Relative clause constructions with a post-copular gap

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In this paper, we examine several types of complex DPs characterized by the presence of the relative-internal 'gap' in a post-copular position. This position is of potential interest in view of the ambiguity of copular constructions in being construable as predicative or equative, and correspondingly of post-copular elements in functioning as predicates or arguments. As we shall see, this state of affairs, combined with varying positions of the complex DP in the matrix, has interesting and analytically challenging implications for the interpretation of the various DPs.

We will examine four types of construction, which are illustrated in (1)-(4).

(1) Ivan is finally [the naturalized American that {his three brothers, everyone else in his family}already are/is _].

(2) a. John is [a doctor {such as, of the kind that}his father is _].
b. John is [the kind of doctor that his father is _].
c. John is {fully, almost, twice}[the {hero, brilliant thinker} that his father is _].
d. [A doctor {such as, of the kind that} John's father was _] is unlikely to be found today.
e. I have never met [a doctor {such as, of the kind that} John's father was _].

(3) [The famous singer you once pretended to be _] is standing over there and casting furious glances at you.

(4) a. [The accomplished mathematician you are **supposed** to be --] should have little difficulty with this simple problem.
b. [The experienced defenders that ({all, most, at least some} of) you **presumably** are _] will hopefully manage to hold this bridge until relieved.
c. [The idealist he **once** was _] sincerely believed in the principles of the American Revolution.
d. I am addressing this appeal to [the idealist you **once** were _], not to [the opportunist you have become _].
e. [The happy couple that those two young people **seem** to be _] is not mere appearance, but genuine reality.
f. [The happy couple that Charles and Diana were **thought** to be _] never in fact existed.
g. [The abominable atrocity that the stoning of those women was _] should not go unpunished.
h. Her book displays the fine sceptical intelligence of [the scholar she is _].

We discuss these constructions in the next four sections. Very roughly, we argue that the gaps in the examples (1)-(2) are best interpreted as **property variables**, the property being non-gradable in (1) and gradable in (2). With respect to (3)-(4), we argue that the gaps are optimally analyzed as **individual concept variables**, an important difference between the two sets of data being that the complex DP purports to be extensional (and possibly referential) in data like (3), and intensional in data like (4). We also argue that the copular structures in data like (1)-(2) are predicative, and in data like (3)-(4), equative. By 'predicative construction', we mean one in which the post-copular term is one logical type higher than the pre-copular one, and by 'equative construction', one in which the pre-copular and post-copular terms are of the same logical type.

1. Constructions with non-gradable property gaps

On the most natural reading of (1), the copular structure cannot be equative. If we assume that it is, the gap needs to be construed as an individual variable, because the copular subject is of the individual type (we assume that if the subject is quantified, as in the version with *everyone else*, it undergoes 'short' QR, and its trace is an individual variable). But if so, abstraction over the post-copular variable yields a set of individuals, and the definite article picks out the unique individual who is a naturalized American and is identical to Ivan's three brothers or to everyone else in his family. The entire sentence will thus be true just in case Ivan is identical to such individuals, and this is clearly not the most natural interpretation of this sentence.

We propose that the post-copular variable starts out at the property type, and after application to the copular subject, undergoes abstraction at the CP level. Since CP denotes a set of properties and the external NP, a set of individuals, CP and NP cannot intersect (intersection being the most common procedure for combining an NP with a restrictive relative CP). Neither can CP be applied to NP, since the complex NP would be construed as a proposition, and would be unable to combine with the definite article. We suggest that NP **specifies** the membership of CP, and that the complex NP is construed as a singleton whose (only) member is the property denoted by the simplex NP. This interpretation can be achieved through a number of steps, which are illustrated in (5) with respect to the example in (1): (i) abstraction, at the CP level, over the variable P that corresponds to the gap (see (5d)); (ii) introduction of a new property variable R, which is equated with P (see (5e)); (iii) abstraction over R (see (5f)); (iv) application of the R-abstract to NP, followed by lambda reduction (see (5g)). Assuming, following Jacobson (1994), a cross-typical definition of the definite article, the latter picks out the unique property that is NATURALIZED AMERICAN and is possessed by Ivan's three brothers or by everyone else in his family (see (5i)). The entire sentence comes out as true if and only if Ivan possesses the property denoted by DP, which is fully in keeping with our intuitions (see (5j)).

(5) a. $[_{IP2}$ Ivan is … $[_{DP}$ the $[_{NP2}$ $[_{NP1}$ nat. Am.] $[_{CP}$ that $[_{IP1}$ his 3 brothers … are _]]]]]
b. __ : = $P_{<e,t>}$
c. IP1: = P(his 3 brothers)
d. CP: = λP.P(his 3 brothers) $\Rightarrow$
e. λP.P(his 3 brothers) & P = R $\Rightarrow$
f. λR.λP.P(his 3 brothers) & P = R
g. NP1: = NAT-AM
h. NP2: = [λR.λP.P(his 3 brothers) & P = R](NAT-AM) =
λP.P(his 3 brothers) & P = NAT-AM
i. DP : = ιP: P = NAT-AM & P(his 3 brothers)
j. IP2: = [ιP: P = NAT-AM & P(his 3 brothers)] (ivan)

One noteworthy property of (1) is that the complex DP is necessarily definite. If we substitute *a* for *the*, the sentence becomes unacceptable. We address this point in the next section.

2. Constructions with gradable property gaps

Note that the complex DP occurs in matrix post-copular position in (2a-c), and in incontrovertible arguments positions (subject and object) in (2d-e). We discuss these two sets of data in *that* order.

In (2a-c), much as in (1), the copular structure cannot be equative for comparable reason,, namely, that these sentences would have the undesired implication that John is the same person as his father. The type of the simplex NP in the matrix must be that of gradable properties, which we take, following, e.g., Heim (2001), to be <d, <e,t>> (we use 'd' as a symbol of convenience to range over both degrees and kinds, following essentially Heim 1987), and the gap must include a variable of this type, as well as a variable of type <d>, to serve as the latter's first argument. We show in (6) what we take to be the principal steps in the compositional interpretation of one version of (2a), which, we believe, reflects most transparently the necessary semantic steps (for the remaining data in (2a-c), we believe some adjustments steps are needed either in the syntax or in the semantics; we will not further explore this matter here). We assume that the words *kind*, *of*, *a* have no effect on interpretation, and we leave them un-interpreted (just like the copulas).

(6) a. [$_{NP2}$ John is a [$_{NP2}$ [$_{NP1}$ doctor] of [$_{DP}$ the kind [$_{CP}$ that [$_{IP1}$ his father is __]]]]]
b. __ : = $G_{<d,<e,t>>}$(d)
c. IP1: = G(d)(his father)
d. CP : = λd.G(d)(his father)
e. DP : = ιd.G(d)(his father)
f. NP1: = $\text{DOCTOR}_{<d,<e,t>>}$
g. NP2: = λx. DOCTOR (ιd.G(d)(his father))(x)
h. IP2 : = [λx. DOCTOR (ιd.G(d)(his father))(x)] (john) ⇒
[λx. DOCTOR (ιd. DOCTOR (d)(his father))(x)] (john)

In (6h), we assume that the lower line is derived from the upper one by construing the free variable G as anaphoric to NP1 (this interpretive step can in principle also take place at the level of NP2).

Some remarks are in order concerning the (in)definiteness of the nominals in (6a). We take the indefiniteness of NP2 to be a syntactic reflection of the fact that gradable properties are not unique, so long as their degree/kind variable is not fixed. We also take the definiteness of DP to be a reflection of the fact that in the context of (6a), the kind of doctor that characterizes John and his father at the temporal indices taken into account is stable, and thus, unique. This is reflected in the fact that substituting *a* for *the* in this DP results in infelicity (similarly for the corresponding DPs in (2a-c), as the reader can check). One can, however, envisage other scenarios in which kinds are not cross-indexically stable, and in such cases, DPs like the one in (6a) may be existentially quantified. An illustration is provided in (7), where distinct doctor kinds applicable to John's father at various **unrealized** world indices are quite plausible, with the result that existential quantification over these kinds is entirely felicitous.

(7) John is a {doctor of a kind, kind of doctor} that his father has never been.

In contrast to gradable properties, it is difficult to see how non-gradable properties could fail to be unique at all the indices of their domain. We thus do not see how a

sentence that differs from (1) only in having an indefinite complex DP could be contextually salvaged.

We now turn to the data in (2d-e), where the complex DP occurs in an incontrovertible argument position, and must thus be construed as a GQ. We assume that this can be done straightforwardly by resorting to Existential Closure, or to a comparable operation that lifts a property into a generic GQ. To illustrate, we assume that the complex DP in (2e) translates as (8).

(8) λP.∃x[DOCTOR (ιd. DOCTOR (d)(john's father))(x) & P(x)]

3. Extensional DPs with relative-internal equation

In (3), the copular structure is clearly equative, because the denotatum of its (controlled null) subject in effect pretended to be someone else, but did not necessarily pretend to be a famous singer (he may in fact not even have known that the person he tried to pass himself off for was a famous singer). The equation holds in the worlds of the pretense, but not in the worlds of the matrix, and the equated terms must thus be of the type 'individual concept' (<s,e>). The derivation of this construction is fairly straightforward. At the level of the copular IP, 'you' is equated with an individual concept variable. At the relative CP level, abstraction over that variable yields a set of individual concepts which intersects with the set denoted by the external simplex NP. At the complex DP level, the definite article is appropriate if the set denoted by the complex NP is a singleton, but if this is not the case, other forms of quantification are possible. For example, *the* may be replaced by *a* or *every* with preservation of grammaticality, as the reader can check. Importantly, and this distinguishes this construction from those to be discussed in the next section, the complex DP is defined at the indices of the matrix, and its construal is thus independent of the construal of the bound variable in post-copular position, which is evaluated at the indices of a CP-internal intensional operator. The upshot of this is that *you*, which is a constant individual concept, may be extensionally identical with the post-copular variable in the relative, and at the same time extensionally distinct from the complex DP in the matrix.

We illustrate these points with a concrete example in (9), focusing on the bracketed complex NP in *the [mathematician that Bill pretended to be] is looking at him furiously*. To represent the syntactic input to semantic interpretation, we use the conventions in Heim & Kratzer (1998). We also make certain assumptions concerning semantic interpretation. In particular, we assume that expressions are interpreted with respect to an index i, which could be understood as a world, a time, or a combination of both. For example, MATHEMATICIAN(i) is the meaning of the constant MATHEMATICIAN at the index i. Predicates apply to individual concepts; for example, LAW STUDENT(i)(MISS AMERICA) says that Miss America is a law student at i. This can be reduced to a predication about an individual; it amounts to saying that Miss America **at i** is a law student at i. Reducibility to predications about individuals holds for many, even though not all predicates; it does however hold for those predicates we will use in the remainder of this paper. We can express reducibility, following Montague, by a meaning postulate that states that for every reducible property of individual concepts P there is an entity property P* such that for every index i and individual concept x for which P(i)(x) is defined, it holds that P(i)(x) = P*(i)(x(i)).

(9) a. ⟦ [*mathematician*] $_1$[*(that*) [*Bill* [*pretended* [*to be* t_1]]]]⟧, uttered at i_0
b. = λiλx[⟦ [*mathematician*]⟧(i)(x) ∧ ⟦$_1$[*(that*) [*Bill* [*pretended* [*to be* t_1]]]⟧(i)(x)] ⇒
c. = λiλx[ACC.MATH(i)(x(i)) ∧ ∀i′∈PRETENDED(i_0)[BILL(i′) = x(i′)]] ⇒
d. = λiλx[ACC.MATH*(i)(x(i)) ∧ ∀i′∈PRETENDED(i_0)[BILL(i′) = x(i′)]]

What characterizes this construction (and will turn out to distinguish it from the construction illustrated in (4)) is that the property denoted by the simplex NP is attributed to the individual concept variable at the indices of the matrix, but not at those of the intensional operator within the relative.

To interpret the complex DP, we need a definition of the definite article that is suitable for application to a property of individual concepts. The standard assumption is that the definite article is interpreted for each index i as the unique individual u such that u has the property denoted by the article's NP complement in i; if this property does not apply to exactly one individual in i, then the expression is undefined. However, when the article is applied to a property of individual concepts, it faces the problem that one and the same individual can be a representative of many individual concepts. The problem is taken care of by adopting the following definition of the definite article (where x and u are variables of type <s,e> and <e> respectively).

(10) ⟦*the* α⟧ = λi′λi ιu ∃x[⟦α⟧(i)(x) ∧ u = x(i)]

We wish to note that in the construction illustrated by (3), the presence of an intensional operator in the relative is not accidental. Rather, such an operator is necessary for felicity, as brought out by the infelicity of (11).

(11) #{The, a} singer that Bill is is looking at you furiously.

Note that, in the absence of an intensional operator, *Bill* has the same extension as the post-copular variable **and** as the complex DP at all the indices that are contextually relevant. But this means that the complex DP is semantically equivalent to the simpler expression *Bill*, and that the equation within CP serves no useful purpose. We surmise that this 'pointlessness' of the equative structure is responsible for the oddity of (9). This conjecture gets some further credibility from the observation that 'Transparent Free Relatives' (TFRs), which also rely on equation, are also infelicitous in the absence of an intensional operator (i.e., of an operator which serves to distinguish the relative from the matrix at **some** index or indices; for detailed discussion of TFRs, see Grosu 2003 and references therein). An illustration is provided in (12).

(12) a.#John lives in [what is {a city, St. Petersburg}.
b. John lives in [what is today {a city, St. Petersburg}], but was once {a village, Leningrad}.

4. Intensional DPs with relative-internal equation

The status of the copular structure in (4) is less immediately obvious than in the case of (3). While in both cases, the equation holds at the indices of a CP-internal intensional operator, the property denoted by the CP-external simplex NP has, in constructions like (3), no necessary relevance to that equation, it being necessarily defined only at the indices of the matrix. In constructions like those in (4), on the other hand, the property denoted by the CP-external NP is highly relevant to the

equation, because it is necessarily defined only at the indices of the intensional operator. In fact, one of the intuitively important functions of this construction seems to be the attribution of the property denoted by the simplex NP to the copular subject at indices distinct from those of the matrix.

All of this notwithstanding, the constructions in (4) also differ from the clearly predicative ones in (1)-(2) in that the denotation of the complex DP is not independent of that of the copular subject. In a sense, the copular subject and the complex DP seem to denote the same individual at all the indices at which they are defined, except that the denotatum of the former need not possess the property denoted by the simplex NP at all the indices of its domain, while the denotatum of the latter does. In (4a), for example, 'you' need not be an accomplished mathematician at the indices of the matrix, while the denotatum of the complex DP needs to denote 'you' **as an accomplished mathematicia**n at all its indices. To capture the intuition that the two expressions denote, in some sense, the same individual, we need to assume, as the informal characterization two sentences earlier tacitly did, that in constructions like (4), just as in constructions like (3), the copular construction equates two individual concepts. To capture the intuition that the 'same' individual may exhibit different constellations of properties at distinct indices, it is necessary to allow a certain flexibility in the notion 'individual', in keeping with Heraklitos' insight that one cannot swim twice in the 'same' river, even though, from a more general perspective, the river may be viewed as being the 'same' at all the indices where it exists.

We will use the term 'counterpart' to designate distinct spatial/temporal stages and/or distinct modal realizations of a constant individual concept. The difference between the constructions in (3) and (4) is then that in the former, the concept equated with the copular subject at the indices of a CP-internal intensional operator may denote a **different individual** in the matrix, while in (4), it may at most denote a **different counterpart of the same individual**. In both cases, the CP-internal intensional operator is necessary for felicity. This can be seen by noting that the version of (13) with *claims* is ambiguous between a construal à la (3) and one à la (4), but the version with *is* has no felicitous reading.

(13) The mathematician that Bill {claims to be, #is} ought to know that
the square root of 2 is an irrational numbed.

In fact, it is not even clear that the two purported readings can be kept apart in the absence of an intensional operator, since an individual identical to Bill at all contextually relevant indices and a counterpart of Bill that is identical at all contextually relevant indices seem impossible to distinguish from each other.

For completeness, we note that the intensional operator necessary for felicity need not be overtly expressed, at least insofar as the constructions in (4) are concerned. In (4a-f), the copular IP includes an explicit operator, which appears in boldface. In (4g-h), there is no such overt element. Nonetheless, in (4g), it is easy to assume that the characterization of an act of stoning (presumably, to death) as an abominable atrocity represents the opinion of the speaker (and presumably of many others), but not necessarily of everyone related to that event (e.g., of the judges who imposed the punishment). Similarly, *scholar* in (4h) purports to attribute to 'her' special attributes, e.g., those of a 'true' scholar, in contrast to the version of (13) with *is*, where *mathematician* seems to merely indicate Bill's formally defined profession. In the former case, then, but not in the latter, the properties attributed to the copular subject

may be viewed as constituting the opinion of certain persons, but not necessarily of everyone.

While sharing the property just noted, the constructions in (3) and (4) also exhibit a number of distinguishing properties, which are arguably traceable to the extensional/intensional status of the complex DP. One such distinguishing property is that the content of the matrix is subject to certain constraints in the constructions in (4), which are not detectable in the constructions in (3). This can be appreciated in relation to the data in (14).

(14) a. [The mathematician that Bill claims to be] is working on a hard problem.
b. [The mathematician that Bill claims to be] should drink less coffee than he does.

These sentences are fine if the bracketed DPs purport to denote some person other than Bill, but strange if the DPs in question purport to denote Bill. Another distinguishing property, which we have already alluded to in the preceding section, is that the determination/quantification of the complex DP is free in data like (3), but restricted to the definite article in data like (4). This can be appreciated by contrasting the felicitous version of (13) with (15).

(15) {A, every, five, all the} mathematician(s) that Bill has claimed to be ought to know that the square root of 2 is an irrational number.

While the complex DP in (13) may be construed either extensionally or intensionally, those in (15) may only have an extensional interpretation. We will propose explanations for the constraints on the intensional complex DPs after outlining a compositional analysis for them.

4.1. A compositional analysis of intensional DPs

Up to the level of CP, the derivation proceeds as in (3), yielding a set of individual concepts. At the level of the complex NP, however, the kind of interpretation illustrated in (9) is not appropriate, because it assigns to the individual concept variable the property denoted by the simplex NP at the indices of the matrix, and not at the indices of the intensional operator, while what we need is precisely the converse. To achieve this result, we propose that the structure in (16a) may also be interpreted by means of the rule in (16b), which states that the individual concept variable has the property denoted by the simplex NP at all the indices of its domain. We illustrate the effects of this rule with a concrete example in (17).

(16) a. $[\![\ [_{NP}\ [_{NP}\ \alpha]\ {}_{n}[_{CP}\ \beta]]]\!]$
b. $= \lambda i\ \lambda x[\ \forall i' \in \mathrm{DOM}(x)[[\![\alpha]\!](i')(x)] \wedge [\![{}_{n}[_{CP}\ \beta]]\!](i)(x)]$

(17) a. $[\![\ [_{NP}\ [_{NP}$ *accomplished mathematician*$]\ {}_{1}[_{CP}$*(that)* [*Bill* [*supposedly* [*is* t_1]]]]]]$]\!]$
b. $= \lambda i\ \lambda x[\ \forall i' \in \mathrm{DOM}(x)[[\![$*accomplished mathematician*$]\!](i')(x)]$
$\wedge\ [\![{}_{1}[_{CP}$ *(that)* [*Bill* [*supposedly* [*is* t_1]]]]]$]\!](i)(x)] \Rightarrow$
c. $= \lambda i \lambda x[\ \forall i' \in \mathrm{DOM}(x)[\textsc{acc.math}(i')(x)] \wedge \forall i'' \in \textsc{Supposed}(i)[\textsc{bill}(i'') = x(i'')]]$
d. $= \lambda i \lambda x[\ \forall i' \in \mathrm{DOM}(x)[\textsc{acc.math}^*(i')(x)] \wedge \forall i'' \in \textsc{Supposed}(i)$
$[\textsc{bill}(i'') = x(i'')]]$

Note that the second conjunct of (17c) implies that all the indices of the intensional operator must be part of the domain of the individual concept variable, because this variable needs to be defined at all these indices for the proposition which says that the denotatum of the variable is identical to Bill to have a truth value. Furthermore, in requiring that the individual concept variable possess the ACC.MATH property at all the indices of its domain, the first conjunct implies that this must be so at all the indices of the intensional operator. Thus, the two conjuncts jointly achieve the same effect as syntactic 'reconstruction' of NP within the scope of the intensional operator.

At the level of DP, application of the definite article (defined as in (10)) yields the interpretation shown in (18).

(18) a. ⟦ [$_{DP}$ *the* [$_{NP}$ [$_{NP}$ *accomplished mathematician*] $_1$[*Bill* [*supposedly* [*is* t_1]]]]]⟧, uttered at i_0

b. = λi″′ λi ιu∃x[⟦[$_{NP}$ *accomplished mathematician*] $_1$[*Bill* [*supposedly* [*is* t_1]]]]⟧(i)(x) ∧ u = x(i)]

c. = λi″′ λi ιu∃x[∀i′∈DOM(x)[ACC.MATH*(i′)(x(i′))] ∧ ∀i″∈SUPPOSED(i_0)[BILL(i″) = x(i″)] ∧ u = x(i)]

d. (when applied to an arbitrary index):
λi ιu∃x[∀i′∈DOM(x)[ACC.MATH*(i′)(x(i′))] ∧ ∀i″∈SUPPOSED(i_0)[BILL(i″) = x(i″)] ∧ u = x(i)]

The meaning of DP is thus an individual concept that maps indices i to the unique individual u such that there is an individual concept x that satisfies the description *accomplished mathematician Bill supposedly is* (in the context i_0), and u is the value of x at i.

Having made clear the interpretation of intensional DPs of the kind illustrated in (4), we now turn to their special properties noted above in relation to (14)-(15). We will in fact distinguish three properties, which relate to (14a), (14b), and (15).

4.2. Accounting for three restrictions on the complex DP

4.2.1. When is the complex DP defined at matrix indices?

To make sense of the infelicity of (14a) on an intensional construal of the bracketed DP, let us first recall that this DP must be defined at all the indices of the CP-internal intensional operator. Can it be defined at additional indices? In principle, there is nothing that can prevent this (just as on the extensional construal of this DP, it is in principle possible, even if not necessary, that Bill may have known that the individual he was trying to impersonate was a mathematician). However, it seems to us that there is a plausible implicature (presumably derivable from Grice's Maxim of Quantity) that it is only at the indices of the operator that Bill may be assumed to be a mathematician, since if additional indices had been intended, the speaker could have used a more encompassing operator. In any event, it is arguably implicated that DP is not assumed to be freely definable at any matrix indices, since if this had been so, the very use of the operator would have become pointless.

We suggest that the indices of the operator will be compatible with those of the matrix clause under two types of circumstances: (i) if the indices of the matrix are plausibly construable as **included** in those of the operator, or (ii) if the implicature is **appropriately defeased**.

The situation in (i) is arguably achieved in (4a), which seems to be adequately paraphrased by "if you are indeed the accomplished mathematician you are supposed be, you should have…", in (4b), which seems to be adequately paraphrased by "on the plausible presumption that you are experienced defenders, one may hope that you will hold …", and in (4c), where the period of time during which 'he' believed in the principles of the American Revolution is construable as included in the period of time during which he was an idealist.

The situation in (ii) is arguably illustrated by (4d), where the implicature is undone by the plausible assumption that an impassioned appeal can **revive** idealistic feelings in someone who has fallen into opportunism. The situation in (ii) is arguably also found in (4e), where the initial impression that the happy-couple status was a mere matter of appearance is explicitly rejected by the assertion that it is in fact a reality.

The situations described in the preceding paragraph should now be contrasted with those found in (14a) and (19). Note that, in stating that Bill-as-a-mathematician is working on a hard problem, the matrix takes the existence in the real world of this counterpart of Bill for granted, and in effect ignores the implicature. Similarly, in (19), which differs from (4c) only in the tense of the matrix verb, the continued existed of he-as-an-idealist at the time of speech is taken for granted, in disregard of the implicature. (19) should also be contrasted with (4d), where the existence of this counterpart of 'he' at the time of speech is made plausible by a 'pragmatic bridge.'

(19) #[The idealist he **once** was _] sincerely believes in the principles of the American Revolution.

4.2.2. The contextual coherence property

We now turn to (14b), which raises a slightly different problem. Note that there is no reason to assume that this example does not fall under the 'inclusion condition', i.e., (i) in the second paragraph of the preceding section. Thus, the matrix includes the modal *should*, just as in (4a), and (14b) is undoubtedly paraphraseable as 'if Bill is indeed the mathematician he claims to be, he should drink less coffee than he does.' But this very paraphrase, while a well-formed instance of material implication, is as odd as (14b), in virtue of the irrelevance of the conditional clause to the matrix (under 'normal' contextual assumptions). The point is that an individual may have many distinguishable counterparts, and the choice of a specific counterpart over all others needs some justification. When the complex DP in (14b) is used referentially, the property MATHEMATICIAN merely helps identify the referent, but when it is used intensionally, the only possible reason for choosing the counterpart characterized by this property is that the property in question is assumed to have some relevance to the larger context. The unacceptability of the intensional variant of (14b) is thus traceable to the apparent absence of any relevance.

4.2.3. The necessary definiteness property

We now turn to the last property of the intensional DPs at issue, their necessarily definite status. As noted earlier, the definite article applied to a property of individual concepts may be defined as in (10) (reproduced below as (20) for convenience).

(20) $[\![\textit{the}\ \alpha]\!] = \lambda i'\lambda i\ \iota u\ \exists x[[\![\alpha]\!](i)(x) \wedge u = x(i)]$

This makes its application possible to properties of non-constant individual concepts, as in (21). The italicized expression identifies different individuals at different temporal indices, and is well-defined just in case at each index of its domain, there is a single individual satisfying the description POPE. At the same time, the state of affairs just described is not a sufficient condition for using the definite article, since the alternative forms of determination in (22) are also possible.

(21) *The pope* has always been a supporter of the arts.
(22) a. *{Every, no} pope* has been a supporter of the arts.
b. *{Some, all, most, no}* popes have been supporters of the arts.

In intensional DPs like those in (4), the definite article is not just a possibility, but in fact a necessity, as brought out by the fact that the DPs in the various versions of (15) cannot be understood as denoting **counterparts of Bill**, but only **individuals distinct from Bill** in the real world. We suspect the reason for this is that counterparts of a single individual that are distinguished from all other counterparts of that same individual **in the same way** (in particular, by the property denoted by the CP-external NP), are conceptually **indistinct**, and may not be quantificationally distinguished from one another.

It is of interest to note that when determiners are directly applied to a proper name, without resorting to an equative proposition, the definite article is necessary just in case the counterparts of the individual denoted by the proper name are felt to be indistinguishable from each other. Thus, along with (23a), we have data like (23b).

(23) a. *{The, #a} Napoleon that returned from Russia* was *{a, *the} very different Napoleon* from *{the, #a} Napoleon who one at Austerlitz.*
b. *A Napoleon that would have won at Waterloo* would have destabilized the continent for years to come.

In (23a), we have three italicized DPs whose N is a proper name. The first and the third are only felicitous when definite, and the second is only grammatical when indefinite. The latter indefinite DP shows no more than that counterparts of a single individual can be in principle distinct. The (in)felicity of the indefinite article in the remaining italicized DPs of (23a) and (23b) seems to depend on whether we conceive of them as indistinct or as distinguishable. The counterpart denoted by the leftmost italicized DP in (23a) is explicitly identified not by a property, but by a time period, say, the one stretching from the disastrous crossing of the Berezina and until the decision to fight other battles. The defining property is implicit; for example, one may assume that Napoleon was a broken man following his first important defeat. From this perspective, the various temporal counterparts of Napoleon during the period in question are viewed as indistinct, and the indefinite article is inappropriate. Similar considerations apply to the rightmost italicized DP in (23a). In contrast, the italicized DP in (23b) denotes hypothetical counterparts of Napoleon, and there is no reason for assuming that the shared property of winning at Waterloo makes them indistinct. One can, for example, imagine a Napoleon who won at Waterloo by having better generals, but also one who won by enlisting the services of 500,000 Chinese volunteers, or by accidentally discovering the atomic bomb, etc. Hence, the indefinite article is fully appropriate, and the definite article is in fact inappropriate (unless a special context is constructed). (23b) is similar to (24), which implies that no matter

how Paris might look, it would cease to be a tourist attraction so long as it lacked the Eiffel Tower.

(24) *{A, any} Paris without the Eiffel Tower* would not longer be a tourist attraction.

Is it possible to construct by means of hypothetical operators felicitous indefinite complex DPs structured like those in (4)? Let us try.

(25) *{The, a} victorious general that Napoleon would have been if he had won at Waterloo* would have destabilized the continent.

Our feeling is that only the definite version of the italicized DP in (25) denotes a counterpart of Napoleon, the indefinite version seems to say that Napoleon would have turned into a different individual endowed with the VICTORIOUS GENERAL property by winning at Waterloo. The reason for this effect seems to be that in this construction, the criterial property distinguishing the counterparts of Napoleon denoted by DP form other counterparts is just VICTORIOUS GENERAL, and this makes all these counterparts indistinct. There is just no way to reconcile this indistinctness with existential quantification, and this presumably triggers the intuition that victorious generals targeted by existential quantification must be distinct individuals.

A similar impression arises from the following example (adapted from *The Cambridge Grammar of the English Language,* Chapter 11, Cambridge University Press, 2002).

(26) Bill is a fat man constantly searching for *{the, a} thin man he once used to be*.

Our impression is that only the definite version is construable as a counterpart of Bill, the indefinite version suggests that Bill is viewing his earlier self as a different person.

5. Summary of results

The principal results of this paper consist in compositional semantic analyses for the four types of externally-headed relative clause constructions with post-copular gaps illustrated in (1)-(4), and in argumentation that a variety of properties detectable in some of these constructions are traceable to aspects of our analyses.

The main properties we attempted to shed light on are:

(i) The constructions in (3)-(4), but not those in (1)-(2), are felicitous just in case the relative clause contains an (overt or implicit) intensional operator, with scope over the post-copular gap.

(ii) In the construction in (4), the relative clause and its matrix are related by certain compatibility and coherence requirements.

(iii) The constructions in (1) and (4), but not those in (2)-(3), are necessarily definite.

We note the following important features of the analyses we proposed:

(a) The copular structure is predicative in the constructions in (1)-(2), and equative in the constructions in (3)-(4).

(b) The gap is interpreted as a non-gradable property variable in (1), as a gradable-property variable applied to a degree/kind variable in (2), and as an individual concept variable in (3)-(4).

(c) The usual rule for interpreting complex NPs by intersecting the relative CP with the external NP is applicable in (2) and (3), but not in (1) or (4). We proposed the following alternative procedures for the latter two cases: In (1), NP identifies the membership of the set of properties denoted by CP, which thus becomes a singleton; in (4), NP assigns the property it denotes to the individual concept variable at all the indices of the latter's domain. The latter procedure, in conjunction with an implicature derivable from the Maxim of Quantity, achieves the effect of syntactic 'reconstruction' of the CP-external NP within the scope of the intensional operator.

(d) The complex DP in (1) is construed as a non-gradable property, and can only be used as a predicate. The complex DP in (2) denotes a gradable property, when placed in a predicative position, and a generalized quantifier of individuals possessing the gradable property, when occurring in an argument position. The complex DP in (3) denotes an individual that may be, and typically is, distinct from the individual denoted by the copular subject at matrix indices. The complex DP in (4) denotes a counterpart of the copular subject distinguished from other counterparts by possession of the property denoted by the simplex NP, and is furthermore (possibly) defined only at the indices of the intensional operator.

(e) Application of the definite article to a property of individual concepts picks out, at all the indices of the definite DP's domain, a unique individual or individual-counterpart, if there is one, and is undefined otherwise.

We suggested the following explanations for the properties (i)-(iii):

(i') Eliminating the CP-internal intensional operator renders the complex DP semantically indistinguishable from the copular subject at all contextually relevant indices, with the result that the use of the more complex structure and of the equation it contains is otiose. We suggested that pointless use of equation is conducive to infelicity, and provided independent supporting evidence from TFRs.

(ii') The compatibility requirement has the following source: The fact that the complex DP is, by implicature, defined only at the indices of the CP-internal operator requires that it also be defined at matrix indices, either by ensuring that the latter are included in the operator's indices, or by explicitly asserting that it is defined at indices other than those of the operator.

The coherence requirement is motivated by the following considerations: Since the particular counterpart characterized by the property denoted by the CP-external NP was chosen over all other imaginable counterparts, it must be that this property plays some role within the larger context, in particular, that it has relevance to the context.

(iii') The necessary definiteness of the construction in (1) was traced to the fact that non-gradable properties are unique at all indices. – The necessary definiteness of the constructions in (4) was attributed to the fact that the characterization of individual counterparts in terms of a unique specific property makes them indistinguishable at all the indices where they exist, and thus, in effect, unique. – In (2), on the other hand, given the existence of a multiplicity of degree/kinds, the felicity of (in)definite deteremination depends on whether the degrees/kinds are contextually assumed to be cross-indexically stable or distinct. – Finally, in (3), definiteness is not compulsory because an individual may in principle be equated (at varying indices) with a multiplicity of individuals.

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