True to fact(s)

Jacques Jayez, Danièle Godard

True to Fact(s)

Jacques Jayez, EHESS, Paris and Danièle Godard, CNRS and Université de Lille 3

1 Introduction

There is a long–standing controversy in the philosophy of language concerning the nature of facts. Linguists have used the term to categorize a type of semantic argument, introduced notably by factive predicates (*know, regret,* etc.). However, no clear definition of the category has emerged. The philosophical approaches oscillate between a realistic conception, where facts are akin to states of affairs in the world (Russell, Austin, Bennett) and a more abstract conception where facts are akin to informational entities (Strawson, Vendler, Devlin, Asher). In linguistics, it is unclear whether *fact* labels sentential arguments which can be paraphrased by *the fact that* S or arrays of distributional and semantic properties. The problem partly stems from a confusion between the lexical content of the word and the category of facts. In addition, as noted by Vendler (1967), *fact* and *facts* are semantically different, the plural noun being eventuality denoting. This difference is also observed in French. In this paper, we address the semantic and ontological status of the singular noun *fait* (*fact*) in French.

2 Distributional properties of *fait*

By using distributional data, Vendler was able to motivate an ontology distinguishing between different types of entities in the world. When applied to facts, the same methodology is less satisfactory. Vendler shows that facts are neither eventualities nor propositions, but does not offer a positive characterization. In particular, there is no single predicate or set of predicates which combines only with *fact*, in contrast with events, which are uniquely characterized by predicates such as *take place.*

We discuss three sets of properties which are taken to be crucial in the literature. First, *fait* can be the subject of *causer* ('cause'), as in *Le fait que Jean ait démissionné a causé de nombreux ennuis* ('The fact that John resigned caused a lot of trouble'). For Vendler, only facts can be the subject of 'cause'. Peterson (1997) argues that events also have this property and Asher (1993) considers that the causal efficacy of facts and events points to the existence of some connection between the two. Actually the 'cause' test is not discriminative at the distributional level, because there are few types of nouns which cannot be the subject of *causer.* Propositions can: *La proposition spinoziste que Dieu est la Nature a causé un énorme scandale dans certains milieux* ('Spinoza's proposition that God is Nature caused a deep shock in some quarters'). Objects in general are also acceptable (*This book caused some puzzlement*).

There is general agreement that facts lack spatio–temporal properties, which sets them apart from eventualities. This is true of *fait* in general, since it cannot be the subject of *avoir lieu* ('take place'), *durer* ('to last') and aspectual verbs or the complement of temporal prepositions. However, this widely accepted observation is too simplistic. *Fait* can be the argument of *se produire* (≈ 'to happen'). It can also be the argument of adjectives like *nouveau* ('new'), *ancien* ('old'), *récent* ('recent'), *inopiné* (≈ 'sudden'), which pertain to the temporal domain.

(1) a. Il s'est produit un fait intéressant ce matin.
     lit. 'there happened an interesting fact this morning'
  b. ??Après un fait aussi intéressant
     'After such an interesting fact'

Finally, it is usually noted that, although the non–temporal properties of *fait* show it to be akin to informational objects, it cannot be the argument of 'true' and 'false'. Moreover, while *fait* is compatible with some adjectives appropriate for informational objects like 'theory' or 'idea' (*clair*, 'clear', *évident*, 'obvious',

irréfutable, ≈ 'indisputable', *douteux*, 'dubious', *avéré*, 'ascertained'), it cannot be a part of an informational object (*Cette idée/??Ce fait se trouve dans l'oeuvre de Spinoza*, 'This idea/This fact is found in Spinoza's works'). In this respect, *fait* is quite different from informational objects in general (Godard & Jayez 1994).

To sum up, while *fait* is neither an eventuality nor an informational object, it is not even clear that its distributional properties point to a stable category on a par with recognized lexical types (event, material object). One must account for this mixed behavior as well as for the combinatorial differences within each class of predicates.

3 Facts as Zalta–style abstract objets

We propose that *fait* refers to an *abstract object* (a.o.) in the sense of Zalta (1997, 1999). A.o. are sets of properties. Thus they evade spatio–temporal localization. There are several kinds of a.o.: fictional characters like Ulysses or Sherlock Holmes, Meinongian objects, numbers, propositional entities (for us, the entities which NPs like 'the proposition that' refer to), etc. We define the a.o. denoted by *fait* to be the set containing the property of warranting the truth of a certain proposition. For instance, the fact that Mary proved the theorem refers to a set containing the property of being such that the proposition 'Mary proved the theorem' is true. In addition, this a.o. is paired with the part of the world (event or state of affairs (s.o.a.)) which makes the proposition true. When this truthmaker is an event, predicates like *nouveau* can retrieve the event in the information structure associated with *fait*, whence the possibility of *nouveau fait* ('new fact').

The initial motivation for a.o. is philosophical. Elaborating on Meinong's and Mally's approaches Zalta aims at capturing the difference between an individual satisfying a property in the traditional, model–theoretic, sense and a property essentially characterizing an object. In the former case, the individual (an ordinary object) is said to *exemplify* the property, while the object (an abstract object) *encodes* the property in the latter case. For instance, John may happen to be a detective. In this case, he exemplifies the property of being a detective by accident. John may also be a detective in virtue of his nature (Fine 1995). He necessarily exemplifies the same property. Finally, John may be a fictional detective, like Sherlock Holmes, in which case he is a detective by stipulation and encodes (at least) that property.

(2) Let **D** be a domain of individuals, $a \in$ **D**, $\mathcal{P}$ a property and W a set of worlds. a satisfies $\mathcal{P}$ at some world $w \in W$ iff a is in the extension of $\mathcal{P}$ at w. Let A be a set of properties. A encodes $\mathcal{P}$ iff $\mathcal{P} \in A$.

Ordinary objects may exemplify spatio–temporal properties. In contrast, a.o. encode the property of being necessarily non spatio–temporal. Nevertheless, they appear to be the argument of predicates which involve space and time. For instance *Mary dreamt of Sherlock Holmes* refers to a particular eventuality. If a.o. are put in the same domain as ordinary objects, we lose well–foundedness. To avoid that, Zalta introduces special objets which are the proxies of a.o. in the domain of individuals. Proxies themselves are not spatio–temporal (they exemplify the property of being necessarily so), but they can enter spatio–temporal relations. In the above sentence, *Sherlock Holmes* denotes the proxy of the a.o. Sherlock Holmes.

Zalta's models have the form $\langle W, \mathbf{O}, \mathbf{S}, \mathbf{A} \rangle$, where W is the set of possible worlds, **O** the set of ordinary objects, **S** the set of special objects and **A** the set of abstract objects. For each relation R^n, $ext(R, w) \subseteq (\mathbf{O} \cup \mathbf{S})^n$ is its extension at w. As indicated, **A** is the powerset of the set of properties. A function $\pi : \mathbf{A} \mapsto \mathbf{S}$ returns, for each a.o., its proxy in **S**. Like a.o., entitites in **S** are not spatio–temporal but can exemplify relations with concrete entities. For instance, the logical form of Mary dreaming of Sherlock Holmes at a certain time t and location ℓ is:

Mary dreams of π(Sherlock Holmes) at $\langle t, \ell \rangle$

The connection between a.o. and proxies is given in (3).

(3) If an a.o. a encodes the property $\mathcal{P}$, its proxy $\pi(a)$ exemplifies $\mathcal{P}$ in every world.

Going back to the semantics of facts, we can now make sense of the divergent intuitions found in the literature. The distributional properties clearly show that an analysis of *fait* as denoting parts of the world is inappropriate. However, this analysis was based on the correct intuition that a fact is the *truthmaker* of a proposition. The symmetric option (a fact is proposition–like) is based on the intuition that a fact contains an information of the same type as a proposition. While it is clear that ordinary s.o.a. are truthmakers (Armstrong 1997), the idea that a.o. can also be truthmakers needs some explanation. Actually, a fact has the intrinsic property of being a truthmaker: it encodes the property of being such that a given proposition obtains. Similarly, there are abstract truthbearers, corresponding to *proposition*, *hypothesis*, *idea*, etc. An abstract truthbearer encodes the property of being such that there is some truthmaker which exemplifies 'being such that p or $\neg p$' for some p.

(4) An a.o. is a set of properties which contains the property $\lambda x. \Box (x$ is not spatio–temporal).
An a.o. is an abstract truthmaker iff it encodes the property $\lambda x. p$ for some p.
An a.o. is an abstract truthbearer iff it encodes the property $\lambda x. (\exists y. ((\lambda z. p)\,[y] \vee (\lambda z. \neg p)\,[y]))$ for some p.

An analysis where an object can be both abstract and a truthmaker might seem counterintuitive. However, the linguistic data confirm that a fact is more difficult to reflect in the material world than propositions, a property which they share with ordinary truthmakers (events and s.o.a.). Minimally, propositions can be written (in a book or on a blackboard). This is not true for facts, as observed in section 2. Compare (5a) and (5b):

(5) a. Regardez la proposition que j'ai écrite au tableau et dites–moi si elle est correcte.
'Look at the proposition I wrote on the blackboard and tell me if it's correct'
b. ??Regardez le fait que j'ai écrit au tableau et dites–moi s'il est pertinent.
'Look at the fact I wrote on the blackboard and tell me if it's relevant'

Facts, like events and s.o.a., can be described, discussed, etc., but not physically coded since they have the function of things, not of informational entities. Only the latter can be physically coded. It has been proposed, in the framework of situation semantics, that facts are infons supported by actual situations (Devlin 1991, Ginzburg 1995). However, if facts were infons they should be amenable to some form of material coding. In addition, the relations and terms which are parts of infons should constitute parts of facts as well. But they do not. One may not refer to the 'arguments' or 'predicates' of a fact (*??Quel est l'individu mentionné dans le fait que vous venez de rappeler?*, 'Who is the person mentioned in the fact you just evoked?').
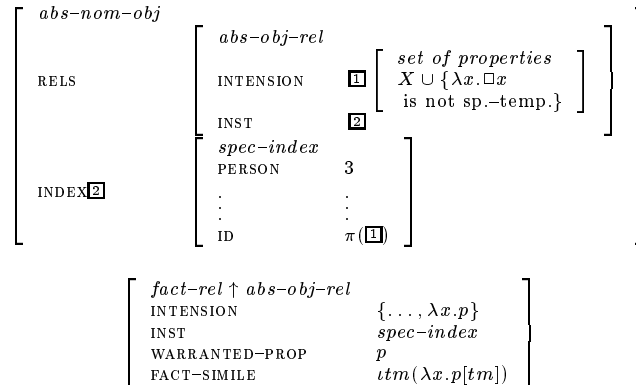
Like a.o. in general, facts have proxies, which allow them to be mentioned in episodic sentences ('Mary suddenly remembered a fact she had forgotten'). But facts differ from other a.o. in that they are also strongly connected with ordinary truthmakers, as stressed in (Bennett 1988, Asher 1993). Certainly, facts are not ordinary truthmakers, but they are paired with ordinary truthmakers which support a proposition. Let *tm* be an ordinary truthmaker which can be described by the proposition p. *tm* is part of the world and is the material truthmaker of p, or, in Zalta's terms, exemplifies the propositional property $\lambda x. p$. *tm* exists in itself, can be described by propositions, but is not defined as being the truthmaker of any proposition, in contrast with a fact. Consider f, the fact that p. f has a proxy $\pi(f)$

which necessarily exemplifies the property of being such that p, by definition (3). It is hardly conceivable that, in w, the proxy can warrant the truth of p without there being an ordinary truthmaker which warrants the truth of p. If it is a fact that Mary proved the theorem, there must be an event of Mary's proving the theorem. So, in every world w, $\pi(f)$ exemplifies $\lambda x.p$ iff, in w, there is a truthmaker tm such that tm (ordinarily) exemplifies $\lambda x.p$. In this respect, the proxy of a fact is strongly connected with the proposition $\exists tm((\lambda x.p)\,[tm])$. We call the ordinary truthmaker which satisfies this proposition in w the *fact–simile* of f in w. The connection with the fact–simile explains the temporal sensitivity of the word *fait*, noted in section 2.

This view of the relationship between facts, ordinary truthmakers (events or s.o.a.) and propositions bears a strong resemblance to that of Asher (1993). Roughly speaking, the proxy corresponds to the notion of 'event–type' and the 'companion proposition' corresponds to p in *the fact that p*. Our analysis differs from Asher's in at least two ways. First, the semantics of the word is not the same. In particular, we do not use the term 'abstract object' as a label, for a category similar to eventualities and objects. We exploit Zalta's analysis to shed light on the very notion of abstract object. This allows us to capture the fact that the relationship between a fact and its companion proposition is not the same than that between an event and the proposition which describes it. We show why the realistic dimension of facts (they are truthmakers) does not entail that they are in the world. Second, we propose that the link between a fact and its fact–simile is part of the lexical representation of the word.

4 Lexical representation

We represent the lexical content of *fait* using the feature–value format of HPSG (Pollard & Sag 1994, Copestake et al. 1997). Noun content is represented as a feature structure of type *nom–obj*. In order to accommodate a.o., we divide this type into the two subtypes *ord–nom–obj*, for nouns denoting an ordinary entity and *abs–nom–obj* for nouns denoting an a.o. A structure of type *abs–nom–obj* has the same two attributes RELS and INDEX as *ord–nom–obj*, but the values are different. RELS contains the predicative information of the N and an INST(ance) feature whose value is an index identified with the value of INDEX; the index points to an individual in the domain of interpretation. For *abs–obj–nom*, the type of the RELS value is *abs-obj-rel*, whose structure contains an attribute INTENSION in addition to the usual attribute INST. The value of INTENSION is a set of properties. It is characteristic of *abs–obj–rel* that the intension contains the property of necessarily being non spatio–temporal. The value of INDEX also is different from the standard value. In fact, we interpret the index as being that of the proxy, since only the proxy can be the argument of linguistic predicates. The index gets the new subtype *spec–index* with an additional attribute ID, which contains the proxy of the a.o. which is the value of INTENSION.

$$
\begin{bmatrix}
abs{-}nom{-}obj \\[4pt]
\text{RELS} \quad
\begin{bmatrix}
abs{-}obj{-}rel \\
\text{INTENSION} \quad \boxed{1}
\begin{bmatrix}
set\ of\ properties \\
X \cup \{\lambda x.\Box x \\
\text{is not sp.--temp.}\}
\end{bmatrix} \\
\text{INST} \quad \boxed{2}
\end{bmatrix} \\[4pt]
\text{INDEX}\ \boxed{2}
\begin{bmatrix}
spec{-}index \\
\text{PERSON} \quad 3 \\
\vdots \qquad\qquad \vdots \\
\text{ID} \qquad \pi(\boxed{1})
\end{bmatrix}
\end{bmatrix}
$$

$$
\begin{bmatrix}
fact{-}rel \uparrow abs{-}obj{-}rel \\
\text{INTENSION} \qquad \{\ldots, \lambda x.p\} \\
\text{INST} \qquad\qquad spec{-}index \\
\text{WARRANTED{-}PROP} \quad p \\
\text{FACT{-}SIMILE} \qquad \iota tm(\lambda x.p[tm])
\end{bmatrix}
$$

The lower structure represents the value of RELS in *fait*, which inherits from the type *abs–obj–rel*. The intension is a set of properties containing the property of being such that p. This reflects our analysis of *fait* as an abstract truthmaker. The type *fact–rel* has two special attributes: WARRANTED–PROP, which points to the proposition that the fact makes true and FACT–SIMILE, which points to the companion truthmaker of the fact. We assume that, in each world, there is a unique truthmaker which is the ordinary truthmaker of a given proposition p. It is widely accepted that reference is contextually restricted so that an episodic sentence is intended to point to a particular truthmaker. For generic sentences, which can express propositions warranted by facts (*le fait que les chats chassent les souris*, 'the fact that cats hunt mice'), the value of FACT–SIMILE should be the set of those hunting events whose participants are cats and mice.

It remains to account for the two distributional problems pointed out in section 2. First, how is it that *fait*, being an a.o., can be the argument of some temporal predicates and not others? The situation is even more complex because some predicates (*se produire*, 'to happen' and *inopiné*, $\approx$ 'sudden') but not others (*être témoin de*, $\approx$ 'to witness' and *nouveau*, 'new') are sensitive to the difference between *fait* and *le fait que*.

(6) a. Un fait intéressant s'est produit ce matin.
         'An interesting fact happened this morning'
     b. ??Le fait que le train a déraillé s'est produit hier soir.
         'The fact that the train was derailed happened yesterday evening'
     c. J'ai été témoin d'un fait intéressant ce matin.
         'I ($\approx$) witnessed an interesting fact this morning'
     d. (?) J'ai été témoin du fait que le train a déraillé.
         'I ($\approx$) witnessed the fact that the train was derailed'

In recent work in lexical semantics, it is assumed that predicates can fetch information associated with the main type of a noun, as in *coercion* (Pustejovsky 1995) or *interpolation* (Godard & Jayez 1995). E.g., *a fast computer* can be analyzed as the modification by the predicate *fast* of the internal activity of the machine. Similarly, we propose that *se produire* and *être témoin de* can access the fact–simile present in the RELS of *fait*. Not every predicate has this ability. For instance *assister à* ('to attend') cannot take *fait* as complement, because it requires it to be of type event. *Être témoin de* is less constrained: (i) it selects events or s.o.a. as semantic arguments; (ii) it can combine with *fait* because it accesses the FACT–SIMILE attribute in *fait*.[1]

Unlike *être témoin de*, *se produire* accepts *un fait* but not *ce/le fait (que)*. We propose that verbs which select an event (not an s.o.a.), e.g. *attendre* ('to wait'), do not combine with *ce/le fait (que)*. In our analysis, the fact–simile of *fait* is an ordinary truthmaker, either an event or an s.o.a. The exact type of the truthmaker (event vs s.o.a.) is fixed by the determiner. With the indefinite, the truthmaker is underspecified while it must an s.o.a. with the definite. *Se produire* and *attendre* take events. *Être témoin de* takes events or s.o.a. provided that they are supported by events that one can observe.[2] In this way, we keep the semantics compositional while accounting for the observed contrasts.

Turning to the second problem, we must explain why a fact cannot be true or

---

[1] *Être témoin de* does not simply look for a metonymic associate of the noun, but requires it to be part of the RELS value. The word *book* is associated with a reading event (Pustejovsky 1995). However, it is not possible to 'witness' a book because the reading event is not part of the RELS value.

[2] So it is possible to (lit.) 'witness an atmosphere' (*J'ai été témoin de cette mauvaise ambiance*, 'I (lit.) witnessed this bad atmosphere'), but not to witness a state without any specific manifestation (*?? J'ai été témoin de sa présidence*, 'I (lit.) witnessed his presidence', *?? J'ai été témoin du fait que 2 et 2 font 4*, 'I (lit.) witnessed the fact that 2 plus 2 is 4').

false, while it can be dubious, ascertained or irrefutable. This list of predicates is sufficient to eliminate the hypothesis that truth predicates are redundant or contradictory (Vendler 1967). If facts were strongly factual, a dubious fact would be as contradictory as a false fact. The factuality of facts is limited to the impossibility for an agent to deny a fact that he assumes in the current information state. We assume that the different modal perspectives (common ground, hypothetical or counterfactual information) correspond to different sets of worlds (information states, Veltman–style). This allows us to retain definition (3) by relativizing it to a particular set of worlds. As to the differences between lexical items, they are explained along the same lines as in the previous case. Some truth predicates (*vrai, faux*) require that the type of the RELS value be that of a truthbearer, which *fact-rel* is not. Others (*douteux, avéré, irréfutable*) are able to retrieve the proposition warranted by the fact.

5 Conclusion

As the denotation of the noun *fait*, a fact is a tough thing. Two factors explain the difficulty with estimating the position of facts on the semantic map. First, as demonstrated above, facts are neither states of affairs nor descriptions of them. They are intensional objects (abstract truthmakers) which cannot be analyzed in the standard way of modern metaphysics. Second, predicates may select facets of the noun rather than its main semantic type. This makes a purely distributional analysis virtually impossible, or at least rather inefficient in some cases. This suggests that *fait* does not correspond to a distributional type but rather to a referential one. *Fait* does not point to a class of distributions, in contrast with event nouns for instance, but to a certain kind of conceptual entity associated with auxiliary entities ('companions') themselves possessing a distributional type.

References

Armstrong, D.M. (1997). *A World of States of Affairs*. Cambridge: Cambridge U.P.
Asher, N. (1993). *Reference to Abstract Objects in Discourse*. Dordrecht: Kluwer.
Austin, J.L. (1961). Unfair to facts. In *Philosophical Papers*, London: Oxford U.P.
Bennett, J. (1988). *Events and their Names*. Oxford: Clarendon Press.
Copestake, A., Flickinger, D. & Sag, I.A. (1997). Minimal Recursion Semantics. An Introduction. Ms., Stanford: CSLI.
Devlin, K. (1991). *Logic and Information*. Cambridge: Cambridge U.P.
Fine, K. (1995). The Logic of Essence. *Journal of Philosophical Logic* 24.
Ginzburg, J. (1995), Resolving questions, I and II. *Linguistics and Philosophy* 18.
Godard, D. & Jayez, J. (1994). Types nominaux et anaphores. *Cahiers Chronos* 1.
Jayez, J. & Godard, D. (1995). Principles as lexical methods. AAAI Spring Symposium on Representation and Acquisition of Lexical Knowledge.
Peterson, P. L. (1997). *Fact, Proposition, Event*. Dordrecht: Kluwer.
Pollard, C. & Sag, I.A. (1994). *Head–Driven Phrase Structure Grammar*. CSLI, Chicago: Chicago U.P.
Pustejovsky, J. (1995). *The Generative Lexicon*. Cambridge: MIT Press.
Strawson, P.F. (1971). Truth. In *Logico–Linguistic Papers*, London: Methuen.
Vendler, Z. (1967). *Linguistics in Philosophy*. Cornell: Cornell U.P.
Vendler, Z. (1972). *Res Cogitans: An Essay in Rational Psychology*. Cornell: Cornell U.P.
Zalta, E.N. (1993). Twenty–Five Basic Theorems in Situation and World Theory. *Journal of Philosophical Logic* 22,4.
Zalta, E.N. (1997). The Modal Object Calculus and its Interpretation. In de Rijke, M. (ed.), *Advances in Intensional Logic*, Dordrecht: Kluwer.
Zalta, E.N. (1999). Principia Metaphysica. Ms., Stanford University, Metaphysical Research Lab (http://mally.stanford.edu/).