How to Unify Russellian and Strawsonian Definite Descriptions

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Abstract In this paper I will deal with ambiguities in natural language exemplifying the difference between *topic* and *focus articulation* within a sentence. I will show that whereas articulating the topic of a sentence activates a presupposition, articulating the focus frequently yields merely an entailment. Based on analysis of topic-focus articulation, I propose a solution to the almost hundred-year old dispute over Strawsonian versus Russellian definite descriptions. The point of departure is that sentences of the form 'The *F* is a *G*' are ambiguous. Their ambiguity stems from different topic-focus articulations of such sentences. Russell and Strawson took themselves to be at loggerheads, whereas, in fact, they spoke at cross purposes. My novel contribution advances the research into definite descriptions by pointing out how progress has been hampered by a false dilemma and *how to move beyond that dilemma*. The point is this. If 'the *F*' is the topic phrase then this description occurs with *de re* supposition and Strawson's analysis appears to be what is wanted. On this reading the sentence *presupposes* the existence of the descriptum of 'the *F*'. The other option is '*G*' occurring as topic and 'the *F*' as focus. This reading corresponds to Donnellan's attributive use of 'the *F*' and the description occurs with *de dicto* supposition. On this reading the Russellian analysis gets the truth-conditions of the sentence right. The existence of a unique *F* is merely entailed. This paper demonstrates how to unify these disparate insights into one coherent theory of definite descriptions.

Keywords Definite descriptions · Presupposition versus entailment · Topic-focus · Transparent intensional logic

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1 Introduction

Natural language has features not found in logically perfect artificial languages. One such feature is *redundancy*; another feature is its converse, namely *ambiguity*. In this paper I will deal with the sort of ambiguity that is pivoted on whether the *topic* or the *focus* of a sentence is highlighted. For instance, 'John only introduced Bill to Sue' lends itself to two different kinds of construal: 'John did not introduce other people to Sue except for Bill' and 'The only person Bill was introduced to by John was Sue'.[1] There are two sentences whose semantics, logical properties and logical consequences only partially overlap.

Based on analysis of sentences that differ as for their topic-focus articulation I propose a solution to the almost hundred-year old dispute over Strawsonian versus Russellian definite descriptions.[2] The point of departure is that sentences of the form 'The *F* is a *G*' are systematically ambiguous.[3] Their ambiguity is, in my view, not rooted in a shift of meaning of the definite description 'the *F*'. Rather the ambiguity stems from different *topic-focus articulations* of such sentences. My analysis assumes that whereas articulating the topic of a sentence activates a pre- supposition, articulating the focus frequently yields merely an entailment.[4] The point is this. If 'the *F*' is the topic phrase then this description occurs with *de re* supposition and Strawson's analysis appears to be what is wanted. On this reading that corresponds to Donnellan's *referential use* of 'the *F*' the sentence *presupposes* the existence of the descriptum of 'the *F*'. The other option is '*G*' occurring as topic and 'the *F*' as focus. This reading corresponds to Donnellan's *attributive* use of 'the *F*' and the description occurs with *de dicto* supposition. On this reading the Russellian analysis gets the truth-conditions of the sentence right. The existence of a unique *F* is merely entailed.

The received view still tends to be that there is room for at most one of the two positions, since they are deemed incompatible. But there is no incompatibility between Strawson's and Russell's positions, because they simply do not talk about one and the same meaning of the sentence 'The King of France is bald'. My novel *contribution* is to point out this *ambiguity* which yielded the false dilemma. Russell argued for attributive use of 'the King of France' whereas Strawson for its referential use. In this paper I will propose a logical analysis of both Russellian and Strawsonian reading of sentences of the form 'The *F* is a *G*'.

Tichý's Transparent Intensional Logic (TIL) will serve as background theory throughout my exposition.[5] Tichý's TIL was developed simultaneously with Montague's IL (Intensional Logic). The technical tools of disambiguation will be familiar

[1] See Hajičová [7].

[2] See for instance Refs. [2, 13–16, 18, 21].

[3] The sentence that triggered the dispute was 'The King of France is bald'.

[4] This assumption is based on [7], and supported by other linguists as well. See, for instance [6], Gundel and Fretheim, in press, http://www.sfu.ca/~hedberg/gundel-fretheim.pdf, and [17, esp. p. 173ff].

[5] For details on TIL, see, in particular [5, 19, 20].

from IL, with two exceptions. One is that we λ-bind separate variables $w, w_1, \ldots, w_n$ ranging over possible worlds and $t, t_1, \ldots, t_n$ ranging over times. This dual binding is tantamount to *explicit intensionalization* and *temporalization*. The other exception is that *functional application* is the logic both of extensionalization of intensions (functions from possible worlds) and of predication.[6] Application is symbolized by square brackets, '[...]'. Intensions are extensionalized by applying them to worlds and times, as in [[*Intension w*] *t*], abbreviated by subscripted terms for world and time variables: $Intension_{wt}$ is the extension of the generic intension *Intension* at $\langle w, t \rangle$. Thus, for instance, the extensionalization of a property yields a set (possibly an empty one), and the extensionalization of a proposition yields a truth-value (or no value at all). A general objection to IL is that it fails to accommodate *hyperintensionality*, as indeed any formal logic interpreted set-theoretically is bound to unless a domain of primitive hyperintensions is added to the frame. Any theory of natural-language analysis needs a hyperintensional semantics in order to crack the hard nuts of natural language semantics. In global terms, divested of its hyperintensional procedural semantics TIL is an anticontextualist (i.e., transparent), explicitly intensional modification of IL. With its hyperintensional procedural semantics added back on, TIL rises above the model-theoretic paradigm and joins instead the paradigm of hyperintensional logic and structured meanings.[7]

The rest of the paper is organized as follows. Section 2 is a brief summary of the bones of contention between Russsellian and Strawsonian conceptions of definite descriptions. The relevant foundations of TIL are introduced in Sect. 3. Finally, in Sect. 4 I propose my unification of elements drawn from Strawsonian and Russellian theories of definite descriptions.

2 Russell Versus Strawson on Definite Descriptions

There is a substantial difference between proper names and definite descriptions. This distinction is of crucial importance due to their vastly different logical behaviour. Independently of any particular theory of proper names, it should be granted that a *proper* proper name (as opposed to a definite description grammatically masquerading as a proper name) is a rigid designator of a numerically particular individual. On the other hand, a definite *description* like, for instance, 'the King of France', 'the highest mountain on earth', 'the first man to run 100 m in under 9 seconds', etc., offers an *empirical criterion* that enables us to establish which individual, if any, satisfies the criterion in a particular state of affairs.

The contemporary discussion of the distinction between names and descriptions was triggered by [14]. Russell's key idea is the proposal that a sentence like

(1) 'The *F* is a *G*.'

containing a definite description 'the *F*' is understood to have, in the final analysis, the logical form

[6] For details, see Jespersen [8].

[7] For a detailed critical comparison of TIL and IL, see [5, §2.4.5].

$(1')\ \exists x(Fx \wedge \forall y(Fy \supset x = y) \wedge Gy)$

rather than the logical form $G(\iota xFx)$.

Though Russell's quantificational theory remains to this day a strong rival of referential theories, it has received its fair share of criticism. Russell's opponents claim that he simply gets the truth-conditions wrong in important cases of using descriptions when there is no such thing as the unique F.[8]

This criticism was launched by Strawson who in 1950 objected that Russell's theory predicts the wrong truth-conditions for sentences like 'The present King of France is bald'. According to Russell's analysis, this sentence is false. In Strawson's view, the sentence can be neither true nor false whenever there is no unique King of France. Obviously, in such a state of affairs the sentence is not true. However, if the sentence were false then its negation, 'The King of France is *not* bald', would be true, which entails that there *is* a unique King of France, contrary to the assumption that there is none. Strawson holds that sentences like these *not only entail*, but also *presuppose*, the existence of a unique King of France. If 'the present King of France' fails to refer, then the presupposition is not satisfied and the sentence fails to have a truth value.[9]

Russell, in response to Strawson's criticism, argues that, despite Strawson's protests, the sentence is in fact false:

> Suppose, for example, that in some country there was a law that no person could hold public office if he considered it false that the Ruler of the Universe is wise. I think an avowed atheist who took advantage of Mr. Strawson's doctrine to say that he did not hold this proposition false would be regarded as a somewhat shifty character [15].

Donnellan [2] observes that there is a sense in which Strawson and Russell are both right, and both wrong, about the proper analysis of definite descriptions, because definite descriptions can be used in two different ways. On a so-called *attributive use*, a sentence of the form 'The F is a G' is used to express a proposition equivalent to 'Whatever is uniquely F is a G'. Alternatively, on a *referential use*, a sentence of the form 'The F is a G' is used to pick out a specific individual, a, and to say of a that a is a G. Donnellan suggests that Russell's quantificational account of definite descriptions might capture attributive uses, but that it does not work for referential uses. Ludlow in 2007 interprets Donnellan as arguing that in some cases descriptions are Russellian and in other cases Strawsonian.

Kripke [11] responds to Donnellan by arguing that the Russellian account of definite descriptions can, by itself, account for both referential and attributive uses, and that the difference between the two cases is entirely a matter of pragmatics. Neale [13] supports Russell's view by collecting a number of cases in which intuitions about truth conditions clearly do not support Strawson's view. On the other hand, a number

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[8] Besides, many hold against Russell's translation of atomic sentences like 'The F is a G' into the molecular form 'There is at least one F and at most one thing is an F and that thing is a G', because Russell disregards the standard constraint that there must be a fair amount of structural similarity between analysandum and analysans.

[9] Nevertheless, for Strawson, *sentences* are meaningful in and of themselves, independently of empirical facts like the contingent non-existence of the King of France.

of linguists have recently come to Strawson's defence on this matter. See Ludlow [12] for a detailed survey of the arguments supporting Strawson's view and arguments supporting Russell's. Here it might suffice to point out that Strawson's concerns have not delivered a knock-out blow to Russell's theory of descriptions, and so this topic remains very much alive. von Fintel [21], for instance, argues that every sentence containing a definite description 'the *F*' comes with the existential presupposition that there be a unique *F*.

In this paper I am not going to take into account Kripke's pragmatic factors like the intentions of a speaker, for they are irrelevant to a *logical* semantic theory. So I am disregarding Donnellan's troublesome notion of having somebody in mind. Instead, I will propose a *logical analysis* of sentences of the form 'The *F* is a *G*'. What I want to show is this. First, definite descriptions are not deprived of a self-contained meaning and they denote one and the same entity in any context. Thus they are never Russellian. Second, Russells insight that a definite description 'the *F*' does not denote a definite individual is spot-on. According to TIL, 'the *F*' denotes a *condition* to be contingently satisfied by the individual (if any) that happens to be the *F*. I will explicate such conditions in terms of possible-world intensions, *viz.* as individual roles or offices to be occupied by at most one individual per world/time pair. Third, I am going to show that Donnellan is right in holding that sentences of the form 'The *F* is a *G*' are systematically ambiguous. However, their ambiguity does not concern a shift of meaning of the definite description 'the *F*', as Fregean or other theories maintain. Instead the ambiguity concerns different *topic-focus* articulations of these sentences.

There are two options. The description 'the *F*' may occur as the topic of a sentence and property *G* (the focus) is predicated of the topic. This case corresponds to Donnellan's *referential use*. Using medieval terminology I will say that 'the *F*' occurs with *de re supposition*. The other option is '*G*' occurring as topic and 'the *F*' as focus. This reading corresponds to Donnellan's *attributive* use of 'the *F*' and the description occurs with *de dicto* supposition. Consequently, and crucially, such sentences are ambiguous between a *de dicto* and a *de re* reading. On their *de re* reading they *presuppose* the existence of a unique *F*. Thus Strawson's analysis appears to be adequate for *de re* cases. On their *de dicto* reading they have the truth-conditions as specified by the Russellian analysis. They do not presuppose, but only entail, the existence of a unique *F*. However, the Russellian analysis, though being equivalent to the one I am going to propose, is not an adequate *literal* analysis of *de dicto* readings.

I am going to bring out the *semantic* nature of the topic-focus difference by means of a literal logical analysis. As a result, I will be furnishing sentences differing only as for their topic-focus articulation with different structured meanings producing different possible-world propositions.[10] Since our logic is a hyperintensional logic of *partial functions*, I am able to analyse sentences with presuppositions in a both natural and principled manner. It means that I associate them with hyperpropositions,

[10] For details on structured meanings, see [4, 10] for a survey.

which in TIL are abstract logical procedures that produce partial possible-world propositions, which occasionally yield truth-value gaps.[11]

We need to work with properly partial functions and propositions with truth-value gaps. On Strawsonian reading the sentence 'The King of France is bald' talks about the office of the King of France (topic) ascribing to the individual (if any) that occupies this office the property of being bald (focus). Thus it is presupposed that the King of France exist, i.e., that the office be occupied. If the office is vacant the proposition denoted by the sentence lacks a truth-value. On our approach this does not mean that the sentence is meaningless. The sentence has a sense, namely an instruction how in any possible world w at any time t to execute the procedure of evaluating its truth-conditions. Only if we evaluate these conditions in such a state-of-affairs where there is no King of France does the process of evaluation yield a truth-value gap.

3 Foundations of TIL

Formally, TIL is an extensional logic of hyperintensions based on the partial, typed λ-calculus enriched with a ramified type structure to accommodate hyperintensions. The syntax of TIL is the familiar one of the λ-calculus, with the addition of a hyperintension called Trivialization (symbolized by a superscripted nought). The semantics is a *procedural* (as opposed to denotational) one. Thus, functional application, in TIL, is not the result of applying a function to an argument, but instead the very *procedure* of applying function to argument; and functional abstraction, in TIL, is not the result of forming a function, but instead the very *procedure* of sorting two domains of entities into functional arguments and values, respectively. The TIL concept of procedurally construed hyperintensions is *construction*. The three definitions below constitute the logical heart of TIL.

Definition 1 *(Types of order 1.)* Let B be a *base*, where a base is a collection of pair-wise disjoint, non-empty sets. Then:

(i) Every member of B is an elementary *type of order 1 over B*.
(ii) Let $\alpha, \beta_1, \ldots, \beta_m$ ($m > 0$) be types of order 1 over B. Then the collection ($\alpha\ \beta_1\ \ldots\ \beta_m$) of all m-ary partial mappings from $\beta_1 \times \cdots \times \beta_m$ into α is a functional type of order 1 over B.
(iii) Nothing is a *type of order 1 over B* unless it so follows from (i) and (ii). □

Remark For the purposes of natural-language analysis, we are currently assuming the following base of ground types, each of which is part of the ontological commitments of TIL:

o: the set of truth-values {**T**, **F**};
ι: the set of individuals (a constant universe of discourse);
τ: the set of real numbers (doubling as temporal continuum);

[11] For an introduction to the notion of hyperproposition, see [9].

ω: the set of logically possible worlds (the logical space).

Constructions construct objects of appropriate types dependently on *valuation* of variables; they *v-construct*, where *v* is the parameter of valuation. With the difference that we construe variables as extra-linguistic objects and not as expressions, our theory of variables is otherwise identical to Tarski's. Thus, in TIL variables construct objects of the respective types dependently on valuation in the following way. For each type α there are countably infinitely many variables $x_1, x_2, \ldots$. The members of α (unless α is a singleton) can be organised in infinitely many infinite sequences. Let the sequences be given (as one is allowed to assume in a realist semantics). The valuation v takes a sequence $\langle s_1, s_2, \ldots \rangle$ and assigns s_1 to the variable x_1, s_2 to the variable x_2; and so on.

When X is an object of any type (including a construction), the Trivialization of X, denoted '^0X', constructs X without the mediation of any other constructions. ^0X is the unique atomic construction of X that does not depend on valuation: it is a primitive, non-perspectival mode of presentation of X. The other constructions are *compound*, as they consist of other constituents apart from themselves. These are *Composition* and *Closure*. Composition is the procedure of applying a function f to an argument a to obtain the value (if any) of f at a. Closure is the procedure of constructing a function by abstracting over variables; i.e., the procedure of abstracting, or extracting, a function from a context, as when abstracting $\lambda x(\phi x)$ from $\phi(a)$.[12]

Definition 2 *(construction)*

(i) The *variable* x is a *construction* that constructs an object O of the respective type dependently on a valuation v: x *v-constructs* O.

(ii) *Trivialization:* Where X is an object whatsoever (an extension, an intension or a *construction*), ^0X is the *construction Trivialization*. It constructs X without any change in X.

(iii) The *Composition* $[X\ Y_1 \ldots Y_m]$ is the following construction. If X *v-constructs* a function f of type $(\alpha\ \beta_1 \ldots \beta_m)$, and $Y_1, \ldots, Y_m$ *v-construct* entities $B_1, \ldots, B_m$ of types $\beta_1, \ldots, \beta_m$, respectively, then the *Composition* $[X\ Y_1 \ldots Y_m]$ *v-constructs* the value (an entity, if any, of type α) of f on the tuple argument $\langle B_1, \ldots, B_m \rangle$. Otherwise the *Composition* $[X\ Y_1 \ldots Y_m]$ does not *v-construct* anything and so is *v-improper*.

(iv) The *Closure* $[\lambda x_1 \ldots x_m\ Y]$ is the following construction. Let $x_1, x_2, \ldots, x_m$ be pair-wise distinct variables *v*-constructing entities of types $\beta_1, \ldots, \beta_m$ and Y a construction *v*-constructing an α-entity. Then $[\lambda x_1 \ldots x_m\ Y]$ is the *construction* λ-*Closure* (or *Closure*). It *v-constructs* the following function f of the type $(\alpha\beta_1 \ldots \beta_m)$. Let $v(B_1/x_1, \ldots, B_m/x_m)$ be a valuation identical with v at least up to assigning objects $B_1/\beta_1, \ldots, B_m/\beta_m$ to variables $x_1, \ldots, x_m$. If Y is $v(B_1/x_1, \ldots, B_m/x_m)$-improper (see iii), then f is undefined on $\langle B_1, \ldots, B_m \rangle$.

[12] There are two other compound construction; Execution and Double Execution. Since I do not need them in this paper, they are not incorporated in Definition 2.

Otherwise the value of f on $\langle B_1, \ldots, B_m\rangle$ is the α-entity $v(B_1/x_1, \ldots, B_m/x_m)$-constructed by Y.

(v) Nothing is a *Construction*, unless it follows from (i) through (iv). □

The definition of the ramified hierarchy of types decomposes into three parts. Firstly, simple types of order 1, which were already defined by definition 1. Secondly, constructions of order n, and thirdly, types of order $n + 1$.

Definition 3 *(Ramified Hierarchy of Types)*

$\mathbf{T_1}$ *(types of order 1)*. See Definition 1.

$\mathbf{C_n}$ *(constructions of order n)*

(i) Let x be a variable ranging over a type of order n. Then x *is a construction of order n over B*.

(ii) Let X be a member of a type of order n. Then ${}^0X$, ${}^1X$, ${}^2X$ are *constructions of order n over B*.

(iii) Let $X, X_1, \ldots, X_m$ $(m > 0)$ be constructions of order n over B. Then $[X\ X_1 \ldots X_m]$ is a *construction of order n over B*.

(iv) Let $x_1, \ldots, x_m, X$ $(m > 0)$ be constructions of order n over B. Then $[\lambda x_1 \ldots x_m\ X]$ is a *construction of order n over B*.

(v) Nothing is a *construction of order n over B* unless it so follows from $\mathbf{C_n}$ (i)–(iv).

$\mathbf{T_{n+1}}$ (types of order $n + 1$). Let $*_n$ be the collection of all constructions of order n over B. Then

(i) $*_n$ and every type of order n are *types of order* $n + 1$.

(ii) If $m > 0$ and $\alpha, \beta_1, \ldots, \beta_m$ are types of order $n + 1$ over B,then $(\alpha\ \beta_1 \ldots \beta_m)$ (see T_1(ii)) is a *type of order* $n + 1$ *over B*.

(iii) Nothing is a *type of order* $n + 1$ *over B* unless it so follows from (i) and (ii). □

Empirical languages incorporate an element of *contingency* that non-empirical ones lack. Empirical expressions denote *empirical conditions* that may or may not be satisfied at some empirical index of evaluation. We model these empirical conditions as *possible-world intensions*. Intensions are entities of type $(\beta\omega)$: mappings from possible worlds to an arbitrary type β. The type β is frequently the type of the *chronology* of α-objects, i.e. a mapping of type $(\alpha\tau)$. Thus α-intensions are frequently functions of type $((\alpha\tau)\omega)$, abbreviated as '$\alpha_{\tau\omega}$'. I shall typically say that an index of evaluation is a world/time pair $\langle w, t\rangle$. *Extensional entities* are entities of some type α where $\alpha \neq (\beta\omega)$ for any type β.

Examples of frequently used intensions are: *propositions* of type $o_{\tau\omega}$, *properties of individuals* of type $(o\iota)_{\tau\omega}$, binary *relations-in-intension between individuals* of type $(o\iota\iota)_{\tau\omega}$, *individual offices* of type $\iota_{\tau\omega}$. Thus individual offices are simply partial functions which, relative to a world/time pair $\langle w, t\rangle$, return at most one individual as value.

Our *explicit intensionalization and temporalization* enables us to encode constructions of possible-world intensions, by means of terms for possible-world variables and times, directly in the logical syntax. Where w ranges over ω and t over τ, the

following general logical form characterizes the logical syntax of constructions of intensions: $\lambda w \lambda t[\ldots w \ldots t \ldots]$. For instance, if *King_of* is a function of type $(\iota\iota)_{\tau\omega}$ and *France* an individual of type ι, the office of the King of France is constructed like this: $\lambda w \lambda t[{}^0King\_of_{wt}\ {}^0France]$.

Logical objects like *truth-functions* and *quantifiers* are extensional: $\wedge$ (conjunction), $\vee$ (disjunction) and $\supset$ (implication) are of type (ooo), and $\neg$ (negation) of type (oo). *Quantifiers* $\forall^\alpha$, $\exists^\alpha$ are type-theoretically polymorphous, total functions of type (o(oα)), for an arbitrary type α, defined as follows. The *universal quantifier* $\forall^\alpha$ is a function that associates a class A of α-elements with **T** if A contains all elements of the type α, otherwise with **F**. The existential quantifier $\exists^\alpha$ is a function that associates a class A of α-elements with **T** if A is a non-empty class, otherwise with **F**.

Below all type indications will be provided outside the formulae in order not to clutter the notation. Furthermore, 'X/α' means that an object X is (a member) of type α. '$X \rightarrow_v \alpha$' means that the type of the object *valuation*-constructed by X is α. Throughout, it holds that the variables $w \rightarrow_v \omega$ and $t \rightarrow_v \tau$. If $C \rightarrow_v \alpha_{\tau\omega}$, then the frequently used Composition $[[C\,w]\,t]$, which is the intensional descent (a.k.a. extensionalization) of the α-intension v-constructed by C, will be encoded as 'C_{wt}'. When using constructions of truth-functions, we often omit Trivialization and use infix notation to conform to standard notation in the interest of better readability. Also when using constructions of identities of α-entities, $=_\alpha\ /(o\alpha\alpha)$, we omit Trivialization, the type subscript, and use infix notion when no confusion can arise.

We invariably furnish expressions with procedural structured meanings, which are explicated as TIL constructions. The analysis of an unambiguous empirical sentence thus consists in discovering the logical construction encoded by a given sentence. The *TIL method of analysis* consists of three steps:

(1) *Type-theoretical analysis*, i.e., assigning types to the objects that receive mention in the analysed sentence.
(2) *Type-theoretical synthesis*, i.e., combining the constructions of the objects ad (1) in order to construct the proposition of type $o_{\tau\omega}$ denoted by the whole sentence.
(3) *Type-theoretical checking*, i.e. checking whether the proposed analysans is type-theoretically coherent.

To illustrate the method, we analyse the stock example 'The King of France is bald' *à la* Strawson.

First, type-theoretical analysis. The sentence mentions these objects. *King_of*/$(\iota\iota)_{\tau\omega}$ is an empirical function that dependently on $\langle w, t\rangle$-pairs assigns to one individual (a country) another individual (its king); *France*/ι; *King_of_France*/$\iota_{\tau\omega}$; *Bald*/$(o\iota)_{\tau\omega}$.

For the sake of simplicity, I will demonstrate the steps (2) and (3) simultaneously. In the second step we combine the *constructions* of the objects obtained in the first step in order to construct the proposition (of type $o_{\tau\omega}$) denoted by the whole sentence. Since we intend to arrive at the *literal* analysis of the sentence, the objects denoted by the semantically simple expressions are constructed by their Trivializations: ${}^0King\_of$, ${}^0France$, ${}^0Bald$. In order to construct the office *King_of _France*, we

have to combine ${}^0King\_of$ and ${}^0France$. The function *King_of* must be extensionalized first *via* the Composition ${}^0King\_of_{wt} \to_v (\iota\iota)$, and the result is then applied to *France*; we get $[{}^0King\_of_{wt}\ {}^0France] \to_v \iota$. Abstracting over the values of w and t we obtain the Closure that constructs the office: $\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France] \to \iota_{\tau\omega}$. But the property of being bald cannot be ascribed to an individual office. Instead it is ascribed to the individual (if any) occupying the office. Thus the office has to be subjected to intensional descent first: $\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt} \to_v \iota$. The property itself has to be extensionalized as well: ${}^0Bald_{wt}$. By Composing these two constructions, we obtain either a truth-value (**T** or **F**) or nothing, according as the King of France is, or is not, bald, or does not exist, respectively. Finally, by abstracting over the values of the variables w and t, we construct the proposition:

$$\lambda w\lambda t[{}^0Bald_{wt}\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}]$$

This construction is assigned as its meaning to the Strawsonian variant of the sentence 'The King of France is bald'. So much for the basic notions of TIL and its method of analysis.

4 Definite Descriptions: Strawsonian or Russellian?

Now I am going to propose a solution to the Strawson-Russell standoff. In other words, I am going to analyse the phenomena of presupposition and entailment connected with using definite descriptions with supposition *de dicto* or *de re*, and I will show how the topic-focus distinction determines which of the two cases applies.

4.1 Topic-Focus Ambiguity

When used in a communicative act, an atomic sentence communicates something (the focus F) about something (the topic T). Thus the schematic structure of an atomic sentence is $F(T)$. The topic T of a sentence S is often associated with a presupposition P of S such that P is entailed both by S and $non - S$. On the other hand, the clause in the focus usually occasions a mere entailment of some P by S.[13]

To give an example, consider the sentence 'Our defeat was caused by John'. There are two possible readings of this sentence. Taken one way, the sentence is about our defeat, conveying the snippet of information that it was caused by John. In such a situation the sentence is associated with the presupposition that we were defeated. Indeed, the negated form of the sentence, 'Our defeat was not caused by John', also implies that we were defeated. Thus 'our defeat' is the topic and 'was caused by John' the focus clause. Taken the other way, the sentence is about the topic John,

[13] See Refs. [6, 7].

ascribing to him the property that he caused our defeat (focus). Now the scenario of truly asserting the negated sentence can be, for instance, the following. Though it is true that John has a reputation for being rather a bad player, Paul was in excellent shape and so we won. Or, another scenario is thinkable. We were defeated, only not because of John but because the whole team performed poorly. Hence, our being defeated is not presupposed by this reading, it is only entailed.

Schematically, if $\models$ is the relation of entailment, then the logical difference between a mere entailment and a presupposition is this:

P is a *presupposition* of *S* : $(S \models P)$ and $(\textit{non-}S \not\models P)$

Thus if *P* is not true, then neither *S* nor *non-S* is true. Hence, *S* has no truth-value.

P is only *entailed* by *S*: $(S \models P)$ and neither $(\textit{non-}S \not\models P)$ nor $(\textit{non-}S \not\models \textit{non-}P)$

Hence if *S* is not true we cannot deduce anything about the truth-value of *P*.

4.2 The King of France Revisited

Above we analyzed the sentence 'The King of France is bald' on its perhaps most natural reading as predicating the property of being bald (the focus) of the individual (if any) that is the present King of France (the topic). Yet there is another, albeit less natural reading of the sentence. Imagine that the sentence is uttered in a situation where we are talking about baldness, and somebody asks 'Who is bald?' The answer might be 'Well, among those who are bald there is the present King of France'. If you receive such an answer, you most probably protest, 'This cannot be true, for there is no King of France now'. On such a reading the sentence is about baldness (topic) claiming that this property is instantiated, among others, by the King of France (focus). Since there are no rigorous grammatical rules in English to distinguish between the two variants, the input of our *logical* analysis is the result of a *linguistic* analysis, where the topic and focus of a sentence are made explicit.[14] In this paper I mark the topic clause in italics. The two readings of the above sentence are:

(S) '*The king of France* is bald' (Strawsonian)
(R) 'The king of France is *bald*' (Russellian)

The analysis of (S) is as above: $\lambda w \lambda t [{}^0 Bald_{wt} \lambda w \lambda t [{}^0 King\_of_{wt}\ {}^0 France]_{wt}]$.

The meaning of 'the King of France', viz. $\lambda w \lambda t [{}^0 King\_of_{wt}\ {}^0 France]$, occurs in (S) with *de re* supposition, because the object of predication is the unique *value* in the chosen $\langle w, t \rangle$-pair of evaluation of the office.[15] To construct this value

[14] For instance, in the Prague Dependency Treebank for the Czech language, the tectogrammatical representation contains the semantic structure of sentences with topic-focus annotators. For details, see http://ufal.mff.cuni.cz/pdt2.0/

[15] For details on the analysis of *de dicto* vs. *de re* supposition within TIL framework, see [5, esp. §§1.5.2 and 2.6.2] and also [3].

(if any), the office must be extensionalized. This is achieved in (S) by Composition $\lambda w \lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}$.

The following *two de re principles* are satisfied: the principle of *existential presupposition* and the principle of *substitution of co-referential* expressions. Thus the following arguments are valid (though not sound):

$$\frac{\textit{The King of France} \text{ is (not) bald}}{\text{The King of France exists}}$$

$$\frac{\begin{array}{c}\textit{The King of France} \text{ is bald} \\ \textit{The King of France} \text{ is Louis XVI}\end{array}}{\textit{Louis XVI} \text{ is bald}}$$

To prove the validity of the first argument, we need to analyse its conclusion 'The King of France exists'. In TIL (non-trivial) existence is explicated as a property of intensions to be instantiated in a given $\langle w, t\rangle$-pair of evaluation.[16] Thus to say that unicorns do not exist is tantamount to saying that at the given world w and time t the property of being a unicorn has empty class of individuals as its extension. Similarly, that the King of France does not exist means that the office of the King of France is vacant at the world and time of evaluation.

Thus in our case we have $Exist/(o\iota_{\tau\omega})_{\tau\omega}$, the property of an office's being occupied at a given world/time pair that is defined as follows:

$$^0Exist =_{of} \lambda w \lambda t \lambda c[{}^0\exists \lambda x[x =_i c_{wt}]]$$

Types: $\exists/(o(o\iota))$; $c \rightarrow_v \iota_{\tau\omega}$; $x \rightarrow_v \iota$; $=_{of}\ /(o(o\iota_{\tau\omega})_{\tau\omega}(o\iota_{\tau\omega})_{\tau\omega})$: the identity of properties of individual offices; $=_i /(o\iota\iota)$: the identity of individuals, $x \rightarrow_v \iota$.

We introduce $Louis/\iota$, $Empty/(o(o\iota))$: the singleton containing the empty set of individuals, and $Improper/(o*_1)_{\tau\omega}$: the property of constructions of being v-improper at a given $\langle w, t\rangle$-pair; the other types are as above. Then for any $\langle w, t\rangle$-pair the following proof steps are truth-preserving:

(a) *existence:*

(1) $(\neg)[{}^0Bald_{wt} \lambda w \lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}]$ ∅

(2) $\neg[{}^0Improper_{wt}\, {}^0[\lambda w \lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}]]$ by Def. 2, iii)

(3) $\neg[{}^0Empty\ \lambda x[x =_i [\lambda w \lambda t[{}^0King\_of_{wt}\ {}^0France]]_{wt}]]$ by Def. 2, iv)

(4) $[{}^0\exists \lambda x[x =_i [\lambda w \lambda t[{}^0King\_of_{wt}\ {}^0France]]_{wt}]]$ EG

(5) $[{}^0Exist_{wt}[\lambda w \lambda t[{}^0King\_of_{wt}\ {}^0France]]]$ by def. of *Exist*

[16] For details see [5], 2.3.

Remark Note that in step (2) the property of being *Improper* of type $(o*_1)_{\tau\omega}$ is applied to the *construction* $[\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}]$ of type $*_1$ that is supplied here by its Trivialisation $^0[\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}]$ belonging to type $*_2$. On the other hand in step (3) *Empty* of type $(o(o\iota))$ is applied to the set of individuals constructed here by $\lambda x\ [x =_i [\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]]_{wt}]$. These two steps are necessary in order to existentially generalize in step (4). In the logic of partial functions such as TIL we cannot carelessly generalize before proving that the set to which existential quantifier is applied is non-empty.

(b) *substitution:*

(1)	$[{}^0Bald_{wt}\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}]$	$\varnothing$
(2)	$[{}^0Louis =_i \lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}]$	$\varnothing$
(3)	$[{}^0Bald_{wt}\ {}^0Louis]$	substitution of identicals

As explained above, the sentence (R) is not associated with the presupposition that the present King of France should exist, because 'the King of France' occurs now in the focus clause. The truth and falsity conditions of the Russellian 'The King of France is *bald*' are as follows:

- True, if and only if among those who are bald there is the King of France.
- False, if and only if among those who are bald there is no King of France (either because the King's office is not occupied, or its occupant is not bald).

Thus the two readings (S) and (R) have *different* truth-conditions, and they are not equivalent, albeit they are co-entailing. The reason is this. Trivially, by definition a valid argument is *truth-preserving from premises to conclusion*. However, due to partiality, the entailment relation may fail to be *falsity-preserving from conclusion to premises*. As a consequence, if A, B are constructions of propositions such that $A \models B$ and $B \models A$, then A, B are not necessarily equivalent in the sense of constructing the same proposition. Though the propositions take the truth-value **T** at exactly the same world/times, they may differ in such a way that at some $\langle w, t\rangle$-pair(s) one takes the value **F** while the other is undefined. The pair of meanings of (S) and (R) is an example of such co-entailing, yet non-equivalent hyperpropositions.

Next I am going to analyse (R). TIL makes it possible to avoid the other objections against Russell's analysis as well. The Russellian rephrasing of the sentence 'The King of France is bald' is this: 'There is a unique individual such that he is the King of France and he is *bald*'. This sentence expresses the construction[17]

(R*) $\lambda w\lambda t[{}^0\exists\lambda x[x =_i [\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]_{wt}] \wedge [{}^0Bald_{wt}x]]]$.

TIL analysis of the 'Russellian rephrasing' does not deprive 'the King of France' of its meaning. The meaning is invariably, in all contexts, the Closure $\lambda w\lambda t[{}^0King\_of_{wt}\ {}^0France]$. Moreover, even the main objection that Russell simply

[17] Note that in TIL we do not need the construction corresponding to $\forall y(Fy \supset x = y)$ specifying the uniqueness of the King of France, because it is inherent in the meaning of 'the King of France'. The meaning of definite descriptions like 'the King of France' is a construction of an individual office of type $\iota_{\tau\omega}$ occupied in each $\langle w, t\rangle$-pair by at most one individual.

gets the truth-conditions wrong if there is no King of France is irrelevant, because in (R^*) the Closure $\lambda w\lambda t[^0King\_of_{wt}\ ^0France]$ occurs intensionally (that is *de dicto*) unlike in the analysis of (S) where it occurs extensionally (*de re*).[18] The existential quantifier ∃ applies to *sets* of individuals rather than a particular individual. The proposition constructed by (R^*) is true if the *set* of individuals who are bald contains the individual who occupies the office of King of France, otherwise it is simply false. The truth conditions specified by (R^*) are Russellian. Thus we might be content with (R^*) as an adequate analysis of the Russellian reading (R). Yet we should not be. The reason is this. Russell's analysis has another defect; it does not comply with *Carnap's principle of subject-matter*, which states, roughly, that only those entities that receive mention in a sentence can become constituents of its meaning.[19] In other words, (R^*) is not the literal analysis of the sentence 'The King of France is *bald*', because existence and conjunction do not receive mention in the sentence. I am going to propose this literal analysis below. Yet before doing so, I must tackle still another issue in which Russell and Strawson differ, namely the problem of *negation*.

From a logical point of view, the two readings differ in the way their respective *negated* form is obtained. Whereas the Strawsonian negated form is 'The *King of France* is *not* bald', which obviously lacks a truth-value at those $\langle w, t\rangle$-pairs where the royal office is not occupied, the Russellian negated form is 'It is not true that the King of France is bald', which is true at those $\langle w, t\rangle$-pairs where the office is not occupied. Thus in the Strawsonian case the property of not being bald is ascribed to the individual, if any, that occupies the royal office. On the other hand, in the Russellian case the property of not being true is ascribed to the whole proposition that the King is bald, and thus (the same meaning of) the description 'the King of France' occurs with *de dicto* supposition. In order to ascribe the property of being true to the whole proposition, we apply the propositional property $True/(\mathrm{oo}_{\tau\omega})_{\tau\omega}$ defined as follows: Let P be a propositional construction $(P/*_n \rightarrow o_{\tau\omega})$. Then $[^0True_{wt}P]$ v-constructs **T** iff P_{wt} v-constructs **T**, otherwise **F**.[20] Now the analysis of the sentence (R) is this construction:

(R') $\lambda w\lambda t[^0True_{wt}\lambda w\lambda t[^0Bald_{wt}\lambda w\lambda t[^0King\_of_{wt}\ ^0France]_{wt}]]$

Neither (R') nor its negation

(R'_neg) $\lambda w\lambda t\neg[^0True_{wt}\lambda w\lambda t[^0Bald_{wt}\lambda w\lambda t[^0King\_of_{wt}\ ^0France]_{wt}]]$

entails that the King of France exists, which is just as it should be. (R'_neg) constructs the proposition *non-P* that takes the truth-value **T** if the proposition that the King

[18] For the definition of extensional, intensional and hyperintensional occurrence of a construction, see [5, §2.6].

[19] See [1, §24.2, §26] and [5, §2.1.1.].

[20] There are two other propositional properties of the same type, namely *False* and *Undefined*: $[^0False_{wt}P]$ v-constructs the truth-value **T** iff $[\neg P_{wt}]$ v-constructs **T**, otherwise **F**. $[^0Undef_{wt}P]$ v-constructs the truth-value **T** iff $[\neg[^0True_{wt}P] \wedge \neg[^0False_{wt}P]]$ v-constructs **T**, otherwise **F**.

of France is bald takes the value **F** (because the King of France is not bald) or is undefined (because the King of France does not exist)

To adduce a more natural example of topic/focus ambiguity, consider another sample sentence:

(2) '*The King of France* visited London yesterday.'

The topic phrase of (2) is 'the King of France'. Hence the sentence ascribes to the holder (if any) of the royal office at the world/time pair of evaluation the property of having visited London yesterday (the focus). Thus both (2) and its negation share the presupposition that the King of France actually exist *now* (that is, at the time of evaluation). If this presupposition fails to be satisfied, then neither of the propositions expressed by (2) and its negation '*The King of France* did not visit London yesterday' has a truth-value.

The situation is different in the case of the sentence (3):

(3) '*London* was visited by the King of France yesterday.'

Now the property (the focus) of having been visited by the King of France yesterday is predicated of London (the topic). The existence of the King of France at the time of evaluation is presupposed neither by (3) nor by its negation. The sentence can be read as 'Among the visitors of London yesterday was the then King of France'. The existence of the King of France *yesterday* is only entailed by (3) and not presupposed.[21] My analyses respect these conditions.

Let *Yesterday*/$((o\tau)\tau)$ be the function that associates a given time t with the time interval that is yesterday with respect to t; *Visit*/$(o\iota)_{\tau\omega}$; *King_of*/$(\iota)_{\tau\omega}$; *France*/ι; $\exists/(o(o\tau))$.

The analysis of (2) comes down to

(2*) $\lambda w\lambda t[\lambda x[^0\exists\lambda t^*[[[^0Yesterday\ t]t^*] \wedge [^0Visit_{wt^*}x\ ^0London]]]$
$\lambda w\lambda t[^0King\_of_{wt}\ ^0France]_{wt}]$

In (2*) the royal office is extensionalized with respect to the world w and the time t of evaluation. At such $\langle w, t\rangle$-pairs at which the office is not occupied the proposition constructed by (2*) has no truth-value, because the extensionalization of the office yields no individual, the Composition $\lambda w\lambda t[^0King\_of_{wt}\ ^0France]_{wt}$ being v-improper. We have the Strawsonian case of the King's existence being presupposed. On the other hand, the sentence (3) expresses

(3*) $\lambda w\lambda t[^0\exists\lambda t^*[[[^0Yesterday\ t]t^*] \wedge [^0Visit_{wt^*}$
$\lambda w\lambda t[^0King\_of_{wt}\ ^0France]_{wt^*}\ ^0London]]]$

In (3*) the royal office is extensionalized with respect to world w and time t^* belonging to the interval $[^0Yesterday\ t]$. If the office goes vacant for all such t^* the Composition $\lambda w\lambda t[^0King\_of_{wt}\ ^0France]_{wt^*}$ is v-improper for any t^* belonging to

[21] [21] disregards this reading, saying that any sentence containing 'the King of France' comes with the presupposition that the King of France exist *now*. In my opinion, this is because he considers only the *neutral* reading, thus disregarding topic-focus ambiguities.

$[^0$*Yesterday t*$]$. Hence the time interval *v*-constructed by the Closure $\lambda t^*[[[^0$*Yesterday t*$]t^*] \wedge [^0$*Visit*$_{wt^*} \lambda w \lambda t[^0$*King_of*$_{wt}$ ^{0}*France*$]_{wt^*}$ ^{0}*London*$]]$ is empty and the existential quantifier takes this interval to **F**. On the other hand, at such a $\langle w, t \rangle$-pair at which the proposition constructed by (3*) is true, the Composition $[^0\exists \lambda t^*[[[^0$*Yesterday t*$]t^*] \wedge [^0$*Visit*$_{wt^*} \lambda w \lambda t[^0$*King_of*$_{wt}$ ^{0}*France*$]_{wt^*}$ ^{0}*London*$]]]$ *v*-constructs **T**. This means that the second conjunct *v*-constructs **T** as well and the Composition $\lambda w \lambda t[^0$*King_of*$_{wt}$ ^{0}*France*$]_{wt^*}$ is not *v*-improper. Thus the royal office is occupied *at some time t** belonging to $[^0$*Yesterday t*$]$. This is as it should be, because (3*) *only entails the existence* of the King of France *yesterday*. We have the Russellian case: the meaning of 'the King of France' occurs with *de dicto* supposition with respect to the temporal parameter *t*.

5 Conclusion

In this paper I demonstrated that both the proponents of Russell's quantificational analysis and of Strawson's referential analysis of definite descriptions are partly right and partly wrong, because sentences of the form 'The *F* is a *G*' are systematically ambiguous. Their ambivalence stems from different topic-focus articulation, and I brought out the *semantic*, as opposed to pragmatic, character of this ambivalence. I showed that a definite description occurring in the topic of a sentence with *de re* supposition corresponds to the Strawsonian analysis of definite descriptions, while a definite description occurring in the focus with *de dicto* supposition corresponds to the Russellian analysis. While the clause standing in topic position triggers a presupposition, a focus clause usually only entails rather than presupposes another proposition. The procedural semantics of TIL provides rigorous analyses such that sentences differing only in their topic-focus articulation are assigned different constructions producing different propositions (truth-conditions) and having different consequences.

Moreover, the proposed analysis of the Russellian reading does not deprive definite descriptions of their meaning. Just the opposite; 'the *F*' receives a context-invariant meaning, which is the construction of an individual office. What is dependent on context is the way this (one and the same) construction is used. Thus I also demonstrated that Donnellan-style referential and attributive uses of an occurrence of 'the F' do not bring about a shift of meaning of 'the F'. Instead, one and the same context-invariant meaning is a constituent of different procedures that behave in logically different ways.

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