination of the semantic values of its constituents via some syntactic rule of combination. Fodor explicitly endorses a much stronger *biconditional* version of the principle of compositionality according to which nothing can be a property of a complex (or host) concept unless it is also a property of its constituents *and vice-versa*. As he puts it in one among many places:

the connection that compositionality imposes on the relations between the possession conditions of constituent concepts and the possession conditions of their hosts goes *in both directions* [my emphasis]. That is compositionality requires not just that having the constituent concepts is sufficient for having a host concept, but also (and even more obviously) that having the host concept is sufficient for having its constituents. Or to put it slightly differently, compositionality requires that host concepts receive their semantic properties from their constituents, and also that their constituent concepts transmit all of their semantic properties to their hosts.⁶⁵

In other words, nothing can be a property of some constituent concept unless it is also a property of the host (or complex) concept of which it is a constituent. Nothing could be a possession condition of a constituent concept unless it is a possession condition of the host (or complex) concept of which it is a constituent. Notice that Fodor's formulation of the biconditional version of the principle of compositionality oscillates between talk of "possession conditions on concepts" and talk of "semantic properties". Surely, however, Fodor does not intend that the property of a complex (or host) concept of *being complex* be also a property of its *non-complex* constituents. But on the biconditional version of compositionality, the property of a complex concept of

being complex should also be a property of its non-complex constituents. By contrast, the standard version of the principle of compositionality merely requires that the semantic value of a host concept be a function of the semantic values of the constituent concepts. Whatever the possession conditions of BLUE, what BLUE contributes to its host is its semantic value, namely the property of being blue. BLUE is not expected to contribute its constituent recognitional possession conditions to the complex recognitional possession conditions of the complex concept (BLUE DOG) of which it is a constituent.

Fodor uses the strong *biconditional* version of the principle of compositionality to argue that if the constituent concept BLUE has possession conditions ABC and if possession-conditions do not compose, then it is possible that the possession conditions of the complex concept BLUE DOG be ABEFG do not result from the composition of the possession-conditions of the constituent concept ABC. If so, then one could have the complex concept BLUE DOG and lack its constituent concept BLUE, whose possession-conditions are ABC. But in fact, in accordance with the simple version of the principle of compositionality, one could not have the concept BLUE DOG unless one had the constituent concept BLUE. If the possession-conditions for the concept BLUE include ABC, then it follows, from the simple version of the principle of compositionality, that one could not have the concept BLUE DOG unless one satisfied conditions ABC.

To see why Fodor's *biconditional* version of the principle of compositionality is unacceptably strong, I now want to suggest (following Horwich)⁶⁶ that it could equally be turned against his own version of informational semantics. According to pure informational semantics, one could not possess the concept DOG unless states of one's brain were nomically locked onto the property *doghood*. But consider the part of the biconditional version of the principle of compositionality according to which nothing can be a possession condition of a constituent concept unless it is

also a possession condition of the *host* (or complex) concept of which it is a constituent. Clearly, no state of any creature has actually been locked onto particular *blue dogs* (I mean dogs with non-painted blue hairs).

Locking onto a property is, therefore, not a compositional property of concepts. If the constituent concept DOG has possession conditions ABC (locking onto *doghood*) and if possession-conditions do not compose, then it becomes possible that the possession conditions of the complex concept BLUE DOG be ABEFG. If so, then one could have the complex concept BLUE DOG and lack its constituent concept DOG, whose possession conditions are ABC (locking onto *doghood*). So no concept has pure informational possession-conditions, not even DOG. I suppose that this is a *reductio* of the argument based on the strong biconditional version of the compositionality principle.⁶⁷

4.3 Dealing with intuitions about analyticity

To a large extent, Fodor's endorsement of informational semantics as a basis for naturalizing intentionality reflects his mistrust (if not his aversion) of teleosemantics. His endorsement of an atomistic version of informational semantics reflects two of Fodor's further commitments. On the one hand, Fodor vehemently rejects semantic (or meaning) holism, which he sees as a radical threat for the nomicity of psychological intentional laws and thus of psychological explanations. On the other hand, Fodor has persistently expressed his endorsement of both confirmation holism and Quine's attack on analyticity. It is revealing that Fodor has vehemently denied that the Duhem-Quine thesis about confirmation holism (which he fully accepts) entails semantic holism (which he strongly rejects). As Fodor succinctly put it, «Quine isn't a meaning *holist*; he's a meaning *nihilist*».⁶⁸ In fact, informational atomism can be construed as a psychological version of Quine's rejection of analyticity. Fodor, however, was dissatisfied with one feature of

Quine's criticism of analyticity, namely that it confounded alleged analytic truths with deep scientific laws, all of which were located at the *center* of our web of beliefs.

In much of his important book on *Concepts*, Fodor sets himself two complementary challenges. First, he argues that far from being merely consistent with Quine's rejection of analyticity, the truth of informational atomism offers the prospect of *explaining* why the latter is true. The second challenge is to provide an informational atomistic account of basic *intuitions* about analyticity consistent with Quine's critique.

The core of Fodor's purported informational atomistic explanation of Quine's rejection of analyticity rests on two assumptions, the first of which is the following version of informational atomism. The fact that the concept DOG means the property *dog* can be said to be constituted by a nomic correlation between two properties of individual dogs themselves: dogs are instances of the property of *being a dog* and they are also instances of the property of *being regular causes of actual and possible DOG tokenings in human brains*. Fodor's second informational semantic assumption is the dissociation between conceptual or semantic and metaphysical necessity. Informational atomism precludes that possession of the concept ANIMAL is a necessary semantic condition for possessing the concept DOG. However, informational atomism is consistent with the fact that instances of the property of *being a dog* should also be instances of the property of *being an animal*, in virtue of some zoological or even metaphysical nomic relation between properties. Thus, on the assumption that informational atomism is true, possession of the concept DOG is secured by the fact that dogs are instances of a pair of properties.

In short, what generates the illusion of there being some analytic connection between the pair of concepts DOG and ANIMAL is the confusion between semantic and zoological (or metaphysical) necessity. One deep question is the scope and limits of the dissociation

between semantic and other necessities.

Furthermore, Fodor also argues that informational atomism can account for our *intuitions* about the analyticity of e.g. “all bachelors are unmarried men” without acknowledging a semantic relation between the pair of concepts BACHELOR and UNMARRIED MAN.⁶⁹ Fodor’s starting point is some early work by Putnam, in which Putnam agreed with much of Quine’s critique of the two dogmas of empiricism. In particular, Putnam agreed with Quine that the concept of analyticity cannot “do any of the heavy duty epistemological work or metaphysical work” (about e.g. a priori knowledge and necessary truths) that the positivists thought it could (as Fodor puts it).⁷⁰ But Putnam also argued against Quine that “all bachelors are unmarried men” nonetheless expresses an analytic truth. Putnam proposed in particular to account for the analyticity of “all bachelors are unmarried men” by turning the semantic relation between the concepts BACHELOR and UNMARRIED MAN into a monadic property of the concept BACHELOR, namely the property of being a *one-criterion concept*.⁷¹ To say that BACHELOR is a one-criterion concept is to say that there is one and only one way of telling whether an individual male is a bachelor, namely by checking whether he falls under the concept UNMARRIED MAN.

As Fodor acknowledges, Putnam’s one-criterion proposal happily disentangles analyticity from the genuine centrality of deep mathematical truths and scientific laws in the web of our beliefs. On the one-criterion proposal, the analyticity of a proposition is consistent with its being located at the periphery of our web of beliefs. However, Fodor raises an objection – which he attributes to Jerry Katz (at the time when both Fodor and Katz were students of Putnam at Princeton) – against Putnam’s one-criterion proposal, namely that it could only work if one could *count* criteria.⁷² Is BACHELOR a *one-criterion* concept because the only way of telling whether an individual instantiates bachelorhood is by checking whether the same indi-

vidual falls under UNMARRIED MAN? Or else is it a *two-criteria* concept because another way to tell whether an individual instantiates bachelorhood is by checking whether he falls under UNWED MAN? It all depends on whether “unmarried” and “unwed” are synonymous. But Fodor takes Quine to have undermined the prospect for a non-circular account of synonymy.

In order to preserve the *semantic disconnection* between concepts, Fodor (who of course assumes that semantics isn’t part of epistemology) proposes to convert Putnam’s *semantic* proposal into an *epistemic* (or epistemological) one. What looks like a putative semantic relation between a pair of concepts, C and C*, should really be construed as the unique *epistemic* contribution of concept C* in mediating the access from concept C to the property expressed (or represented) by C and conversely. If and when concept C is embedded within a rich nomological theory, the path from C to the property expressed and conversely is unlikely to be mediated by a single other concept, as shown for example, by the access from DOG to doghood or from WATER to waterhood and conversely. When there is no unique likely epistemic intermediary, the intuition of analyticity dissolves. By contrast, our *intuition* that “all bachelors are unmarried men” expresses an analytic truth reflects the fact that concept C*, UNMARRIED MALE, is likely to be the unique epistemic intermediary between concept C, BACHELOR, and the property *being a bachelor*. In short, Fodor’s purported explanation of intuitions of analyticity is consistent with Quine’s denial of analyticity because it does not appeal to any *semantic* connection between concepts C and C*.

Informational atomism precludes the existence of a *semantic* connection between BACHELOR and UNMARRIED MAN. An informational atomistic account is committed instead to the claim that BACHELOR is constituted by *nomological* or *nomical* relations between instances of *bachelorhood* and tokenings of BACHELOR. In other words, instances of bachelorhood must cause tokenings of

BACHELOR in virtue of some natural law that subsumes every such causal relation.

It is truistic that bachelors are instances of the property of *being a bachelor*. What is far from truistic, however, is whether there is or could be a *nomic* correlation between the property of *being a bachelor* and tokens of BACHELOR such that instances of the property of *being a bachelor* could cause tokenings of BACHELOR in human brains, *in virtue of some natural law*. It is, I think, unlikely that instances of the property of *being a bachelor* could be *causally efficacious*, i.e. could cause some effect in virtue of some *natural law*, including the tokening of the concept BACHELOR in human brains. I do not deny that instances of the property of *being a bachelor* are likely to cause tokenings of the concept BACHELOR in human brains. What I wish to cast doubt on is the claim that instances of the property of *being a bachelor* could cause tokenings of BACHELOR *in virtue of being* instances of the property of *being a bachelor* or in virtue of the *nomicity* of this property.

The property expressed by the English word “bachelor” is like properties expressed by such English words as “married”, “divorced” or “widow”: it is a *legal* or *legalistic* property, not a *nomic* property. The fact that such a property is being instantiated gives *rights* and *obligations* to its instances. But it is not causally efficacious in the physical process whereby an individual who instantiates it causes some change for two conspiring reasons: the first of which is that legal properties are not causally efficacious in genuine changes. Secondly, a human male can only satisfy the English predicate “bachelor” if he *lacks* (not if he instantiates) the legal property of *being married*.

To see why legal properties are unlikely to be causally efficacious in genuine changes, consider Xantippe, Socrates’s wife. At the very time Socrates died as a result of his drinking the hemlock, Xantippe instantly became a widow. Whatever the distance between Xantippe’s and Socrates’s bodies, at the very instant Socrates passed away, she in-

stantly acquired the property of being a widow, in violation of the relativistic principle that no signal could travel faster than the speed of light. Socrates’s drinking the hemlock caused a genuine change in Socrates, not in Xantippe. The change whereby Xantippe instantly acquired the property of *being a widow* upon Socrates’s death can be called a *mere Cambridge* change as Geach called these spurious changes.⁷³ Socrates’s death did not cause Xantippe to become a widow. Socrates’s death and Xantippe’s becoming a widow are not two distinct events, but a single event under two distinct descriptions.

Nor could the fact that Xantippe instantiates the property of *being a widow* cause a genuine change, including the tokenings of WIDOW in human brains, *in virtue of the fact* that she instantiates this property. What is likely to cause the tokening of WIDOW in a human brain is the agent’s derivation of a conclusion from a pair of beliefs (or premises), i.e. the belief that Socrates died and the belief that Xantippe was Socrates’s wife. Similarly, the fact that an individual instantiates the property of *being a bachelor* could *not nomically* cause the tokenings of BACHELOR in human brains, i.e. *in virtue of the fact* that the relevant individual instantiates the property of *being a bachelor*. Before Socrates was married to Xantippe, he was a bachelor. When he got married, he instantly changed: he lost the property of being a bachelor. This change, whereby Socrates instantly turned from being a bachelor into being married, is a mere Cambridge change, not a genuine change. The fact that Socrates instantiated the property *being a bachelor* played no causal role in this mere Cambridge change because no genuine causal interaction underlies a Cambridge change. Socrates’s losing the property of being a bachelor and his getting married to Xantippe are not two distinct events, but a single event under two distinct descriptions.

Without appealing to Geach’s terminology, Fodor recognized the distinction between genuine and spurious changes when he creat-

ed the following pair of predicates:⁷⁴ any particle in the universe satisfies the predicate “is an H-particle at t ” if and only if a particular dime in his pocket is head-up at t ; and it satisfies the predicate “is a T-particle at t ” if and only if the very same dime in his pocket is tails-up at t . Thus, by handling the dime in his pocket, Fodor could change the state of every particle in the universe from being a T-particle at t to being an H-particle at $t+1$ and conversely. Clearly, the properties expressed by the pair of predicates invented by Fodor could not be *nomtic* properties.

Furthermore, even if one rejects Geach’s distinction between *genuine* and *mere* Cambridge (or spurious) changes, it is odd to accept the claim that the fact that an individual *fails* to meet some condition or *lacks* some property (e.g. *being married*) could be metaphysically construed as the fact that the individual instantiates a *nomtic* property. There are many predicates of natural languages (“bald”, “empty”, “hole” or “shadow”) that can only be satisfied if the relevant entities *lack* some definite property, a fortiori if they *lack* some *nomtic* property. Other predicates of natural languages (“witch”, “unicorn” or “mermaid”) fail to express a genuine property because nothing can satisfy these predicates. *Failing* to instantiate some genuine property should not be confused with instantiating a genuine negative property, let alone a *nomtic* negative property.

Thus, I grant that bachelors instantiate two properties: the property of *being a bachelor* and the property of being causes of tokenings of BACHELOR in human brains. But I deny that there is a *nomtic* relation between these two properties. I deny that bachelors could cause tokenings of BACHELOR in human brains *in virtue* of a *nomtic* relation between instances of the property *being a bachelor* and tokens of BACHELOR. Rather, a tokening of BACHELOR in an agent’s brain is likely to be the outcome of the agent’s conjoining her belief or knowledge about the marital status of a bachelor together with her knowledge of the meaning of the English

word “bachelor” or alternatively of the semantic relation between UNMARRIED MAN and BACHELOR.

In short, Fodor commits himself to an uncompromised informational atomistic treatment of BACHELOR for the purpose of denying that BACHELOR and UNMARRIED MAN are *semantically* related, in accordance with Quine’s rejection of the analyticity of the truth expressed by “all bachelors are unmarried.” Fodor also extends his informational atomistic account to concepts of weekdays, such as TUESDAY and is willing to deny that “Tuesdays precede Wednesdays” expresses an analytic truth. He further argues that one could have the concept TWO without having the concept PRIME. But what about the converse? Could one really have the concept PRIME and lack other numerical concepts, e.g. TWO?

Fodor is willing to trade wild metaphysical necessary relations between pairs of properties for the denial of analyticity. For example, he is ready to construe the relation between *being a bachelor* and *being an unmarried male* or between *being a Tuesday* and *being the day before Wednesday* as a metaphysically necessary relation between pairs of properties. Fodor is thus committed to the very strong assumptions that *being a bachelor* and *being a Tuesday* are *nomtic* properties whose instances could cause the tokenings of the corresponding concepts in human brains in virtue of a natural law. I am not willing to go that far for the sake of denying analyticity.

My own suggestion is to remove legal concepts and concepts for weekdays from the scope of informational semantics. Possession of legal concepts (e.g. BACHELOR) or concepts for weekdays (e.g. TUESDAY) is not supported by *nomtic* correlations between brain states and instances of the corresponding properties. Knowledge of some natural language is necessary for having such concepts. The possession of such concepts is supported by knowledge of the semantic connections between the meanings of the relevant legal words and words standing for weekdays in various natural languages (e.g.

Italian, English or Swahili). Granting such semantic relations is to grant the existence of corresponding analytic truths. I may be wrong, but I doubt that granting them would threaten the nomicity of psychological explanation (or pave the way for relativism).

5 Concluding remarks

Fodor was passionately unwilling to compromise. For example, he famously embraced what came to be known as “mad dog nativism,” which, as he was aware, many others took to be preposterous.⁷⁵ Similarly, he embraced full informational atomism, in accordance with Quine’s rejection of the analytic/synthetic distinction. He embraced full informational atomism, because he passionately rejected semantic holism. He passionately rejected semantic holism, because he took it to be not only incompatible with the nomicity of psychological explanation, but also to pave the way for relativism, which he found offensive.

Dan Dennett once compared Jerry Fodor to a trampoline: «you jump on him and he springs back, presenting claims twice as trenchant and outrageous».⁷⁶ I do not disagree with Dennett, but I prefer to put it this way: there is a lot to learn from disagreeing with Fodor. I disagree with Fodor’s commitment to informational atomism on three grounds. I do not think that it can satisfy the Fodorian requirement that content matters to psychological explanation. I do not think that only informational atomism is consistent with the principle of compositionality. Finally, I think that informational atomism bloats the category of *nomic properties*.

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Notes

¹ Noam Chomsky quoted in K. BRANSON, *Obituary: Jerry Fodor, Rutgers university philosopher, pioneer of cognitive science among the late 20th and early 21st centuries*, 2017 – URL: <https://news.rutgers.edu/obituary-jerry-fodor-rutgers-university-philosopher-pioneer-cognitive-science/20171201#.WpR4k2bMzOT>. Interestingly, Chomsky has famously drawn a distinction between *methodological* naturalism, which he accepts, and *metaphysical* naturalism, which, unlike Fodor, Chomsky rejects. This sets Chomsky apart from many of Fodor’s metaphysical commitments. For an extended discussion of the gap between Chomsky and Fodor cf. P. JACOB, *The scope and limits of Chomsky’s naturalism*, in: J. BRICMONT, J. FRANCK (eds.) *Chomsky Notebook*, Columbia University Press, New York 2010, pp. 211-234.

² For an enlightening overview cf. G. REY, *Remembering Jerry Fodor and his work*, in: «Mind & Language», vol. XXXIII, n. 4, 2018, pp. 321-341.

³ Cf. J.A. FODOR, *The language of thought*, Crowell, New York 1975.

⁴ Cf. P. JACOB, *What minds can do*, Cambridge University Press, Cambridge 1997.

⁵ Cf. W.V.O. QUINE, *Word and object*, MIT Press, Cambridge (MA) 1960.

⁶ Cf. W.V.O. QUINE, *Two dogmas of empiricism* (1950), in: W.V.O. QUINE, *From a logical point of view*, Harper Torchbook, New York 1953, pp. 20-46.

⁷ Cf. F. BRENTANO, *Psychology from an empirical standpoint* (1874), translated by A.C. RANCURELLO, D.B. TERRELL, L.L. MCALISTER, Routledge & Kegan Paul, London 1973.

⁸ W.V.O. QUINE, *Word and object*, cit., p. 221.

⁹ I use “content”, “semantic property”, “aboutness”, and “intentionality” interchangeably.

¹⁰ Cf. D.C. DENNETT, *Intentional systems*, in: «The Journal of Philosophy», vol. LXVIII, n. 4, 1971, pp. 87-106.

¹¹ J.A. FODOR, *Psychosemantics. The problem of meaning in the philosophy of mind*, MIT Press, Cambridge (MA) 1987, p. 97.

¹² Cf. H. FIELD, *Tarski’s theory of truth*, in: «The Journal of Philosophy», vol. LXIX, n. 13, 1972, pp. 347-375.

¹³ Cf. J.A. FODOR, *The elm and the expert*, MIT

Press, Cambridge (MA) 1994, p. 5: «A serious intentional psychology must presuppose the *naturalizability* of content. Psychologists have no right to assume that there *are* intentional states unless they can provide, or anyhow foresee providing, or anyhow foresee no principled reason why someone couldn't provide, naturalistic sufficient conditions for something to be an intentional state».

¹⁴ Cf. W.V.O. QUINE, *Word and object*, cit.

¹⁵ In *Word and Object* Quine asked: «Is physicalism a repudiation of mental objects after all, or a theory of them? Does it repudiate the mental state of pain or anger in favor of its physical concomitant, or does it identify the mental state with a state of the physical organism (and so a state of the physical organism with the mental state)?» (p. 265). His own immediate answer was: «Some may [...] find comfort in reflecting that the distinction between an eliminative and an explicative physicalism is unreal». (*ibidem*) I take this passage as evidence of Quine's irresolution between the eliminativist and the non-eliminativist interpretation of materialism.

¹⁶ In *Pursuit of truth*, Quine famously wrote: «In psychology one may or not be a behaviorist, but in linguistics one has no choice. Each of us learns his language by observing other people's verbal behavior and by having his own faltering verbal behavior observed and reinforced or corrected by others. We depend strictly on overt behavior in observable situations» (W.V.O. QUINE, *Pursuit of truth*, MIT Press, Cambridge (MA) 1990, pp. 37-38). I take this passage as evidence of Quine's irresolution between the behaviorist and the non-behaviorist interpretation of materialism.

¹⁷ Cf. *Introduction*, in: J.A. FODOR, *The language of thought*, cit., pp. 1-26.

¹⁸ Cf. W.V.O. QUINE, *Two dogmas of empiricism*, cit.

¹⁹ Cf. W.V.O. QUINE, *Truth by convention* (1936), in: W.V.O. QUINE, *Ways of Paradox and Other Essays*, Harvard University Press, Cambridge (MA) 1966, pp. 77-106; W.V.O. QUINE, *Carnap and logical truth* (1963), in: W.V.O. QUINE, *Ways of paradox and other essays*, Harvard University Press, Cambridge (MA) 1966, pp. 107-132.

²⁰ Quine further dismissed the notion of an *implicit* convention, cf. W.V.O. QUINE, *Truth by convention*, cit.

²¹ W.V.O. QUINE, *Two dogmas of empiricism*, cit., p. 41.

²² *Ibidem*.

²³ Cf. J.A. FODOR, *The modularity of mind*, MIT Press, Cambridge (MA) 1983; J.A. FODOR, *The mind does not work this way*, MIT Press, Cambridge (MA) 2000.

²⁴ J.A. FODOR, *A theory of content and others essays*, MIT Press, Cambridge (MA) 1990, p. xi.

²⁵ J.A. FODOR, *Concepts. Where cognitive science went wrong*, Oxford University Press, Oxford 1998, p. 71.

²⁶ The English adjectives “nomic” and “nomological” and the English noun “nomicity” mean respectively *lawful* and *lawfulness*: they derive from the Greek word *nomos*, which means *law*, and are used in the philosophy of science (cf. Hempel's famous *deductive-nomological* model of explanation).

²⁷ Fodor's main repeated objection to the pragmatist tradition embodied by Wittgenstein and Ryle is «its inability to make sense of the notion of a mental process» (cf. J.A. FODOR, *Concepts. Where cognitive science went wrong*, cit., p. 10; J.A. FODOR, *Hume variations*, Oxford University Press, Oxford 2003, p. 9).

²⁸ Cf. Crane's insightful book entitled *The mechanical mind* (T. CRANE, *The mechanical mind. A philosophical introduction to minds, machines and mental representations*, Routledge, London 1998).

²⁹ I use capital letters to refer to concepts.

³⁰ J.A. FODOR, *The elm and the expert*, cit., p. 2.

³¹ Cf. J.A. FODOR, *Psychosemantics*, cit.; J.A. FODOR, *A theory of content and other essays*, cit.

³² Cf. F. DRETSKE, *Knowledge and the flow of information*, MIT Press, Cambridge (MA) 1981.

³³ Cf. J.A. FODOR, *Psychosemantics*, cit.; J.A. FODOR, *A theory of content and other essays*, cit.

³⁴ Cf. R.G. MILLIKAN, *Language, thought and other biological categories*, MIT Press, Cambridge (MA) 1984; R.G. MILLIKAN, *White queen. Psychology and other essays for Alice*, MIT Press, Cambridge (MA) 1993; R.G. MILLIKAN, *Varieties of meaning*, MIT Press, Cambridge (MA) 2004.

³⁵ Cf. F. DRETSKE, *Explaining behavior*, MIT Press, Cambridge (MA) 1988; F. DRETSKE, *Naturalizing the mind*, MIT Press, Cambridge (MA) 1995.

³⁶ Cf. K. NEANDER, *Misrepresenting and malfunctioning*, in: «Philosophical Studies», vol. LXXIX, n. 2, 1995, pp. 109-141; K. NEANDER, *A mark of the mental: In defense of informational semantics*, MIT Press, Cambridge (MA) 2017.

³⁷ Cf. P. JACOB, *What minds can do*, cit. for ex-

tended discussion.

³⁸ Cf. J.A. FODOR, *Psychosemantics*, cit.; J.A. FODOR, *A theory of content and other essays*, cit.

³⁹ I further argued that only a teleosemantic appeal to biological functions can resolve the problem of the transitivity of nomic dependencies that is not reducible to the disjunction problem, cf. P. JACOB, *What minds can do*, cit., pp. 98-100.

⁴⁰ Cf. B. LOEWER, G. REY, *Editors' Introduction*, in: B. LOEWER, G. REY (eds.), *Meaning in Mind, Fodor and his Critics*, Blackwell, Oxford 1991, pp. xi-xxxvii, here p. xxvii

⁴¹ Cf. E. PACHERIE, *Holophobia*, in: «Acta Analytica», vol. XII, n. 12, 1994, pp. 105-112.

⁴² J.A. FODOR, *A theory of content and other essays*, cit., p. 52. For example, assuming that semantic holism is correct, then it could not be a psychological law that believing that one is in immediate danger causes release of adrenalin: no two individuals are likely to share this belief at a single time because they are unlikely to share all their beliefs; nor is a single individual at two different times because an individual's beliefs are bound to change across space and time (cf. N. BLOCK, *Holism: Mental and semantic*, in: E. CRAIG (ed.), *Routledge encyclopedia of philosophy*, Routledge, London 1998 – doi: 10.4324/9780415249126-W015-1).

⁴³ Cf. J.A. FODOR, *A theory of content and other essays*, cit.

⁴⁴ J.A. FODOR, *Psychosemantics*, cit., p. xii.

⁴⁵ J.A. FODOR, *A theory of content and other essays*, cit., p. 156.

⁴⁶ J.A. FODOR, *Hume variations*, cit., pp. 73-74. As Fodor put it using different terms: «concept pragmatism is a dead parrot. I come to bury this parrot not to praise it; the funeral is long overdue», J.A. FODOR, *Having concepts: A brief refutation of the Twentieth Century*, in: «Mind & Language», vol. XIX, n. 1, 2004, pp. 29-47, here p. 32.

⁴⁷ Cf. J.A. FODOR, *Concepts: A potboiler*, in: «Philosophical Issues», vol. VI, 1995, pp. 1-24; J.A. FODOR, *Hume variations*, cit.

⁴⁸ Cf. J.A. FODOR, *Concepts: A potboiler*, cit.; J.A. FODOR, *Hume variations*, cit., p. 25.

⁴⁹ Cf. J.A. FODOR, *Concepts. Where cognitive science went wrong*, cit.; J.A. FODOR, *Language, thought and compositionality*, in: «Mind & Language», vol. XVI, n. 1, 2001, pp. 1-15; J.A. FODOR, *Hume variations*, cit.; J.A. FODOR, *Having concepts*, cit.; J.A. FODOR, *LOT2. The language of thought revisited*, Oxford University Press, Oxford 2009.

⁵⁰ J.A. FODOR, *LOT2*, cit., p. 9.

⁵¹ Fodor has consistently pointed out that despite the gap between Cartesian rationalism and Humian empiricism, Hume fully endorsed the legacy of the Cartesian veil-of-ideas idea (cf. J.A. FODOR, *Hume variations*, cit.).

⁵² R. RORTY, *Philosophy and the mirror of nature*, Princeton University Press, Princeton 1979, p. 140.

⁵³ H. PUTNAM, *Sense, nonsense, and the senses: An inquiry into the powers of the human mind*, in: «The Journal of Philosophy», vol. XCI, n. 9, 1994, pp. 445-517, here p. 453.

⁵⁴ J.A. FODOR, *LOT2*, cit., p. 10.

⁵⁵ Cf. H. PUTNAM, *The meaning of "meaning"* (1974), in: H. PUTNAM, *Mind, Language, and Reality, Philosophical Papers*, vol. II, Cambridge University Press, Cambridge 1975, pp. 215-271; T. BURGE, *Individualism and the mental*, in: P. FRENCH, T.E. UEHLING, H.K. WETTSTEIN (eds.), *Midwest Studies in Philosophy*, vol. IV, University of Minnesota Press, Minneapolis 1979, pp. 73-122.

⁵⁶ J.A. FODOR, *The elm and the expert*, cit., p. 36.

⁵⁷ Cf. *ibid.*

⁵⁸ Cf. J.A. FODOR, *Concepts. Where cognitive science went wrong*, cit., p. 15.

⁵⁹ Cf. *ibid.*, pp. 15-32.

⁶⁰ Cf. S. STICH, *From folk psychology to cognitive science. The case against belief*, MIT Press, Cambridge (MA) 1983.

⁶¹ J.A. FODOR, *The elm and the expert*, cit., p. 40.

⁶² Cf. G. FREGE, *Über Sinn und Bedeutung*, in: «Zeitschrift für Philosophie und philosophische Kritik», NF, n. 100, 1892, pp. 25-50.

⁶³ Cf. J.A. FODOR, *Having concepts*, cit., p. 38.

⁶⁴ Cf. P. HORWICH, *Concept constitution*, in: «Philosophical Issues», vol. IX, 1998, pp. 15-19; C. PEACOCKE, *Fodor on concepts: Philosophical aspects*, in: «Mind & Language», vol. XV, n. 2-3, 2004, pp. 327-340; F. RECANATI, *The Fodorian fallacy*, in: «Analysis», vol. LXII, n. 4, 2002, pp. 285-289.

⁶⁵ J.A. FODOR, *Language, thought and compositionality*, cit., pp. 8-9.

⁶⁶ Cf. P. HORWICH, *Concept constitution*, cit.

⁶⁷ For an early version of the arguments in this section cf. P. JACOB, *Recognitional concepts and conceptual combination*, in: M. WERNING, E. MACHERY, G. SCHURZ (eds.), *The compositionality of meaning and content*, vol. I: *Foundational Issues*, Ontos Verlag, Frankfurt a.M. 2005, pp. 135-146.

⁶⁸ J.A. FODOR, *Psychosemantics*, cit., p. 66.

⁶⁹ J.A. FODOR, *Concepts. Where the cognitive science went wrong*, cit., pp. 80-86.

⁷⁰ Cf. *ibid.*, p. 80.

⁷¹ H. PUTNAM, *The analytic and the synthetic* (1962), in: H. PUTNAM, *Mind, language, and reality. Philosophical papers*, vol. II, Cambridge University Press, Cambridge 1975, pp. 33-69.

⁷² Cf. J.A. FODOR, *Concepts. Where the cognitive science went wrong*, cit., pp. 81-82.

⁷³ Cf. P. GEACH, *God and the soul*, Routledge, New York/London 1969.

⁷⁴ Cf. J.A. FODOR, *Psychosemantics*, cit., pp. 33-35.

⁷⁵ Cf. G. REY, *Remembering Jerry Fodor and his work*, cit., p. 329.

⁷⁶ Quoted by Loewer and Rey (cf. B. LOWER, G. REY, *Editors' introduction*, cit., p. xi) and again by Rey (cf. G. REY, *Remembering Jerry Fodor and his work*, cit., p. 323).

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