


# FLORIDI'S SEMANTIC INFORMATION REVISITED: COMMITMENTS, APPLICATIONS AND CRITIQUES

*A INFORMAÇÃO SEMÂNTICA DE FLORIDI REVISITADA:  
COMPROMISSOS, APLICAÇÕES E CRÍTICAS*

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## Abstract

This paper offers a systematic reconstruction and critical examination of Luciano Floridi's strongly semantic theory of information (TSSI). After situating Floridi's project within the broader context of the philosophy of information and identifying the problems that motivate it (particularly the Bar-Hillel–Carnap paradox and the deduction scandal) the paper articulates the central commitments of the TSSI: the General Definition of Information (GDI), the

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veridicality thesis (VT), and the informativeness measure  $i(P) = 1 - [d(P)]^2$ . Floridi's dissolution of both classical puzzles is examined and assessed. The paper then advances three interconnected objections that press beyond those already established in the literature: (i) the distinction between 'being informative' and 'being information' – which Floridi deploys to neutralise the challenge from false but seemingly informative propositions – is shown to be unstable and unable to discharge the explanatory burden the TSSI places upon it; (ii) conceptual confusions between metadata, meta-information, data information, and informational data generate a grounding circularity within the GDI that the levels-of-abstraction methodology cannot dissolve; and (iii) definite descriptions introduce a form of referential indeterminacy that destabilises the informativeness measure at its core, and this is not a peripheral difficulty but one inherent to any theory of information with genuine pretensions to cover natural-language representations. The paper also positions the TSSI relative to verisimilitude-based alternatives (Frické, D'Alfonso, Cevolani) and closes by sketching, in deliberately prospective terms, a direction for development based on graded adequacy and contextual fitness.

**Keywords:** Semantic information. Veridicality thesis. Bar-Hillel–Carnap paradox. Deduction scandal. Definite descriptions. Philosophy of information.

## Resumo

O presente artigo oferece uma reconstrução sistemática e um exame crítico da teoria fortemente semântica da informação (TSSI) de Luciano Floridi. Após situar o projeto floridiano no contexto mais amplo da filosofia da informação e identificar os problemas que o motivam (particularmente o paradoxo de Bar-Hillel–Carnap e o escândalo da dedução), o artigo articula os compromissos centrais da TSSI: a definição geral de informação (GDI), a tese veritativa e a medida de informatividade  $i(P) = 1 - [d(P)]^2$ . A dissolução floridiana de ambos os problemas clássicos é examinada e avaliada. O artigo avança então três objeções interconectadas que vão além das já estabelecidas na literatura: (i) a distinção entre 'ser informativo' e 'ser informação' – que Floridi mobiliza para neutralizar o desafio das proposições falsas aparentemente informativas – revela-se instável e incapaz de sustentar o peso explicativo que a TSSI lhe impõe; (ii) confusões conceituais entre metadados, metainformação, informação dos dados e dados informacionais geram uma circularidade de fundamentação na GDI que a metodologia dos níveis de abstração não dissolve; e (iii) descrições definidas introduzem indeterminação referencial que desestabiliza a própria medida de informatividade, dificuldade que não é periférica mas inerente a qualquer teoria da informação com pretensões de cobertura de representações em linguagem natural. O artigo posiciona também a TSSI em relação a alternativas baseadas em verossimilhança (Frické, D'Alfonso, Cevolani) e conclui esboçando, em termos deliberadamente prospectivos, uma direção de desenvolvimento fundada em adequação graduada e aptidão contextual.

**Palavras-chave:** Informação semântica. Tese veritativa. Paradoxo de Bar-Hillel–Carnap. Escândalo da dedução. Descrições definidas. Filosofia da informação.

## 1. Introduction

Among the conceptual challenges that have animated analytic philosophy since the mid-twentieth century, few have proven as persistent, or as productive of theoretical machinery, as the question of what information actually is. The word 'information' is, as both Shannon (1948) and Floridi (2011, p. 81) have noted, irreducibly polymorphic: it appears across technical discourse in engineering, biology, and computer science, yet also pervades ordinary epistemic vocabulary in ways that resist unification. It is this tension between the formal tractability of technical measures, and the semantic richness of ordinary informational talk that defines the space within which Floridi's philosophy of information operates.

Luciano Floridi's informational project is best understood as an exercise in what he calls 'conceptual engineering': the careful construction and revision of concepts with the precision of an engineer and the critical rigour of a philosopher (Floridi, 2011b, p. 282). Within this project, the theory of semantic information occupies a foundational position. It not only provides a definition of information but offers the conceptual tools needed to address two long-standing puzzles that had troubled the field since the pioneering formal work of Rudolf Carnap and Yehoshua Bar-Hillel: the paradox that now bears their names, and the deduction scandal identified by Jaakko Hintikka.

The Bar-Hillel–Carnap paradox (henceforth BCP) arises within the classical probabilistic approach to semantic information – what Floridi calls the weak theory (TWSI). Since informational content is defined as the complement of logical probability, a logical contradiction, whose probability is zero, turns out to carry maximum information. This is deeply counterintuitive: a contradiction cannot describe any possible state of the world, and something incapable of being true seems an unlikely vehicle for conveying information about how things are. The deduction scandal presents a complementary difficulty: tautologies, being necessarily true, carry zero information. Since the conclusion of any valid deductive argument, together with the premises, forms a tautology, valid deductions appear informationally sterile.

Floridi's response to both puzzles is his strongly semantic theory of information (TSSI), first presented in his 2004 paper in *Minds and Machines* and consolidated in *The Philosophy of Information* (2011). The theory's defining commitment is the veridicality thesis (VT): only true, well-formed, meaningful data constitute semantic information. False representations are not a weak subspecies of information but pseudo-information — representations that fail to qualify as information at all. This single move dissolves both puzzles, but it also generates new theoretical

obligations and also new vulnerabilities.

It is worth noting at the outset that the TSSI does not stand alone in the literature on alethically sensitive theories of information. Frické (1997), D'Alfonso (2011), and Cevolani (2011; 2014) have pursued verisimilitude-based approaches that avoid the BCP without the categorical exclusion of false representations from the domain of information; on these accounts, what matters is a proposition's degree of closeness to the truth rather than truth simpliciter. The present paper assesses the TSSI relative to these alternatives in Section 6.

The paper proceeds as follows. Section 2 reconstructs Floridi's framework, covering the GDI, the levels-of-abstraction methodology, and the veridicality thesis, including Floridi's subsequent defences of the VT in 2005, 2007, and 2008. Section 3 examines how the TSSI addresses the BCP and the deduction scandal through the informativeness measure and virtual information. Section 4 surveys the principal objections already established in the secondary literature. Section 5 advances three further, interconnected objections. Section 6 offers a brief prospective sketch of an alternative direction. Section 7 concludes.

## 2. Floridi's Informational Project

### 2.1 The General Definition of Information

Floridi's account of information begins with what he calls the General Definition of Information (GDI). Rather than constructing a theory top-down from contested intuitions, Floridi takes as his starting point a broad consensus across disciplines from information science to decision theory. The GDI specifies that a set of data  $P$  constitutes an infon — a basic unit of information — if and only if three conditions are jointly satisfied:<sup>1</sup>

- (1)  $P$  consists of  $n$  data  $d$ , with  $n \geq 1$ ;
- (2) the data are well-formed;
- (3) the well-formed data are meaningful. (Floridi, 2011, p. 84)

The notion of 'data' receives a deliberately minimal characterisation. Following the 'diaphoric' interpretation – from the Greek *diaphora* ('difference') – data are

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<sup>1</sup>The term 'infon' is borrowed from situation semantics (Barwise & Perry, 1983), where it denotes a basic unit of informational content associated with a situation. Floridi retains the label but reconstitutes its meaning within the GDI framework, detaching it from the situation-theoretic commitments of Barwise and Perry.

constituted by a lack of uniformity: differences between things in the world (data *de re*), differences between physical states (data *de signo*), or differences between symbols (data *de dicto*). This characterisation is designed to be neutral across four dimensions: ontological, typological, taxonomic, and genetic – making no commitments about the nature, type, classification, or origin of data-bearing entities. The GDI includes a further neutrality that proves contentious: alethic neutrality. Under the GDI alone, information does not presuppose truth. Well-formed meaningful data can convey falsehoods or have no truth value at all. This means that misinformation and disinformation would qualify as species of information: defective ones, perhaps, but information nonetheless. It is precisely this implication that Floridi rejects, and from which the TSSI departs.

## 2.2 Levels and Gradients of Abstraction

Floridi's analysis proceeds by means of the 'levelism' methodology, built around levels of abstraction (LoA). An LoA consists of a finite, non-empty set of typed variables (observables) together with the expected relationships among them. The choice of LoA determines which features of a system are visible to analysis. Different LoAs can be ordered into Gradients of Abstraction (GoA), providing a hierarchical structure with Kantian resonances: access to the world is always mediated by some conceptual apparatus, and what can be known depends on which level of that apparatus is operative (Floridi, 2008b).

The LoA framework plays a crucial methodological role throughout the TSSI: it allows Floridi to respond to objections by relocating the level of analysis, since an apparent counterexample may arise only from applying a concept at the wrong LoA. Whether this response succeeds in specific cases, or displaces problems rather than resolving them, is something we examine in Section 5.

## 2.3 The Veridicality Thesis and its Defences

Floridi's central theoretical move is to add a fourth condition to the GDI:

(4) The well-formed meaningful data are veridical. (Floridi, 2004, p. 198)

The choice of 'veridical' rather than 'true' is deliberate.<sup>2</sup> 'True' is standardly a predicate of linguistic items, whereas Floridi wants a condition applying to any

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<sup>2</sup>The choice of 'veridical' rather than 'true' in Floridi (2005) was motivated by a desire to remain neutral between propositional and non-propositional information. Photographs, maps, and thermal signatures can be veridical or non-veridical without it being natural to call them 'true' or 'false'. The ontological neutrality of the data account demands a predicate applicable across these formats.

entity capable of carrying information, in keeping with the ontological neutrality of the data account.

Floridi has sustained the VT across a sequence of publications. In Floridi (2005), he argued against the 'Standard Definition' of semantic information as merely meaningful data, contending that truth-values do not supervene on semantic information and that calling something 'false information' is a category mistake analogous to calling a plastic duck a type of duck. In Floridi (2007), he offered a formal semantic argument based on four principles – non-negativity, additivity, a probabilistic interpretation of the inverse relationship principle, and an informativeness constraint – showing that these jointly require the VT to avoid the BCP and certain cases of semantic content loss.<sup>3</sup> In Floridi (2008a), he further argued that epistemically relevant semantic information, i.e., information satisfying a relevance condition, provides additional vindication of the VT, since what advances inquiry is always the true informational content, not the false component associated with it.

The practical consequence of the VT is sweeping: misinformation and disinformation are not types of information but pseudo-information. Floridi supports this with a compositional test derived from Geach (1956): whereas 'false proposition' decomposes cleanly into 'P is a proposition' and 'P is false', the expression 'false information' fails the compositionality test, revealing that 'false' functions attributively rather than predicatively – it does not specify a kind of information but denies that the item is information at all.

### 3. The TSSI in Action: Two Central Applications

#### 3.1 The Informativeness Measure

Having established the VT as the normative foundation of the TSSI, Floridi develops a quantitative measure of informativeness. The key concept is discrepancy: the degree to which a proposition  $P$  deviates from  $w$ , where  $w$  is the most informative and accurate description of the situation  $s$  that  $P$  purports to represent. The discrepancy measure  $d(P)$  ranges over  $[-1, +1]$ :

- (a) if  $P$  is true and precisely matches  $w$ , then  $d(P) = 0$ ; (b) if  $P$  is a tautol-

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<sup>3</sup>Floridi (2006) develops a modal logic of being informed (KTB), where the axiom  $I\wp \rightarrow p$  formalises veridicality as a property of informational states. On this approach, being informed that  $p$  entails that  $p$  is true, drawing a principled distinction between the state of being informed and the weaker states of believing or suspecting. Allo (2011) provides formal semantics for this logic in both pure and applied versions.

ogy, then  $d(P) = 1$ ; (c) if  $P$  is a contradiction, then  $d(P) = -1$ ; (d) if  $P$  is contingently true, then  $0 < d(P) < 1$ ; (e) if  $P$  is contingently false, then  $-1 < d(P) < 0$ .

Drawing on fuzzy logic, situation logic, and error theory, Floridi establishes a symmetry: two propositions at equal discrepancy distances from  $w$  — one contingently true, one contingently false — have quantitatively equivalent informativeness. This yields the general equation  $i(P) = 1 - [d(P)]^2$ . At  $d(P) = 0$ ,  $i(P) = 1$  — maximum informativeness; at  $d(P) = \pm 1$ ,  $i(P) = 0$  — neither tautologies nor contradictions contribute genuine information about a specific situation.<sup>4</sup>

### 3.2 Dissolving the Bar-Hillel–Carnap Paradox

The BCP arises because the TWSI identifies informational content with logical content, measured as the complement of a priori inductive probability:  $\text{CONT}(P) =_{\text{def}} 1 - m(P)$ ;  $\text{INF}(P) =_{\text{def}} -\log m(P)$ , where  $m(P)$  is the logical measure of  $P$ . Since a contradiction has  $m(\perp) = 0$ , it follows that  $\text{CONT}(\perp) = 1$ : maximum content, and consequently maximum information. Bar-Hillel and Carnap accepted this result explicitly:<sup>5</sup>

*A self-contradictory sentence asserts too much; it is too informative to be true. (Bar-Hillel & Carnap, 1953, p. 229)*

Floridi's dissolution distinguishes two concepts the TWSI had conflated: the logical content of a proposition (measured by  $\text{CONT}$ ) and its situational informativeness (measured by  $i(P)$ ).  $\text{CONT}(P)$  quantifies logical strength, i.e., how many possible state-descriptions  $P$  excludes from a formal language, and measures data, not information. The informativeness measure  $i(P) = 1 - [d(P)]^2$  does something different: it asks how closely  $P$  approximates the most accurate available description  $w$  of a given situation  $s$ . Under this measure, contradictions score zero because they are consistent with no situation whatsoever; tautologies also score zero because their generality fails to narrow down any particular situation. The paradox dissolves as the result of a category confusion:  $\text{CONT}$  and  $i$  measure different things, and using

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<sup>4</sup>The values  $d(P) = 1$  assigned to tautologies and  $d(P) = -1$  assigned to contradictions are definitional stipulations rather than results derived from a more fundamental formula: Floridi sets these as anchor points by construction, on the grounds that tautologies are consistent with every possible situation (and so tell us nothing about any particular one) while contradictions are consistent with none (Floridi, 2004, 2011). The measure is therefore anchored to a particular situation  $s$  described by  $w$ , not to the abstract logical space of all possible worlds.

<sup>5</sup>Bar-Hillel and Carnap (1953, p. 229) acknowledged this result explicitly: 'A self-contradictory sentence asserts too much; it is too informative to be true.' They accepted it as the price of a theory concerned with measuring logical content rather than epistemic value.

CONT as a proxy for situational informativeness was always a mistake.

### 3.3 The Deduction Scandal and Virtual Information

The deduction scandal presents a complementary challenge, addressed by Floridi in collaboration with D'Agostino (2009). Hintikka's formulation remains the canonical one:

C. D. Broad has called the unsolved problems concerning induction a scandal of philosophy. It seems to me that in addition to this scandal of induction there is an equally disquieting scandal of deduction. Its urgency can be brought home to each of us by any clever freshman who asks, upon being told that deductive reasoning is 'tautological' or 'analytical': in what other sense, then, does deductive reasoning give us new information? (Hintikka, 1973, p. 222)

The argument is tight: a deduction  $P_1, \dots, P_n \vdash Q$  is valid if and only if  $(P_1 \wedge \dots \wedge P_n) \rightarrow Q$  is a tautology; tautologies carry zero information; therefore valid deductions convey no new information. As Dummett (1991, p. 195) observed, this would reduce mathematics to 'merely getting things down on paper', an evident absurdity. Earlier attempts at resolution proved unsatisfying for reasons that reduce, ultimately, to computational intractability: the tautology problem is co-NP-complete, and no feasible procedure for rendering all logical relations directly inspectable is available.<sup>6</sup>

D'Agostino and Floridi reframe the scandal through computational tractability. The relevant question is not whether the conclusion's information is logically 'contained' in the premises, but whether it can be extracted by computationally feasible (in polynomial-time) procedures. Classical propositional logic is NP-hard: extracting all implicit information may require exponential resources. This intractability means deduction involves genuine cognitive effort and real information gain.

The resolution appeals to virtual information: information not contained in the current informational state of the reasoner but temporarily invoked to complete a deduction.<sup>7</sup> Within the 'intelim' semantics – based on introduction and elimination rules for logical connectives – inferences can be classified according to whether

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<sup>6</sup>Cook's (1971) theorem showed that Boolean satisfiability is NP-complete; the tautology problem is the complementary co-NP-complete problem. Earlier attempts at resolution were unsatisfying: Hempel's psychologistic response explained away the phenomenon rather than accounting for it, and Wittgenstein's proposal that a 'suitable notation' would make all logical relations directly inspectable confronts exactly this computational obstacle. For an extensive critical survey of pre-D'Agostino attempts, see Sequoiah-Grayson (2008).

<sup>7</sup>The analogy with virtual particles in physics, explicitly invoked by D'Agostino and Floridi

they require virtual information. Those requiring none are strictly analytic; those requiring it are informationally non-trivial. The deduction scandal dissolves: logical truths carry information, but its extraction requires computational work commensurate with the inferential investment performed.

## 4. Established Critiques in the Literature

The TSSI has attracted sustained critical attention across several philosophical fronts. The earliest substantive responses came from Fetzer (2004) and Dodig-Crnkovic (2005), who questioned whether the VT is necessary or coherent for a theory of information. Fetzer argued that false theories — phlogiston theory, caloric theory, Newtonian absolute space — can be scientifically productive, and that excluding them as pseudo-information impoverishes rather than clarifies the concept.<sup>89</sup>

Scarantino and Piccinini (2010) pressed the case from naturalized epistemology, arguing that natural semantic information — the kind operative in biology and cognitive science — is not essentially veridical. Organisms can be systematically misinformed, and this misinformation plays genuine cognitive roles; to exclude it from the domain of information renders the TSSI irrelevant to precisely the domain where informational vocabulary is most theoretically productive.

Adriaans (2010) challenged the TSSI from the direction of algorithmic information theory, arguing that the formal treatment of information via Kolmogorov complexity and Shannon entropy is too powerful and too successful to be set aside in favour of a philosophically motivated veridicality condition. For Adriaans, the TSSI is internally consistent but too narrowly scoped to function as a general theory of information.

Long (2014) argued, contra Floridi, that information is intrinsically semantic

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(2009, fn. 4), is illuminating: virtual information is 'borrowed' from outside the current informational state to complete an inference, then 'discharged', much as virtual particle pairs come into existence and annihilate without leaving a net energy trace.

<sup>8</sup>Fallis (2011) engages directly with Floridi's treatment of misinformation, arguing that the VT generates an inadequate account of the distinction between informing and misinforming. In particular, Fallis shows that the framework cannot accommodate cases in which a false representation produces a true belief, or a true representation produces a false one — cases routine in everyday epistemic practice. These examples suggest that the normatively relevant distinctions cut across the binary information/pseudo-information divide that the VT imposes, rather than aligning with it.

<sup>9</sup>Sequoiah-Grayson (2007) responded on Floridi's behalf against the early objections of Fetzer (2004) and Dodig-Crnkovic (2005), arguing that both critics misread the pragmatic scope of the TSSI: operating at a specific LoA, the theory is designed to handle a particular explanatory target, and objections that assume a broader scope of application mistake the theory's methodological commitments.

but alethically neutral: the semantic dimension of information is constituted not by truth but by the intentional or representational properties of data. In Long's view, veridicality is an extrinsic normative standard applied to already-constituted information, not an intrinsic condition of its constitution. This relocates the VT from a definitional requirement to a normative ideal – a subtle but significant shift in theoretical status.

Perhaps the most technically precise critique comes from Ferguson (2015), who demonstrated that the combination of the GDI and the VT generates information-liar paradoxes. The sentence  $P_1$ : 'This sentence carries no information' creates an unstable evaluation: if it carries no information, it is true, hence genuine information; if it does, it is false, hence pseudo-information. Ferguson does not treat this as a decisive refutation, but argues that the TSSI must depart more radically from the modal intuitions underlying the BCP framework — intuitions that generate both the original paradox and a paradox in its proposed solution.

Fresco and Michael (2016) advanced a dual critique: first, that human cognitive systems process information identically regardless of veridicality, suggesting that truth is normative rather than constitutive with respect to information processing; and second, that the conditions making the BCP appear paradoxical, e.g., identifying information with informativeness, treating logic as a theory of inference, and treating validity as sufficient for rational inference, are independently questionable.

Lundgren (2019) proposed disentangling 'being information' from 'being informative' and showed that an alethically neutral conception of semantic information can manage the BCP through this distinction alone, without the VT.<sup>10</sup> His conclusion is that a veridical conception of information can be retained as a subconcept – applying specifically to cases where truth-aptness matters – but cannot serve as the general definition of semantic information.

Taken together, these critiques place the VT under pressure from the philosophy of science, from naturalized epistemology, from algorithmic information theory, and from formal logic. The TSSI has sophisticated defenders, and its internal architecture is technically impressive. But no consensus has emerged, and the objections above constitute a genuine challenge that the theory's proponents have not fully met.

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<sup>10</sup>Lundgren (2019) resolves the Bar-Hillel–Carnap paradox by disentangling 'being information' from 'being informative': a proposition may be highly informative — in the sense of discriminating among states of affairs — without qualifying as strongly semantic information in Floridi's sense. Lundgren concludes that a veridical conception can be retained as a subconcept, applying where truth-aptness matters, but cannot serve as the general definition of semantic information.

## 5. Three Further Objections

### 5.1 The Instability of the Informative/Information Distinction

The first objection targets what Floridi deploys as his principal resource for neutralising the challenge from false but informationally relevant representations. Both Floridi (2005, 2007) and, from a critical direction, Lundgren (2019) operate with a distinction between two properties: being information (in the strongly semantic sense, requiring veridicality) and being informative (in the functional sense of reducing uncertainty or assigning a positive discrepancy value). Floridi's position is that these come apart: a false proposition can be informative without being information. Floridi addresses four specific versions of this challenge in his 2005 paper, arguing in each case that what genuinely counts as information is the true component extracted from or associated with the false representation, not the false representation itself.<sup>11</sup> Our objection does not contest the coherence of this distinction as a matter of definition, but its explanatory stability. Specifically, whether it can bear the weight that the TSSI requires of it without collapsing into an *ad hoc* stratagem. We argue it cannot, for three reasons.

First, the distinction generates a bifurcation in the theory's explanatory resources that no use-case in applied information science, epistemology, or philosophy of science requires. Consider the idealised models of physics: the Newtonian point-mass, the ideal gas, the frictionless plane (see Cartwright, 1983). These models are informative, i.e., they assign well-defined discrepancy values with respect to actual physical situations, yield genuine quantitative predictions, and successfully organise large empirical domains. But they are false, and so, by the VT, they are pseudo-information. No practising physicist or philosopher of science describes such models this way. She would say they carry approximate information, or information correct to within a certain margin of error, or information adequate at a given level of precision. The TSSI offers no vocabulary for this description: its only categories are 'information' (veridical) and 'pseudo-information' (not). The informativeness measure can compute the degree of inaccuracy of the model, but the theory then

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<sup>11</sup>Floridi (2005, pp. 363–365) addresses the challenge from false-but-informative propositions through four sub-cases: (FI.1) FI can include genuine information; (FI.2) FI can entail genuine information; (FI.3) FI can be indirectly informative; (FI.4) FI can support decision-making. His response to each is that what genuinely counts as information is the true component extracted from or associated with FI, not FI itself. A response that presupposes the separability we contest in the body of this paper.

discards this computation under the label of pseudo-information. The bifurcation does not capture the actual epistemic situation; it registers and then dismisses the relevant quantity.

Second, the distinction is unstable at the interface where the TSSI is supposed to do its primary philosophical work. In Floridi (2008a), he argues that epistemically relevant information vindicates the VT because what advances inquiry is always the true content conveyed, not the false component. This argument presupposes that the true and false components of any representation can be cleanly separated. In the case of idealised models, this separation is unavailable. The ideal gas model does not convey a true component plus a false component; it conveys a unified representation that is simultaneously false as a description of any actual gas and indispensable as an epistemic tool. There is no true residue to extract. If the TSSI's response to false-but-informative representations requires the separability of true and false components, it fails precisely for the most important class of scientific representations.

Third, and most directly: the distinction between being informative and being information is not derived from the formal structure of the TSSI but imposed upon it from the outside. The formula  $i(P) = 1 - [d(P)]^2$  assigns positive values to false propositions; the VT then bars those values from counting as 'genuine' informativeness. But there is no formal criterion within the measure itself that separates the genuine from the merely apparent cases. The VT functions as an external override – a normative decision to discard certain formal results rather than a theoretical consequence of the measure. This is precisely the move that Cevolani (2011, 2014) and D'Alfonso (2011) avoid in their verisimilitude-based accounts, which allow the formal apparatus to grade representations continuously from the fully true to the maximally false without imposing a categorical exclusion at the truth boundary. The TSSI's distinction between being informative and being information is therefore not a theoretical achievement but a constraint imposed from outside the formal core of the theory, whose justification the VT alone cannot provide.

## 5.2 Data Taxonomy and the Grounding Circularity in the GDI

The second objection targets the definitional foundations of the TSSI rather than the VT. It concerns the relationships among four concepts that Floridi's framework requires but does not distinguish with sufficient precision: metadata, data information, informational data, and meta-information. Once carefully distinguished,

these concepts reveal a grounding circularity within the GDI that the LoA methodology cannot resolve.<sup>12</sup>

The GDI's second condition requires that data be 'well-formed'. This is not a trivial demand. Well-formedness is a relational property: data are well-formed relative to a syntax, a code, a set of conventions, or a representational scheme. To recognise that a given dataset is well-formed, one must have access to the relevant scheme. One must know, for example, that a string of digits is a postal code, a binary encoding, or an XML file, and know the rules governing each. This knowledge is itself information about the structure and conventions governing the data in question.

A concrete case makes this dependency vivid. Suppose one encounters a manuscript filled with unfamiliar symbols arranged in rows, exhibiting statistical regularities consistent with natural language – certain symbols cluster together, others are rare, positional patterns recur within and across lines. In Floridi's terms, there is clearly data here: physical differences, lacks of uniformity between marks and parchment, between one symbol-shape and another. But are these data 'well-formed' in the sense required by condition (2) of the GDI?

To answer the question above, one needs to know what system of conventions the sequence is supposed to instantiate – what counts as a symbol, what counts as a well-formed combination, what constitutes a departure from the expected structure. Without that knowledge, one cannot determine whether the marks correctly instantiate any syntactic structure at all. The Voynich Manuscript, an undeciphered illustrated codex whose symbols exhibit language-like distributional properties while resisting all attempts at decipherment, presents exactly this situation: the physical differences are unambiguous, but the well-formedness of the data, in the GDI sense, cannot be established because the meta-information about the system generating them is absent. That meta-information is itself semantic. The GDI's second condition thus presupposes what it is supposed to generate.

The following taxonomy clarifies the issue. Metadata are data about data, not yet interpreted: a file header specifying data type, considered purely as a physical structure. Data information is metadata that has been interpreted and rendered meaningful within some LoA: the same header, now understood as encoding 'this file contains JPEG image data'. Informational data are primary data carrying information about something external to themselves: the pixel values interpreted as

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<sup>12</sup>This is what we call a grounding circularity, following the terminology of discussions in the metaphysics of grounding: a circularity arises when the existence or constitution of  $x$  is supposed to be grounded in  $y$ , but  $y$ 's constitution presupposes  $x$ . The GDI's well-formedness condition generates precisely this structure — the grounding of data-as-information in well-formedness requires the prior availability of informational resources for recognising well-formedness.

representing light intensities. Meta-information is information about information, with interpreted properties: 'this image was compressed on 15 March, reducing resolution by 30%'. The GDI's well-formedness condition requires the ability to recognise that a given set of data instantiates the relevant syntactic structure correctly. But this recognition already requires data information, and arguably meta-information, about the structure and conventions in question. The GDI thus presupposes, for its own application, precisely what it is supposed to generate: the capacity to treat data as informative.

What makes this problem particularly acute is that it arises from a tension – internal to Floridi's own conceptual apparatus. The diaphoric interpretation of data is explicitly grounded in Bateson's notion of 'a difference that makes a difference' (Floridi, 2011, ch. 4; Bateson, 1972). But Bateson's original formulation is irreducibly relational: a difference makes a difference – as Bateson put it – in some later event, for some system that can respond to it. The relational character is constitutive of the concept. Floridi, however, requires data to be pre-interpretive, alethically neutral, and independent of any interpreting agent, precisely so that the GDI can serve as a definition prior to semantics. In doing so, he strips the relational dimension that made Bateson's notion coherent in the first place. A diaphoric *datum* that is not yet 'for anything' – that makes no difference to any system – is not Bateson's difference but a de-relationalized residue of it. And a difference that is not a difference for anything carries no resources with which to anchor the 'well-formed relative to what' that condition (2) of the GDI requires. The tension is not merely extrinsic: Floridi simultaneously relies on Bateson's relational concept to characterize data and denies the relationality that concept requires.

This is a grounding circularity of a specific kind – and a clarification of its precise target is needed to anticipate a natural reply. One might object that the GDI is an explicative definition rather than a procedural one: just as the tripartite analysis of knowledge as justified true belief does not require that an agent already know what justification is in order to have knowledge, the GDI does not require that an agent already possess information in order for data to be well-formed. Well-formedness, on this reply, is an objective property of the data themselves, not a state of the interpreter. This reply is available, but it does not reach the argument as stated. Our claim is not about recognition, i.e., the epistemic conditions under which an agent comes to identify well-formedness, but about constitution: what well-formedness itself is. Well-formedness is a relational property; data are well-formed only relative to a representational scheme, and this is an informational structure.

Thus, there is no well-formedness independent of a scheme in relation to which

something is well-formed, and the existence of that scheme is already a semantic fact. The objection would succeed if well-formedness were an intrinsic, non-relational property of physical marks — but then the Voynich example shows it is not: the same physical structure can fail to be well-formed under one interpretive background while being well-formed under another. The circularity is constitutive, not merely epistemological. The GDI is supposed to ground the distinction between data and information by specifying the conditions under which data count as information.

But the second condition (well-formedness) can only be applied by an agent who already has informational resources for recognising well-formedness. Those resources are themselves constrained by the GDI: they must consist of well-formed meaningful veridical data. Recognition of well-formedness thus presupposes the GDI at a higher level, which in turn requires recognition of well-formedness at that level, and so on. This is not an epistemic regress about how an agent comes to know whether data are well-formed, but a constitutive one: the GDI cannot ground the distinction it is supposed to ground without already presupposing it.<sup>13</sup> What follows from this is that the GDI is best understood as an immanent characterization: it describes the internal relations among components of a system already operating semantically, but does not explain how that system arises from pre-semantic physical differences. A genuinely foundational account would require a theory of transition – an account of how physical differences acquire the status of well-formed data.

The closest resource within the philosophy of information tradition is Dretske's (1981) theory of natural semantic information, which grounds informational content in nomic-causal regularities: smoke carries information about fire not by virtue of any interpretive act but because a natural law connects the two. Natural information, on this account, provides a pre-semantic stratum on which conventional, GDI-structured information might be built. Floridi does not adopt this route — and for good reason. Dretske's natural information is itself embedded in a scheme that already presupposes organisms capable of exploiting nomic regularities as signals, reintroducing at the level of the organism precisely the interpretive dependency that a foundational account is meant to precede.

There is no non-circular path, within the resources of the Floridian framework

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<sup>13</sup>Floridi might respond by invoking the LoA methodology: at different levels of abstraction, what counts as 'data' and what counts as 'meta-information' shifts, and the apparent circularity is an artefact of applying concepts across levels inappropriately. But this response relocates rather than dissolves the problem. The LoA methodology is itself a meta-level theoretical tool: identifying, choosing, and applying an LoA requires informational resources – information about what observables are available, what relationships hold among them, and what level of abstraction is appropriate. These resources are not supplied by the GDI at any single level; they are presupposed at the level of the methodology itself. The LoA framework cannot serve as its own foundation.

as currently constituted, from physical difference to GDI-structured information without traversing a semantic stratum that the definition is supposed to generate. The practical stakes of this gap become visible in the applied philosophy of information: the account of information quality developed by Floridi and Illari (2014) must implicitly invoke contextual standards, i.e., accuracy, completeness, timeliness, not derivable from the GDI alone and that already presuppose the semantic stratum whose emergence the GDI does not explain.

The practical consequence is visible in Floridi's treatment of environmental information: information conveyed by non-linguistic natural phenomena such as tree rings, geological strata, or animal tracks. For such phenomena to count as well-formed and meaningful under the GDI, some agent must interpret the relevant data within an appropriate LoA. But recognising that the LoA is applicable to the data in question requires prior informational access to the relationship between the LoA and the data — itself a second-order informational act. Floridi's framework offers no non-circular account of how this act is possible, and the silence on this point is a theoretical lacuna rather than a deliberate idealisation.

### 5.3 Definite Descriptions, Indeterminacy and the Reference Point

The third objection targets the informativeness measure  $i(P) = 1 - [d(P)]^2$  directly, arguing that the measure is undefined — or at best radically indeterminate — for an important and pervasive class of propositions: those containing definite descriptions that fail to refer uniquely or whose referential content is pragmatically variable. Definite descriptions are among the most common structures in both natural language and scientific discourse, and a theory of semantic information that cannot handle them has a narrower scope than its proponents claim.

A definite description in Russell's (1905) analysis is an expression of the form 'the F', analysed as ' $\exists x(Fx \wedge \forall y(Fy \rightarrow y = x) \wedge \dots)$ '. If no unique F exists, the proposition is false, but remains meaningful. Floridi's measure requires that  $w$  be fixed: a maximally informative and accurate description of the situation  $s$  that  $P$  is about. The difficulty arises in cases where the definite description in  $P$  fails to uniquely pick out a referent, making the identity of  $s$ , and hence of  $w$ , indeterminate.

The classic case is  $P =$  'The present King of France is bald.' On a Russellian analysis,  $P$  is false: there is no present King of France. But what is  $w$  for this sentence? France's current republican arrangements constitute one possible candidate for  $s$ , in which case  $w$  might be 'France is a republic and has no monarch';  $d(P)$

would then be very large. But in this interpretation, P is not really 'about' a king at all – it is about France's political system, which is only negatively relevant to P's apparent subject. Alternatively, s might be taken as the non-existent situation of there being a king – but a non-existent situation has no w. The informativeness measure is undefined because w is undefined.

Consider next a proposition involving what appears to be a harmlessly imprecise description: 'The average European household consumes 4,200 kWh of electricity per year.' This sentence is commonly treated as informative in both policy and scientific contexts. Yet 'the average European household' does not denote any particular household; on a strict Russellian reading, either the sentence is false (since no unique average household exists) or its truth conditions require unpacking into a quantificational structure whose relationship to any particular situation s is unclear. The  $d(P)$  calculation with respect to a fixed w faces the same indeterminacy as in the previous case, though now it arises not from non-existence but from statistical generalisation.

The difficulty is compounded by Donnellan's (1966) distinction between referential and attributive uses of definite descriptions.<sup>14</sup> In the referential use, a speaker employs 'the F' to pick out a particular individual she has in mind, even if that individual does not uniquely satisfy F. In the attributive use, the speaker says something about whoever uniquely satisfies F, without any particular individual in mind. The same sentence can function either way depending on communicative context, yielding different (or undefined) values of  $d(P)$  for the same proposition depending on the pragmatic context of utterance. The formula  $i(P) = 1 - [d(P)]^2$  is thus not a function of the proposition P alone, and Floridi's theory provides no principled account of how the relevant pragmatic context enters the measure.

A Floridian might respond that the TSSI operates at an LoA that abstracts away from context-dependence, treating reference as fixed in the way formal logic does. This response merits consideration but ultimately concedes too much. The TSSI is repeatedly presented – by Floridi himself and in Sequoiah-Grayson and Floridi (2022), for example – as having applications to real-world epistemic problems: the quality of information in databases, the analysis of misinformation, the epistemology of being informed. These applications involve natural language representations saturated with definite descriptions. A theory that exempts itself from

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<sup>14</sup>Donnellan (1966, pp. 285–287) illustrates the referential use: 'Smith's murderer is insane', uttered at a trial by someone who has Jones in mind as the defendant, says something about Jones even if Jones did not commit the murder. The discrepancy value  $d(P)$  should in this case be computed with respect to Jones's properties, not with respect to whoever actually murdered Smith. Floridi's measure, anchored to a context-independent w, cannot straightforwardly accommodate this pragmatic dependence.

handling definite descriptions by abstracting them away cannot consistently claim applicability to the real-world epistemic phenomena motivating it.<sup>15</sup>

A defender of the TSSI might press a more technical reply: in a model-theoretic semantics of the kind Floridi employs, definite descriptions are handled as partial functions over a domain of interpretation fixed by the LoA adopted for the analysis. On this approach, ‘the present King of France’ is simply undefined in any model with the actual domain, the proposition is false, and  $d(P)$  is computed with respect to the actual facts about France — no pragmatic indeterminacy arises because reference is settled model-theoretically before pragmatics enters the picture. The difficulty with this reply is that it defers rather than resolves the problem. The choice of domain — the decision about which objects populate the model — is itself a theoretically loaded step, not a neutral datum.

For the cosmological proposition discussed above, competing theories of quantum gravity, inflationary cosmology, and loop quantum cosmology not only assign different properties to the object described but disagree about whether any such object exists at all, and consequently about whether the domain contains a referent for the description. Selecting a domain in such cases is not a formal operation performed within the TSSI; it is a substantive scientific commitment that precedes the application of the measure. The very step that the LoA methodology is supposed to manage (identifying the appropriate LoA) is in these cases the object of genuine theoretical disagreement, and no model-theoretic apparatus within the TSSI can resolve it. The formal machinery presupposes what the application of the theory to real scientific content cannot take for granted.

Moreover, the difficulty is not limited to non-denoting or statistically defined descriptions. Consider a proposition from physical cosmology: ‘The moment immediately following the Big Bang singularity had a temperature of approximately  $10^{32}$  K.’ This proposition contains a definite description — ‘the moment immediately following the Big Bang singularity’ — whose referential content is contested across competing theories of quantum gravity, inflationary cosmology, loop quantum cosmology, and string cosmology.<sup>16</sup> Under each theoretical framework, the situation

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<sup>15</sup>Strawson (1950) challenged Russell’s analysis by arguing that sentences containing non-denoting definite descriptions do not make a false statement but suffer presupposition failure; they fail to make a statement at all. Under Strawson’s account, the problem for the informativeness measure is more severe: there is no proposition to evaluate, hence no  $d(P)$  to compute. Kripke’s (1977) critique of description theories adds a further layer: reference may be determined by causal-historical chains rather than descriptive content, making the determination of  $w$  even more elusive.

<sup>16</sup>The cosmological case is especially compelling because no paraphrase eliminates the referential difficulty: competing theories of quantum gravity, inflationary cosmology, loop quantum cosmology, and string cosmology each assign different physical content, or deny physical content altogether,

s and hence the reference point  $w$  would be specified differently – or not at all, if the theory entails that no such moment exists. The discrepancy  $d(P)$  would receive different values under different theoretical commitments, and this theoretical dependence is not a feature of the proposition itself but of the framework chosen to interpret it. This is not a marginal exotic case: it is a proposition that any adequate theory of scientific information would need to evaluate, and it illustrates how deeply the referential indeterminacy of definite descriptions pervades scientific discourse.

## 6. A Prospective Direction: Graded Adequacy and Contextual Fitness

The three objections advanced in Section 5 converge on a shared theoretical diagnosis. The TSSI assumes a single, fixed, context-independent reference world  $w$  as the anchor for informativeness computations; it imposes a binary distinction between information and pseudo-information as its evaluative framework; and it operates at a level of idealisation that excludes context-sensitive, pragmatically determined informational phenomena. These are not independent weaknesses but manifestations of a common commitment: that the alethic status of a representation can be determined independently of the purposes and contexts for which it is deployed. We sketch here, in explicitly prospective terms, the direction in which a more adequate theory might develop. The suggestion is not a finished alternative but a research agenda; the gap between what the objections establish and what a complete successor theory would require remains substantial.

The central idea is to replace the binary VT with a graded adequacy condition: rather than asking whether  $P$  is true or false, one asks how adequate  $P$  is to the purposes and contexts for which it is employed. Adequacy admits of degrees and is relativised to a context of use. This connects naturally with Hacking's (1992) concept of self-authenticating styles of reasoning – a concept that, properly understood, is more radical than is sometimes acknowledged in the literature. For Hacking, a style of reasoning does not merely organise antecedently available epistemic items or determine what counts as good evidence; it constitutes which propositions are even candidates for truth or falsehood.<sup>17</sup> Styles become standards of objectivity

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to 'the moment immediately following the Big Bang singularity'. The determination of  $w$  is here not a matter of lexical disambiguation but of unresolved empirical and theoretical disagreement.

<sup>17</sup>As he puts it, a sentence of the kind introduced by a given style 'is a candidate for truth or falsehood only in the context of the style' (Hacking, 1992, p. 13). Outside the appropriate style, the sentence has no alethic value — it is not true-or-false at all.

because they get at the truth, but the truth they get at is internal to the style that introduced the relevant type of sentence.

What is immune to refutation is the style itself, not the content it produces. For information theory, this carries a strong implication that our earlier discussion understated: the requirement for a fixed, style-independent  $w$  is not merely impractical but philosophically misconceived. The TSSI presupposes that propositions can be assessed for veridicality independently of the inferential context in which they are deployed; Hacking's self-authentication thesis denies precisely this. Bueno's (2012) pluralist account of styles of reasoning provides a further resource for this direction. Bueno distinguishes Hacking's broad styles (postulational, experimental, statistical, taxonomic, historical-genetic) from what he calls narrow styles: more domain-specific patterns of inferential relations that are used to select, interpret, and support evidence for results in a particular field.<sup>18</sup> Different narrow styles produce genuinely different standards of adequacy: what counts as an adequate representation in molecular biology differs from what counts as adequate in pure mathematics, and neither reduces to a single notion of correspondence with a context-independent world  $w$ .

This pluralism about styles is, we suggest, the appropriate methodological counterpart to Floridi's own acknowledgement that information is polymorphic. If information takes genuinely different forms across contexts, and if the standards for evaluating representations are set by the inferential practices of the context in question, then the adequacy of an informational representation cannot be assessed by a single, uniform veridicality condition. The graded adequacy function  $A(P, c)$  sketched below is, in effect, a formalisation of the insight that style-relative adequacy is the appropriate evaluative standard for a genuinely polymorphic theory of information.

Before sketching this formalism, it is worth noting that a more parsimonious alternative path exists, one that addresses all three objections of Section 5 with fewer theoretical resources: the outright adoption of alethic neutrality (NA) as the default position. Several authors have shown that an alethically neutral conception of semantic information – one that does not require truth as a constitutive condition – can resolve the Bar-Hillel–Carnap paradox, accommodate the epistemic value of false representations, and sidestep the well-formedness circularity identified in Section 5.2.

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<sup>18</sup>As Bueno defines them, narrow styles are fundamentally inferential in nature: their purpose is to enable agents to infer relevant information about the domain under investigation, and they set the standard of adequacy against which representations are evaluated (cf. Suárez, 2004, on how inferential roles determine the fitness of scientific representations).

Lundgren (2019) demonstrates this by disentangling informativeness from being information and retaining the veridical conception as a sub-concept rather than a defining condition; Long (2014) provides an ontological grounding for the same position; and Primiero (2009) develops a formal logic of becoming informed that explicitly rejects the VT in favour of proof-conditional semantics. This is an approach extended in his more recent work (2020; 2022) to cover false and damaged information as formally tractable entities with specific semantic properties, rather than treating them as mere absences of genuine information as the VT requires. On any of these accounts, veridicality is not eliminated but relocated: it marks one end of the informational spectrum, not its threshold. The graded adequacy function  $A(P, c)$  sketched below can be read as a formalisation of precisely this relocation – what Floridi calls information would correspond to the  $A(P, c) = 1$  case, making the TSSI a special, limiting instance of a more general framework. That route (Option A, in the terms of our analysis) would make the theoretical gains of the present paper more transparent; we leave its full development for future work.

Applied formally, the suggestion would be to replace the binary VT with a continuous function  $A(P, c) \in [0, 1]$ , where  $c$  is a context of use:  $A(P, c) = 1$  represents full adequacy – the highest grade, corresponding roughly to Floridi's veridical information; lower values represent partial adequacy;  $A(P, c) = 0$  represents complete inadequacy, what Floridi might intend by pseudo-information. The comparison with verisimilitude-based accounts is instructive here. Cevolani (2014) demonstrates that Floridi's discrepancy measure cannot discriminate among false statements that differ in their degree of closeness to the truth.<sup>19</sup> A graded adequacy function  $A(P, c)$  incorporating contextual parameters alongside discrepancy values might achieve what neither pure veridicality nor pure verisimilitude achieves alone.<sup>20</sup> The function  $A(P, c)$  is a measure of adequacy relative to a context of use (not of absolute proximity to a language-independent truth), and this contextual relativity is precisely what makes it resistant to the instability results that afflict purely verisimilitude-based accounts.

How the adequacy function  $A$  is to be formalised precisely, how it relates

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<sup>19</sup>Cevolani (2014) demonstrates that Floridi's discrepancy measure cannot serve as a verisimilitude measure because it fails to discriminate among false statements that differ in their degree of closeness to the truth. This is a technically precise limitation with significant implications: a theory that cannot grade degrees of falsehood cannot explain why some false representations are epistemically superior to others, precisely what a theory of information quality would need to do.

<sup>20</sup>It is worth noting that the contextual parameter  $c$  also provides a principled response to the Miller-Tichý objection (Miller, 1974; Tichý, 1974), which demonstrated that Popperian verisimilitude – measured as absolute distance-to-truth – is language-dependent and formally unstable: for any false theory, a change of language can always make it appear closer to the truth than a true theory.

to  $d(P)$ , and whether it avoids reintroducing analogous difficulties in a different vocabulary are questions that cannot be answered here. The contribution of the present discussion is to show that the motivation for this revision arises from internal pressures on the TSSI and that the gap between what the TSSI achieves and what a general theory of information would need to achieve is wider than the theory's proponents have acknowledged.

## 7. Concluding Remarks

Floridi's strongly semantic theory of information is a genuine and significant contribution to the philosophy of information. It provides a carefully articulated definition of information, a multi-layered defence of the veridicality thesis across a sequence of publications spanning 2004–2012, a quantitative framework for measuring informational accuracy, and technically sophisticated responses to two classical puzzles. The dissolution of the Bar-Hillel–Carnap paradox and the treatment of the deduction scandal via virtual information are illuminating and have deservedly attracted sustained attention in the literature.

The three objections advanced in Section 5 identify difficulties of a persistent and interconnected character — pressures that require structural revision. The first shows that the distinction between 'being informative' and 'being information', which Floridi deploys to handle false-but-informative propositions, is unstable: it cannot account for the epistemic status of scientific idealisations, requires a separability of true and false components where none is available, and operates as an external override of the formal apparatus rather than a consequence of it. The second reveals a grounding circularity in the GDI: the well-formedness condition presupposes informational resources (a form of meta-information) that the GDI itself is supposed to generate. The third shows that definite descriptions introduce referential indeterminacy that destabilises the reference point  $w$  upon which the informativeness measure depends, and that this difficulty cannot be exempted by appeal to idealisation without sacrificing the theory's claim to applicability in real epistemic contexts.

These difficulties do not place the TSSI in a uniquely weak position. Verisimilitude-based alternatives (D'Alfonso, 2011; Cevolani, 2011, 2014) avoid the first difficulty but face their own challenges regarding the formal definition of closeness-to-truth and the handling of reference. Alethically neutral accounts (Long, 2014; Lundgren, 2019) avoid all three at the cost of abandoning the veridicality condition entirely, with consequences for the theory's connection to epistemology and knowledge. The

semantic information theory is genuinely contested, and no existing account is without serious difficulties.

What the present analysis suggests is that the TSSI's commitment to binary veridicality and to a context-independent reference point  $w$  are the specific features most in need of revision. The prospective direction sketched in Section 6 – graded adequacy relativised to contexts of use – is a pointer rather than a programme. Developing it into a rigorous formal theory with a precise account of how  $A(P, c)$  relates to  $d(P)$  and how it avoids reintroducing the difficulties it is designed to overcome remains substantial work for the future. The more modest contribution of the present paper is to have shown, through internally motivated arguments, that the TSSI's own formal resources point beyond the binary veridicality framework within which they are currently embedded.

## References

ADRIAANS, Pieter. A critical analysis of Floridi's theory of semantic information. *Knowledge, Technology & Policy*, v. 23, n. 1–2, p. 41–56, 2010.

ALLO, Patrick. The logic of 'being informed' revisited and revised. *Philosophical Studies*, v. 153, n. 3, p. 417–434, 2011.

BAR-HILLEL, Yehoshua; CARNAP, Rudolf. Semantic information. *The British Journal for the Philosophy of Science*, v. 4, n. 14, p. 147–157, 1953.

BARWISE, Jon; PERRY, John. *Situations and Attitudes*. Cambridge, MA: MIT Press, 1983.

BATESON, Gregory. *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology*. New York: Ballantine Books, 1972.

BUENO, Otávio. Styles of reasoning: a pluralist view. *Studies in History and Philosophy of Science*, v. 43, n. 4, p. 657–665, 2012.

CARTWRIGHT, Nancy. *How the Laws of Physics Lie*. Oxford: Clarendon Press, 1983.

CEVOLANI, Gustavo. Verisimilitude and strongly semantic information. *Etica & Politica / Ethics & Politics*, v. 13, n. 2, p. 159–179, 2011.

CEVOLANI, Gustavo. Strongly semantic information as information about the truth. In: CIUNI, Roberto; WANSING, Heinrich; WILLKOMMEN, Caroline (ed.). *Recent Trends in Philosophical Logic*. Cham: Springer, 2014. p. 59–74. (*Trends in Logic*, v. 41).

COOK, Stephen. The complexity of theorem proving procedures. In: *PROCEEDINGS OF THE THIRD ANNUAL ACM SYMPOSIUM ON THEORY OF COMPUTING*. New York: ACM Press, 1971. p. 151–158.

D'AGOSTINO, Marcello; FLORIDI, Luciano. The enduring scandal of deduction: is propositional logic really uninformative? *Synthese*, v. 167, n. 2, p. 271–315, 2009.

D'ALFONSO, Simon. On quantifying semantic information. *Information*, v. 2, n. 1, p. 61–101, 2011.

DODIG-CRNKOVIĆ, Gordana. System modelling and information semantics. In: BUBENKO, Janis Jr. et al. (ed.). *Proceedings of the Fifth Promote IT Conference*. Lund: Studentlitteratur, 2005.

- DONNELLAN, Keith. Reference and definite descriptions. *The Philosophical Review*, v. 75, n. 3, p. 281–304, 1966.
- DRETSKE, Fred I. *Knowledge and the Flow of Information*. Oxford: Blackwell, 1981.
- FALLIS, Don. Floridi on misinformation. *Etica & Politica / Ethics & Politics*, v. 13, n. 2, p. 201–214, 2011.
- DUMMETT, Michael. *The Logical Basis of Metaphysics*. London: Duckworth, 1991.
- FERGUSON, Thomas Macaulay. Two paradoxes of semantic information. *Synthese*, v. 192, n. 11, p. 3719–3730, 2015.
- FETZER, James H. Information: does it have to be true? *Minds and Machines*, v. 14, n. 2, p. 223–229, 2004.
- FLORIDI, Luciano. Outline of a theory of strongly semantic information. *Minds and Machines*, v. 14, n. 2, p. 197–221, 2004.
- FLORIDI, Luciano. Is semantic information meaningful data? *Philosophy and Phenomenological Research*, v. 70, n. 2, p. 351–370, 2005.
- FLORIDI, Luciano. The logic of being informed. *Logique et Analyse*, v. 49, n. 196, p. 433–460, 2006.
- FLORIDI, Luciano. In defence of the veridical nature of semantic information. *European Journal of Analytic Philosophy*, v. 3, n. 1, p. 31–41, 2007.
- FLORIDI, Luciano. Understanding epistemic relevance. *Erkenntnis*, v. 69, n. 1, p. 69–92, 2008a.
- FLORIDI, Luciano. The method of levels of abstraction. *Minds and Machines*, v. 18, n. 3, p. 303–329, 2008b.
- FLORIDI, Luciano. *The Philosophy of Information*. Oxford: Oxford University Press, 2011.
- FLORIDI, Luciano. A defence of constructionism: philosophy as conceptual engineering. *Metaphilosophy*, v. 42, n. 3, p. 282–304, 2011b.
- FLORIDI, Luciano. Semantic information and the network theory of account. *Synthese*, v. 184, n. 3, p. 431–454, 2012.
- FLORIDI, Luciano; ILLARI, Phyllis McKay (ed.). *The Philosophy of Information*

Quality. Cham: Springer International Publishing, 2014. (Synthese Library, v. 358).

FRESCO, Nir; MICHAEL, Michaelis. Information and veridicality: information processing and the Bar-Hillel/Carnap paradox. *Philosophy of Science*, v. 83, n. 1, p. 131–151, 2016.

FRICKÉ, Martin. Information using likeness measures. *Journal of the American Society for Information Science*, v. 48, n. 10, p. 882–892, 1997.

GEACH, Peter T. Good and evil. *Analysis*, v. 17, n. 2, p. 33–42, 1956.

HACKING, Ian. 'Style' for historians and philosophers. *Studies in History and Philosophy of Science*, v. 23, n. 1, p. 1–20, 1992.

HINTIKKA, Jaakko. *Logic, Language-Games and Information: Kantian Themes in the Philosophy of Logic*. Oxford: Clarendon Press, 1973.

KRIPKE, Saul. Speaker's reference and semantic reference. *Midwest Studies in Philosophy*, v. 2, n. 1, p. 255–276, 1977.

LONG, Bruce Raymond. Information is intrinsically semantic but alethically neutral. *Synthese*, v. 191, n. 14, p. 3447–3467, 2014.

LUNDGREN, Björn. The information liar paradox: a problem for Floridi's RSDI definition. *Philosophy and Technology*, v. 28, n. 2, p. 323–327, 2015.

LUNDGREN, Björn. Does semantic information need to be truthful? *Synthese*, v. 196, n. 7, p. 2885–2906, 2019.

MILLER, David. Popper's qualitative theory of verisimilitude. *The British Journal for the Philosophy of Science*, v. 25, n. 2, p. 166–177, 1974.

PRIMIERO, Giuseppe. An epistemic constructive definition of information. *Logique et Analyse*, v. 52, n. 205, p. 65–86, 2009.

RUSSELL, Bertrand. On denoting. *Mind*, v. 14, n. 56, p. 479–493, 1905.

SCARANTINO, Andrea; PICCININI, Gualtiero. Information without truth. *Metaphilosophy*, v. 41, n. 3, p. 313–330, 2010.

SEQUOIAH-GRAYSON, Sebastian. The metaphilosophy of information. *Minds and Machines*, v. 17, n. 3, p. 331–344, 2007.

SEQUOIAH-GRAYSON, Sebastian. The scandal of deduction. *Journal of Philosophical Logic*, v. 37, n. 1, p. 67–94, 2008.

SEQUOIAH-GRAYSON, Sebastian; FLORIDI, Luciano. Semantic conceptions of information. In: ZALTA, Edward N. (ed.). *The Stanford Encyclopedia of Philosophy*. Spring 2022 ed. Stanford: Stanford University, 2022.

SHANNON, Claude E. A mathematical theory of communication. *Bell System Technical Journal*, v. 27, n. 3, p. 379–423, 1948.

STRAWSON, Peter F. On referring. *Mind*, v. 59, n. 235, p. 320–344, 1950.

SUÁREZ, Mauricio. An inferential conception of scientific representation. *Philosophy of Science*, v. 71, n. 5, p. 767–779, 2004.

TICHÝ, Pavel. On Popper's definitions of verisimilitude. *The British Journal for the Philosophy of Science*, v. 25, n. 2, p. 155–160, 1974.

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