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Logical Conversions

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Abstract

As I have argued elsewhere [10], and as summarized in the first two sections below, it turns out to be both logically and semantically revealing to acknowledge the existence of converse, or conversely construed, quantifiers, which mirror their classical, or classically construed, counterparts. In this paper I argue that classically construed quantifiers in their turn mirror their conversely construed counterparts in transitive verb/direct object constructions. The phenomena can be properly understood if we discharge the domain presupposition which is associated with the classical construal from its default existential import. We propose to, instead, draw from a concept of intentional reification, that goes without existential commitment.

Keywords: syllogistic reasoning, generalized quantifiers, intentional reification, ontological non-commitment.

1 Conversions in Logic

In his *De Interpretatione* and his *Prior Analytics* Aristotle has established and investigated what is now known as a square of oppositions dealing with four types of propositions of the form AuB, where A and B are general terms, and u is one of the four combinators e, a, i and o. The four types of propositions formally present the contents of sentences of the form *No A are B*, *All A are B*, *Some A are B*, *Not all A are B* (*Some A are not B*), respectively. For any combinator u we here define:

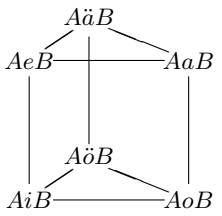
$$A\ddot{u}B =_{def} BuA$$

If we keep to an extensional evaluation of the four categorial propositions, and think of the terms A and B as denoting some set-theoretical or mereological

extension in some universe E, then the truth conditions of a proposition that $A\ddot{u}B$ can be specified as follows:[1]

$A\ddot{e}B$ is true in E *iff* A is disjoint from B in E;
$A\ddot{\imath}B$ is true in E *iff* A substantially overlaps B in E;
$A\ddot{a}B$ is true in E *iff* A includes B in E;
$A\ddot{o}B$ is true in E *iff* A does not include B in E.

We may, classically, observe that $A\ddot{e}B$ *iff* AeB and $A\ddot{\imath}B$ *iff* AiB, and that $A\ddot{\ddot{u}}B$ *iff* AuB. If we assume referential or existential import by the predicate term, we can also, trivially, observe that $\{\ddot{e}, \ddot{a}, \ddot{\imath}, \ddot{o}\}$ constitutes a square of converts, with contradictories, contraries and subcontraries. The join of the converted square with the traditional square can moreover be seen to constitute a *prism* of oppositions:



If we assume *differential import* ($\emptyset \neq A \neq B \neq \emptyset$), the top horizontal lines connect *contrary* propositions, and the bottom horizontal lines connect *subcontraries* then. Vertical lines connect *contradictories*, of course.

The new combinators $\ddot{e} = e$, $\ddot{a}$, $\ddot{\imath} = i$, and $\ddot{o}$ can be rendered in English by the expressions "no", "only", "some", and "not only", when they are used as *determiners*.[2] Determiners are taken to be terms that yield a proposition when combined with a nominal phrase and a verbal phrase, as we see in the following examples:

(1) No undergraduates qualified. ($U\ddot{e}Q$)
Only graduates did. ($G\ddot{a}Q$)

(2) No, not only graduates qualified. ($G\ddot{o}Q$)
Some undergraduates did. ($U\ddot{\imath}Q$)

Classical syllogistic reasoning has been firmly rooted in the work of Aristotle. With (essentially two) more combinators, there are, of course, more reasoning

[1] I have here refrained from making the usual, formally important, distinction between sentences and propositions that they express. I hope to avoid a discussion about the notion of a proposition, and I feel confident that the reader can understand these clauses as they are stated, or otherwise add his own supplementary modifications if these are conceived necessary.

[2] As one of the reviewers remarked, "Not only A are B" is typically used in English, to convey in addition that at least some A are B. The same can be seen to hold for "Not all A are B", but the effect with "only" appears to be stronger.

patterns, and obviously also more valid ones.[3] If we drop the assumption of existential (or differential) import for the time being, the classical four combinators from the Aristotelian square yield 15 valid syllogistic reasoning schemes. The six combinators from the above prism of oppositions yield 48 valid reasoning patterns. This set is logically well-behaved. The set of 48 valid schemes, in the prism, can be seen to be the logical result of just one valid scheme, and one may at will choose anyone of the 48 valid schemes to derive the others from.

The reason is in the first place, as has already been known for long, that the *figure* of a syllogism is immaterial to its validity. With our prism of combinators this fact can be fully exploited since every proposition has a converse formulation, and therefore every valid syllogistic scheme can be converted into an equi-valid scheme in any other figure. For, as is easily observed:

$$\begin{array}{c} MuP \\ \underline{SvM} \\ SwP \\ [\textit{fig. 1}] \end{array} \quad \textit{is valid iff} \quad \begin{array}{c} P\ddot{u}M \\ \underline{SvM} \\ SwP \\ [\textit{fig. 2}] \end{array} \quad \textit{is, iff} \quad \begin{array}{c} MuP \\ \underline{M\ddot{v}S} \\ SwP \\ [\textit{fig. 3}] \end{array} \quad \textit{is, iff} \quad \begin{array}{c} P\ddot{u}M \\ \underline{M\ddot{v}S} \\ SwP \\ [\textit{fig. 4}] \end{array} \quad \textit{is}$$

In the second place, also known for long by now, the *order of premises* is also immaterial, logically speaking, and since every proposition has a converse now, we can always formulate the converted syllogism. For, as is also easily observed:

$$\begin{array}{c} A_1 \\ \underline{A_2} \\ SwP \end{array} \quad \textit{is vald iff} \quad \begin{array}{c} A_2 \\ \underline{A_1} \\ P\ddot{w}S \end{array} \quad \textit{is}$$

These two observations already suffice to show that every valid syllogistic scheme has $2 \cdot 4 = 8$ different manifestations. One might also say that the 48 valid schemes, hence, reduce to essentially 48/8=6 valid ones.

The set of valid syllogistic schemes inhibts more structure, because any one of them licenses an inference to the falsity of either one of the premises on the assumed falsity of the conclusion. (By Aristotle's own method using reasoning from the absurdum.) For, upon the classical notion of negation:

$$\textit{if} \quad \begin{array}{c} A_1 \\ \underline{A_2} \\ C \end{array} \quad \textit{is valid, then so is} \quad \begin{array}{c} A_1 \\ \underline{\textit{not-}C} \\ \textit{not-}A_2 \end{array} \quad \textit{and so is} \quad \begin{array}{c} \textit{not-}C \\ \underline{A_2} \\ \textit{not-}A_1 \end{array}$$

[3] The basic reasoning patterns are syllogistic schemes indicated by strings uvw_i, where u and v are the combinators of the major and the minor premises of a scheme, respectively, where w is the combinator of the conclusion, and where i indicates the figure, one of the four possibilities of distributing the middle term over the premises.

A string uvw_1 is short for $\begin{array}{c} MuP \\ \underline{SvM} \\ SwP \end{array}$, uvw_2 for $\begin{array}{c} PuM \\ \underline{SvM} \\ SwP \end{array}$, uvw_3 for $\begin{array}{c} MuP \\ \underline{MvS} \\ SwP \end{array}$ and uvw_4 for $\begin{array}{c} PuM \\ \underline{MvS} \\ SwP \end{array}$.

With the four combinators we can distinguish 256 possible reasoning patterns, with six combinators we now have 864 schemes.

The availability of converse propositions does not add to particularly this observation, but for the fact that conversions can after all serve to frame a contraposited scheme within the very same figure, as we have established above. We may note, finally, that any valid scheme allows for a systematic negation $\overline{P}$ (or $\overline{S}$ or $\overline{M}$) of the predicate term P (or the subject term S or the middle term M).[4] For, observe that, e.g.:

$$AaB = AeB = \overline{A}\ddot{a}B \quad and \quad AoB = AiB = \overline{A}\ddot{o}B$$

and therefore, e.g.:

$$\frac{MaP}{\underline{SaM}}{SaP} \quad \frac{MeP}{\underline{SaM}}{SeP} \quad and \quad \frac{MaP}{\underline{SiM}}{SiP} \quad \frac{MaP}{\underline{S\ddot{o}M}}{S\ddot{o}P} \quad and \quad \frac{MeP}{\underline{SiM}}{SoP} \quad \frac{M\ddot{a}P}{\underline{SoM}}{SoP}$$

$$[Barbara] \quad [Celarent] \quad [Darii] \quad [Bar\ddot{o}cc\ddot{o}] \quad [Ferio] \quad [B\ddot{a}rocco]$$

As a result of all this, *every* valid syllogistic scheme can be subjected to *every* reconfiguration (negation, contraposition, conversion, or refiguring) so as to yield (the validity of) any other one of the 48 valid syllogistic schemes.

2 Conversions in Language

Also in the formal study of the semantics of natural language special attention has been given to determiners, or quantified expressions in general, and this has occasioned the so-called theory of generalized quantifiers in the last quarter of the previous century. Mathematically conceived, determiners are relations D between sets of individuals A and B in a universe of ur-elements E (or, possibly, chunks of stuff in some mereological structure). The universe E can be thought of as contextually supplied, and essentially figures as the domain of quantification so that it is generally required that:

$$D_E(A, B) \textit{ iff } D_E(E \cap A, E \cap B)$$

For some specific, logical, determiners, indicated by italic capitals, the relations can be defined as follows:

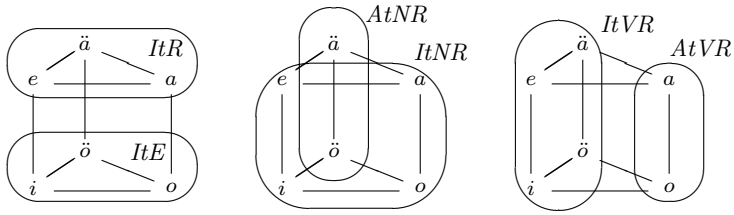
$$\begin{array}{rll} NO_E(A,B) & \textit{iff} & (E \cap A \cap B) = \emptyset \\ SOME_E(A,B) & \textit{iff} & (E \cap A \cap B) \neq \emptyset \\ FIVE_E(A,B) & \textit{iff} & |E \cap A \cap B| \geq 5 \\ MANY_E(A,B) & \textit{iff}^5 & |E \cap A \cap B|/|E| \geq a \quad [\text{e.g., } a = 1/3] \\ & \vdots & \end{array}$$

[4] As one of the reviewers acutely observed, full use of, e.g., *subject* negation would effectively yield an extended structure of 8 combinators (modulo equivalence), which are portrayed in the so-called *Keynes-Johnson octagon*. [28, §106-7] Hans Reichenbach [39] has displayed them in a *cube of oppositions*, which has been studied in some more detail in [10].

[5] This relation cashes out the idea that there is a lot of $A \cap B$, or, rather, that the proportion

The six combinators identified in the previous section can be individually distinguished by means of certain logical properties of determiners. A determiner can be said to be *immune to restriction* (*ItR*) iff whenever it holds of two sets A and B on some domain E, it holds of them on every subdomain $E' \subseteq E$ of E: $D_E(A, B)$ and $E \supseteq E'$ implies $D_{E'}(A, B)$. A determiner is said to be *immune to extension* (*ItE*) iff it holds of two sets A and B on any extension $E' \supseteq E$ of a domain E on which it holds of A and B: $D_E(A, B)$ and $E \subseteq E'$ implies $D_{E'}(A, B)$. Obviously, the *general* (universal) *propositions* are constructed with combinators $e, a, \ddot{a}$ that are immune to restriction; *particular* (existential) *propositions* result from combinators $i, o, \ddot{o}$ that are immune to extension.

One can also focus on the use of a determiner's arguments as a possible domain of quantification. Then it may turn out that a determiner is *immune* (in stead of *sensitive*) to taking one of the arguments as the domain, or it may be even *allergic* to it: if in that case the quantified proposition is trivial, or redundant. Thus we say that D is *immune* to *nominal restriction* (*ItNR*) iff $D_E(A, B)$ whenever $D_{E\cap A}(A, B)$. D is said to be *allergic* to *nominal restriction* (*AtNR*) iff $D_{E\cap A}(A, B)$ is redundant. Likewise D is said to be *immune* to *verbal restriction* (*ItVR*) iff $D_E(A, B)$ whenever $D_{E\cap B}(A, B)$. D is said to be *allergic* to *verbal restriction* (*AtVR*) iff $D_{E\cap B}(A, B)$ is redundant. The following diagrams display the distribution of the mentioned logical properties over the six combinators from the prism.



The logical combinators in the prism are either immune or allergic to both nominal and verbal restriction. The classical four from the Aristotelian square of opposition are immune to nominal restriction, and the two new converts are allergic to it. In converse, of course, the four converted combinators are immune to verbal restriction. Interestingly, according to the above definition a determiner like *MANY* is neither immune nor allergic to either nominal or verbal restriction. It is sensitive to both forms of restriction.

A substantial body of work in the theory of generalized quantifiers is arguably supported by the Aristotelian paradigm. Upon the Aristotelian conception of

of stuff that is both A and B in E surprisingly exceeds some contextually given average. Of course, quite a lot of speculation may be involved in determining what on a certain occasion, and relative to A and B, counts as surprising and what as the relevant average. [4] suggested the default value $a := 1/3$.

a proposition a predicate term is said to *apply to* or *decline from* the *whole of* or *part of* a subject term [3, Book I, 1, 24a].[6] This conception inspires to the more general idea of a predication over substances (or preferably non-empty sets) and such that a predicate (P) is said to relate in a specific way to a given subject (S). P does (or does not) apply to *all* S, to *some* S, to *no* S, to *most* S, to *many* S, or just to *the* S, etc. I will refer to this as the *classical construal* of quantified propositions, and I will also suggestively write $B[A]_{D_E}$ to indicate that B applies to the A according to the determiner relation labeled by D in E. This construal, of course, still permits of an extensional (truth-conditional) evaluation, along the following lines:

$$\begin{array}{rll} B[A]_{ALL_E} & \textit{iff} & (E \cap A) \subseteq ((E \cap A) \cap B) \\ B[A]_{MOST_E} & \textit{iff} & |(E \cap A) \cap B|/|(E \cap A)| > 1/2 \\ B[A]_{MANY_E} & \textit{iff}^{7} & |(E \cap A) \cap B|/|(E \cap A)| \geq a \\ & \vdots & \end{array}$$

The classical paradigm of construing quantified propositions does not always easily fit the converse combinators, or quantifiers that can be conceived converses of the classical ones. One is not easily inclined to paraphrase *Only graduates qualified* as stating that *qualify* applies to only graduates, let alone that it applies to ?*only of them*. Likewise, *Not only graduates qualified* or *Mostly graduates qualified* resists an interpretation, if any it is, according to which the predicate applied to ?*not only of them*, or to ?*mostly of them*. Instead, such converse constructions somehow relate to the domain of those who qualified, and state it did or did not occasion *only* (*mostly*, ...) graduates. The property of qualifying *only*/*mostly* applied to graduates. I will refer to this as the *converse construal* of quantified propositions, and will write, suggestively again, $[B]A_{D_E}$ to indicate that the domain of B occasions A according to the determiner relation labeled by D in E. An extensional evaluation of some determiners construed along these lines can be specified as follows:

$$\begin{array}{rll} [B]A_{ONLY_E} & \textit{iff} & (E \cap B) \subseteq ((E \cap B) \cap A) \\ [B]A_{MOSTLY_E} & \textit{iff} & |(E \cap B) \cap A|/|(E \cap B)| > 1/2 \\ [B]A_{MANY_E} & \textit{iff}^{8} & |(E \cap B) \cap A|/|(E \cap B)| \geq a \\ & \vdots & \end{array}$$

[6] Propositions have likewise been classified into either affirmative or negative predications, with either universal or particular force. Some (or all) of S is (or is not) P. Whence the four combinators of square of opposition. Actually, these are the four, characteristic, ways of construing propositions, among a few more that Aristotle actually discusses in [2, 3].

[7] Notice that this defines a subtle variant of $MANY$, that evaluates the proportion of A's who B among the A in E, not among just the universe E. It actually presents the nominally restricted rendering of $MANY$. We will come back to this below.

[8] Notice that this defines yet another subtle variant of $MANY$, that evaluates the propor-

It may be observed, and expected, that the *symmetric* determiners *SOME* and *NO* also easily allow for a formulation according to this, converse, paradigm. If it is said that *Some/No graduates qualified,* this can be construed as stating that, among those who qualified, there are some/no graduates. We will come back to this below, too.

The traditional construal of quantified propositions inspires to thinking of subject terms as indicating substances, and to associate uses of such terms with a presupposition of *existential import*. But also if such an assumption is not maintained, it seems, the traditional construal has prompted the conviction that natural language determiners are *conservative*.[9] In order to decide whether P applies to D of S, one has to look at the S's only, for the set or substance indicated by the subject term "sets the stage". [4, 40, 36] With its predominant focus on determiners that fit this classical paradigm, that is, effectively, on determiners that are immune to nominal restriction, the theory of generalized quantifiers has thus excluded those allergic to it from the picture. Indeed, when occasionally observed, such determiners have been denied the status of a determiner. [4, 5, 40, 36, 21] But surely, if determiners are conservative by stipulation, then it is not much of a *linguistic universal* to state that they are, and this hypothesis has indeed been abolished fairly widely in the meantime. See, e.g., [9, 26, 19, 46, 42, 14, 18], and [10] for more discussion.[10]

The restricted classical focus has disabled the theory of generalized quantifiers to distinguish the phenomenon of nominal restriction. For nominal restriction is invisible on quantifiers which are immune to nominal restriction. The interpretation of *many* has therefore been something of a puzzle in the literature, leading even up to, again, questioning its status as a determiner. Even so, separate, seemingly independent, readings have been identified, such as a 'cardinal', a 'proportional' and a 'reverse proportional' reading of *many*. Interestingly, these readings result from the 'basic' construal of *MANY*, from its nominally restricted construal and from its verbally restricted construal,

tion of A's who B among the B in E, not among just the universe E. This actually is the verbally restricted rendering of *MANY*. As said, we will come back to this below.

[9]Formally, a determiner D is said to be conservative iff $D_E(A, B)$ whenever $D_E(A, A \cap B)$. If a determiner is immune to nominal restriction, it is conservative.

[10]In particular the non-conservative term "only" has been disqualified as a determiner. The term has undoubtedly many other typical properties, both syntactically and semantically, it has generated a branch of research of its own, with seminal contributions by Mats Rooth and Manfred Krifka, and such has been taken a further excuse to deny the term the role of a determiner. Yet most of the acknowledged natural language determiners have their own peculiar syntactic and semantic properties, and terms like "a", "the", "all", "every", "most", "many", "five", ..., have been fruitfully studied in a non-determiner role, too. Such idiosyncracies provide no good reason to deny these terms a determiner role, and exclude them from a study of generalized quantifiers.

respectively. A proper use of the following sentence arguably invokes a 'proportional' reading, that is, a nominally restricted construal of $MANY$:

(3) Many Dutchmen skate in the winter.
$SK[DU]_{MANY_E} = MANY_{E\cap DU}(DU,SK)$

The idea may be that the proportion of Dutchmen that skates in the winter is large relative to, e.g., the (averaged) proportion of Dutchmen engaged in alternative activities in the winter. A use of the following sentence seems to call for a verbally restricted reading of $MANY$, aka. the 'reverse proportional' reading:

(4) Many Swedes have won the Nobel Prize.
$[WO]SW_{MANY_E} = MANY_{E\cap WO}(SW,WO)$

The idea may now be that the proportion of Nobel Prize winners that is Swedish is large relative to, e.g., the (averaged) proportion of winners of competing nationalities. (See [43, 18, 10] for more discussion.)

The difference between the two forms of construal of e.g., *SOME* and *NO*, and of that of *ALL* or *MOST* (classically construed) and *ONLY* and *MOSTLY* (upon the converse construal), is extensionally void, and truth-conditionally and perhaps logically immaterial. Yet it does display *some* difference in meaning.[11] Gary Milsark already distinguished "weak" and "strong" readings of *some* and *no*, while observing that the distinction is not extensional (truth-conditional). [33]

The difference can be conceived a cognitive one, a difference in construal (in cognitive semantic terms) or (in formal semantics terminology) in information structure. Upon the traditional construal the subject term can be conceived to be *topical*, or presupposed, and the predicate term may count as *focal*, or *new*; upon the converse construal it is, of course, the other way around. Typically, then, upon the classical construal the subject term's denotation can be supposed to be non-empty; upon the converse construction such a presupposition can be taken to pertain to the predicate term. Likewise, the *focal* contribution of the predicate term on the classical construal is essential, and can be expected to be non-trivial and ineliminable. The same goes for the subject term upon the converse construal. These arguably pragmatic facts have been observed in the literature, and now fall into place.

[11] In natural language, of course, subjects and predicates behave differently, not only semantically, but already syntactically. If we convert a sentence, a verb has to be 'noun-ed' and the noun requires a copula, at least, to become verbal. Temporal or modal information may thereby vanish or may have to be, arguably arbitrarily, added. Apparently, truly equivalent conversions are hard to get by!

Strong quantifiers, that is, unambiguously classically construed ones, indeed fairly systematical associate a domain presupposition, and a presupposition of existential import, with their subject term. This has been reported every now and then in the literature. [32, 16, 35] In converse, quantifiers like *only*, that are unambiguously interpreted according to the converse paradigm, are associated with a presupposition of *existential import′* (mind the prime) relating to their predicate term. [17]

That a focal term is ineliminable, that is, the predicate term upon a classical construal, and the subject term upon the converse construal, may perhaps show from the following examples. While observing a scene, or a painting, one may understandably utter (5):

(5) Some people. No linguists. Only philosophers. Mostly continental philosophers.

A report from an international inspection committee can be reasonably summarized with, e.g., (6):

(6) Only conventional weapons. Some missiles. No nukes.

However, it seems odd, to me, to report, in the same vein, with (7) or (8):

(7) Most philosophers. All continental philosophers.

The idea would be that if, e.g., "most philosophers" is used or intended to say something about the philosophers, somehow (7) does not succeed in doing so, that is, if we do not feel pressed to supplement a, now silent, predicate like, e.g., "*are there*". Things are somewhat more complicated if we attempt an analogous construal of (8).

(8) All missiles. Most nukes.

For this would in the first place raise the non-trivial question which missiles and which nukes one could be talking of, and such that all of the first "are there"(?), or such that most of the second "are found"(?).[12] It appears that quantifiers that are allergic to verbal restriction, as upon the envisaged classical construal, cannot do without a verbal predicate and do not allow it to remain elided.

In return, nominal ellipsis appears to be awkward upon the converse construal. Notice, first, that if we are talking about the students, it is fine to come up with (9).

[12]Surely this is not to say that examples like (7) and (8) cannot be sensibly used. I believe an utterance of (7) can be fairly naturally understood in relation to the persons witnessed in the scene seen and taking it to claim that *they* are mostly philosophers, and that *they* all are continental. Likewise, (8) can be used to report that all of the things found are missiles, and most of them are nukes. However, notice that this would indeed boil down to interpreting the explicit nouns as the *predicate* argument, and actually strenghthen my point.

(9) All/Five/Some/Most signed.

These sentences easily allow for a classical construal, and then the contextually given domain of students can figure as the domain of quantification.[13] However, it is fairly odd to say something like (10), which requires a converse construal.

(10) ?Only/?Mostly signed.

Observe that there is nothing wrong with saying "Only/Mostly students signed." We may hypothesize that the quantifiers that are allergic to nominal restriction are allergic to nominal elision, too.

The fact that *SOME* and *NO* allow for both a classical and a converse construal may also serve to explain that both allow both nominal and verbal elision, and also that the latter, *NO*, does not unambiguously yield a domain presupposition. Thus, while (11) typically implies that there are graduates, (12) does not typically imply that there are mistakes. Moreover, (13) can be fine even if there turn out to be no graduates, while it may serve to imply that some, non-graduates, did fail the test.

(11) No graduates SIGNED.

(12) No mistakes have been detected.

(13) No GRADUATES failed the test.

Once converse quantifiers have been recognized, or the converse construal more generally, we also gain a proper outlook upon the interpretation of existential *there* constructions, something that has long puzzled the theory of generalized quantifiers. It has been observed, or argued, that 'weak' quantifiers figure nicely in such constructions, while 'strong' quantifiers are said not to do so. The following array of examples may serve to illustrate the phenomenon.

(14) There are $\left\{\begin{array}{cc} \text{some} & ?\text{all} \\ \text{no} & ?\text{not all} \\ \text{(not) only} & ?\text{the} \\ \text{mostly} & ?\text{most} \end{array}\right\}$ apples (available / in the basket).

It has been proposed that what semantically distinguishes the quantifiers that figure arguably happily in these constructions is that of being an *intersective*

[13] We may have to add that "No signed" and "The signed" are not seen to be felicitous. As for "No" one may observe that one ought to use "None" instead, and for what might have been intended by "The" one surely has to use "They".

determiner, effectively a determiner that is immune to nominal and verbal restriction.[14] [25, 44] Such a proposal is tenable, indeed, if one excludes from consideration determiners that are allergic to nominal restriction, like the converse quantifiers *ONLY* and *MOSTLY*. But as one can see from (14), and as has by long been acknowledged, such determiners do perfectly happily figure in these constructions. [23, 27] Once one takes the full array in (14) into account, it appears that the determiners that figure less easily in existential *there* constructions are exactly those that are allergic to verbal restriction.[15] (And indeed those in the picture that are not allergic to verbal restriction, and also not to nominal restriction, are the symmetric ones, as has been proposed before.) One may furthermore observe, as we did above, that determiners that are allergic to verbal restriction are also allergic to verbal elision. The feelings about (14) then follow from the assumption that this is precisely what existential *there* constructions do: elide, or vacuate, the verbal argument of the complementing noun phrase.

In this section I hope to have demonstrated that certain linguistic intuitions, pertaining to the interpretation of *many*, domain presupposition, nominal and verbal elision, and existential *there* constructions, can be made sense of in terms of the logico-semantic properties of quantifiers and features of construal and use. The distinctive properties have been invariance and variation under specific extensions or restrictions of the domains, and the relevant features have been immunity and allergy in view of a threat of redundancy, or triviality. All along, the relevant observations can be taken to belong to the unobservable, and the explanations to the inexplicable, if the classical paradigm is taken for granted. The findings did become observable, and explicable, once the converse paradigm has been acknowledged.

3 Conversions in Mind

Both Aristotelian logic and the theory of generalized quantifiers are built on the paradigm of predications over subjects or substances. The classical construal suggests, and supports, quantification over *(extensionally) given* domains, or

[14] More precisely, a determiner D is said to be *intersective* iff $D_E(A, B)$ whenever $D_E(A \cap B, A \cap B)$. Obviously, determiners immune to nominal and verbal restriction are intersective, then.

[15] This point may not be obvious for the definite determiner "the", or "the four," but it is if they are interpreted along the lines of the seminal [4]. The constructions $THE_E(A, B)$ and $THE\_4(A, B)$ then are taken to *presuppose* that there is exactly one, viz., there are exactly four, A in E, and to *assert* that he/they is/are B. On this interpretation the assertoric part is redundant when verbally restricted, that is, then the determiners count as allergic to verbal restriction.

sets, or stuff. Upon the converse construal a nominal term is predicated over a verbally induced domain. It is, perhaps not universally but widely, acknowledged that verbal phrases primarily relate of events and states [41, 7, 8, 37], and that their direct and indirect objects need not be material objects [1, 12, 31] The converse construal thus appears to suggest and support quantification over *(intentionally) construed* domains, conceptual models, mental spaces, and the like.

Asymmetries between the two types of quantified constructions can therefore be expected, and have been observed, in *Transitive-Verb / Direct-Object* constructions [34], even though quantifiers, classically construed, can be intentional, too [35]. In this section I want to argue that not only, of course, conversely construed quantifiers can be read extensionally, but that classically construed quantifiers, also, actually easily, permit intentional readings. The main contribution of this discussion lies in the proper presentation of the intentional domains of quantification involved. For I believe it to be properly understood only if intentional objects, which are non-existent, are not rendered extensionally, which would imply existent.

It is readily observed that people may on occasion visit and praise relatives and students, build houses and bridges, design dollhouses and shopping malls, bake cookies and cupcakes, paint roses and trees, imagine castles and mermaids, worship goddesses and dragons, and need doctors, postdocs, and engineers. Not only do we report these things the way I just did, but we can also qualify the reports by means of any of the quantifiers we have witnessed above. People may have built *all* houses, designed *only* bridges, and worship *most* goddesses, and paint *mostly* trees.

As long as we are concerned with properly extensional verbs, verbs that can be taken to denote relations between individuals, neither the classical nor the converse construal raise any particular issues. Examples in the following array are suitably construed classically.

(15) *Vicky visited* $\left\{\begin{array}{c} \textit{(not\_)all} \\ \textit{no} \\ \textit{some} \\ \textit{five} \\ \textit{many} \\ \textit{most} \end{array}\right\}$ *students.*

Employing the classical scheme $B[A]_{D_E}$ above, the property B of being visited by Vicky is applied to the students A according to the respective determiner relation D in some contextually given universe E. Classically construed, these sentences can be taken to report about 'the students' and claim that Vicky vis-

ited *D of them*. Notice that this construal, in view of the threat of redundancy, apparently presupposes that there are students in *E*.

The next array contains examples suitably construed (also) according to the converse paradigm.

(16) *Vicky visited* { *(not_)only*, *no*, *some*, *five*, *many*, *mostly* } *students.*

Upon the converse construal we obtain a report about Vicky's visit(s), the individuals visited, and the claim that these involved only/no/some... students. According to the schematic structure $[B]A_{D_E}$, the domain (B) of individuals visited by Vicky occasions *only/no/some/...* (D) students (A) in an assumed contextually given universe E. Notice that, upon this construal, there *may or may not* be students that Vicky visited, in so far as she is said to have visited *any*. However, apparently, the construction presupposes that Vicky did pay some visits.[16]

All of the other examples mentioned above, besides perhaps the ones involving *visits* and *praise*, are not extensional in not merely relating existing individuals, or sets of them. In particular the direct objects of *building activities*, *designs*, *bakings*, *paintings*, *imaginations*, *worships* and *needs* do not need to have materialized, or be realized, and hence do not need to exist, properly speaking. Nevertheless there is no problem in quantifying the object position, at least, upon the converse construal. Even if we understand the bakings in the array in (17) not as that of a baking of some previously prepared stuff, but in a, say, productive way, we can still, easily, make sense of the examples.

(17) *Chris is baking* { *(not_)only*, *no*, *some*, *five*, *many*, *mostly* } *cupcakes.*

There is a way of uniformly paraphrasing the examples by saying that Chris is involved in a baking that tends to yield, or is intended to yield, a product that occasions *only/no/some/...* cupcakes. The examples need not relate of

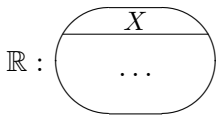
[16]Surely, non-presuppositional construals are possible, especially with the extensionally symmetric determiners *some*, *no*, *five*, and *many*.

any existing cupcakes, such that Chris is or is not baking *them*, but rather it relates of an envisaged outcome of the activity, in the result of which there are *only/no/some/...* cupcakes.

It is undeniable that at least some of the examples in (17), also on the envisaged construal, relate of cupcakes, which we can talk about, if only to say that *they* do not or not yet exist, or that *they* will be delicious. More importantly, *these* cupcakes, are said to exist only intentionally. And this should not be taken to mean that they are these special kinds of individuals that have this peculiar property of intentional existence. It is only supposed to mean that there is some kind of intention for something of the kind to exist. And that intention may become realized, so that, then, in that case, such cupcakes exist, but it may equally well not be realized, or not yet be realized, so that, in that case, then, the cupcakes simply don't exist.

I think it belongs to solid common sense that whatever stuff will be there in the future (or would, or could, or should be there at any time), does not necessarily need to actually be there now. It may be intended (envisaged, planned, imagined, required) that there be certain stuff, while it is not actually the case that there is, or will be. As for the cupcakes reported about above, it is, in a certain sense, intended that they be there, but there is, or exists, actually nothing that are the things that are intended to be there. To say that the cupcakes only intentionally exist is nothing but to say that it is intended that cupcakes exist. There is no stuff here that, by baking, changes from having the property of being intended, to that of being real. Nobody would buy that stuff.[17]

The situations at issue can be figuratively, and neatly, presented by *mental spaces* or *discourse representations*, that come along with their own intended domains of quantification. [13, 24] In what follows I will use a blend of those, and display these intentional domains schematically as follows:



Here $\mathbb{R}$ presents some intentional relation of it being intended (imagined, planned, painted, required) that there be X (stuff, things) of a certain kind that may serve as an intentional domain of quantification.[18] We can use such

[17] Surely some people "buy intentional objects", which may even mean that, e.g., they now are the owner of that intended bungalow that never gets realized, and that they can even sell it further. Even so, one ought to maintain that these people actually own, and sell, nothing.

[18] Presentations like we find here and in what follows, as well as their satisfaction conditions, are discussed in formal detail in [11], elaborating fairly straightforwardly on the work of Jaakko Hintikka [20].

a display to present the relevant aspects of the meaning of (17) above, upon its converse construal, that is.

$$e : BAKE[e, c] \qquad \mathbb{Y}_e : \left(\begin{array}{c} Y \\ \hline [Y]CUPCs_{D_Y} \end{array}\right)$$

The idea is that of a report of an event (e) of a baking by Chris, such that the event is intended to yield ($\mathbb{Y}_e$) a result or product Y, so that Y has D cupcakes. If, or when, the event is successful, there will be D cupcakes, or so is the associated intention. For this report to be true, there need not be any actual cupcakes. Even though I do not really want to dwell upon this here, the truth conditions of this report may consist in requiring that in all possible situations (worlds) that would realize the intention, there is a realization of Y as the outcome of e and that satisfies the condition of having D cupcakes. The actual world, however, does not need to provide for such a realization, not even in the future.

In an analogous fashion we can display (aspects of) the meaning of sentences like (18), upon their converse construal again.

(18) *Donna painted* $\left\{\begin{array}{c} only \\ \vdots \\ mostly \end{array}\right\}$ *roses.*

$$a : PAINT[a, d] \qquad \mathbb{P}_a : \left(\begin{array}{c} Y \\ \hline [Y]ROSEs_{D_Y} \end{array}\right)$$

Again, for such reports to be true, there need not be any actual roses, if only what Donna produced on the linen occasions D roses, or, better, if what could have been depicted by it would correctly have been called 'roses' then.

Things seem to be somewhat different when we consider non-extensional transitive verbs with quantifiers classically construed. Consider the following array:

(19) *Brenda designs* $\left\{\begin{array}{c} all \\ \vdots \\ most \end{array}\right\}$ *bridges.*

We could interpret such examples straightforwardly, and extensionally, in the following fashion:

$$a : DESIGN[a, b] \qquad \mathbb{Y}_a : \left(\begin{array}{c} Y \\ \hline Y[BRDGs]_{D_E} \end{array}\right)$$

This presents a designing activity (a) of Brenda (b) with D bridges in the intended yield (Y). However, this extensional construal is problematic. As presented here, there are these bridges in our universe E, and D of them are in the intended result of Brenda's design. On the assumption that existing bridges need no longer be designed, apparently some understanding of 'design' is called for, different from the one we have been assuming in the discussion above. If, however, we, therefore, understand the determiner D to relate to, and quantify, the intended result Y, which is, in the way we understood the determiners in (17) and (18), we arrive at an alternative presentation, displayed as follows:

$$a : DESIGN[a, b] \qquad \mathbb{Y}_a : \left(\begin{array}{c} Y \\ \hline Y[BRDGs]_{D_Y} \end{array}\right)$$

If the examples in (19) are rendered along these lines, however, they would be entirely vacuous. The display here presents Brenda as designing D of the bridges that she designs. In view of the allergy of these determiners to verbal restriction, such readings ought to be avoided.

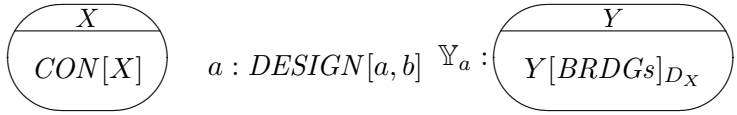
It has been felt, for these reasons, that 'strong' quantifiers, quantifiers classically construed, fail the kind of intentional reading that conversely construed quantifiers apparently do have. Friederike Moltmann [34] seems to have arrived at such a conclusion, but allows for a certain kind of intentional readings, viz., those in which classically construed quantifiers may after all extensionally quantify over intentional objects:

> *The question now is, are there any intensional readings available for strong or, more generally, domain-presupposing quantifiers? (. . .)* [*Some such sentences*] *do not display intensional readings, but rather extensional readings in which the quantifier ranges over possible, rather than actual objects.* [34, p. 28/36]

We feel, as is argued more extensively in the next section, that merely possible objects should not be rendered 'extensionally', because this would afford them a kind of actuality which their mere possibility is inconsistent with. However, in a more recent paper [35, p. 210] Moltmann presents examples in which classically construed quantifiers relate to presupposed, intentional domains, not necessarily construed extensionally. Indeed, I guess, everybody can easily make sense of the following sentences, with clarifications appended, clarifications which, if contextually understood, could be omitted.

(20) Brenda designs all (most, ⋯) bridges—which are part of the PLAN.
Chris is baking all (most, ⋯) cupcakes—NEEDED for the party.
Petra painted all (most, ⋯) roses—ASKED FOR.
Gisela worships all (most, ⋯) goddesses—that were IMAGINED.

It thus seems that, after all, we then can allow classically construed quantifiers a properly intentional reading as construed above, if only its presupposed domain is intentionally construed as well. Examples like (19) can be understood, e.g., as relating to a larger construction plan with an intended outcome X and such that Brenda engages in designing D (all/. . . /most) of the bridges among X. This situation can be presented as follows:



The example reports of a situation in which there is such a plan, and some activity of Brenda, and such that the intended outcome (realization) of the activity would consist in D of the bridges that are part of (the realization of) the plan. Such a presentation, I feel, gives a fair approximation of an intuitive understanding of examples (19). Notice that it does not involve any actual, not even future, bridges, and that it also does not invoke any kind of things that figure as intentional entities in the current plan and as possibly realized objects in the future. All that the display is intended to convey is some plan and some activity that are understood to be coordinated by what appears to be a shared focus on a common goal.

4 Conversions in Discourse

Philosophers and linguists from time to time employ examples like we have just discussed as an excuse to posit entities which are possible objects, which may be there and don't exist, and which may turn from real to not-real and back again, like other things turn pale and get their color back again. Very much affected by the work of Quine [38, and subsequent work], this does not make sense to me. It does not make sense to say that there, literally, are things that don't exist, except if such is understood to mean that something was thought or intended or planned to exist, but it turned out not to be realized; and when I say here that something was thought, intended, planned to exist this should be understood to mean that it was thought, intended, planned that there was some such thing. It is true indeed, in the latter case, that we can say that there was thought, intended, planned to be something, and that *it* does not exist, or *it* will not be realized, and this is also indeed the way people normally talk

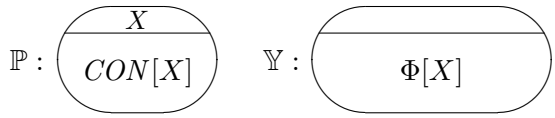
about such things. But I feel that people normally don't think that the "it" that does not exist or is not realized, really is an entity that has the property of non-existence, and I think that people normally would feel fooled if a linguist or philosopher would tell him so.

Obviously, it remains a fact that people thus do relate of intentional objects, and quantify them. The examples in (19), upon the reading finally displayed, involve quantification about what can no better be labeled than intentional objects. Equally easily we may talk about envisaged cupcakes, and guess that *they* are possibly stuffy. Or we talk about planned bridges, and estimate that *they* will probably be expensive. We may discuss the PhD students that are needed for a project, and demand that *they* complete *their* thesis within the scheduled time. There is no reason to condemn this type of talk, and I surely don't advocate doing so here. Yet this common linguistic practice may indeed have prompted granting some kind of existence to intentional, or otherwise merely possible, objects, some thing I already objected to just above. For instance, in view of such practices and examples Moltmann [35, p. 213] has taken a strong, 'intensional', quantifier to range over "a domain consisting of merely possible entities, the set of things x such that it is possible to imagine x." But, again, such formulations lead to "ruining the good old word 'exist'," as Quine [38] has argued from a philosophical perspective, and decisively to me. From an arguably also linguistic perspective Elizabeth Anscombe, among no doubt many others, has formulated the same feeling also fairly robustly:

> *The fact that we can use the concept of identity in connexion with intentional objects should not lead us to think there is any sense in questions as to the kind of existence—the ontological status—of intentional objects.*
> *All such questions are nonsensical.* [1, p. 168]

I cannot but agree. In response to the question "Do future (or past) cakes exist?" one can only answer "Not now." Or "Not yet." (Or "No longer.") "Do possible individuals exist?" One ought to say "Not actually." "Are there imaginary objects?" "Not really." More generally, as I already indicated above, in reply to the question: "Are there purely intentional objects?" one can, I believe, only seriously say, "Not actually. Only intentionally." Once people start saying things like "Yes and no. They do not exist but they do '*exist*', ...", the feeling of being fooled creeps up again.

As has already been said, the reading of (19) suggested above should not be taken to induce any ontological commitment towards the planned bridges. The presentation has the following schematic form, in which the now relevant characteristics are displayed only.



There is a plan to realize a set of constructions, and there is coordinated activity intended to yield, e.g., a proportion of the bridges among them. As one can see, the planned constructions figure in a "modal space" only, not in a real one. But while we, thus, need not commit to their existence, the above types of discourse do show that they are accessible for coreference and quantification. In Cognitive Grammar this possibility has been observed and explained in terms of Fauconnier's celebrated "Access Principle".

> *A crucial property of language, cognitive constructions, and conceptual links is the* Access Principle *(also called Identification principle). The principle states that an expression that names or describes an element in one mental space can be used to* access *a counterpart of that element in another mental space.* [12, p. 42]

> *One of Fauconnier's central insights is that many puzzling semantic phenomena are the result of the fact that a value in one space can be described by the role its counterpart in another space has, even if that role is invalid for the value in the first space. This is called the Access Principle (. . .).* [6, p.35]

Remaining in the spirit of Quine's work, I prefer to refer to this type of identification as a kind of reification, in particular *intentional reification*. The reason being that, in contrast with the practice in Cognitive Grammar, I do think we can and also should understand intentional spaces as presentations, which have, or are, formally specifiable realization conditions, and the same holds for the presentations in the "real space" as well. That the two modal spaces above contain two presentations of X, actually and only shows that the presentations present the same intended object (set), that is, that their possible (possibly not actual) realization be one and the same. Intentional reification induces "intentional identity".

The kind of "intentional identity" at stake here really is the kind of identity so-dubbed by Peter Geach:

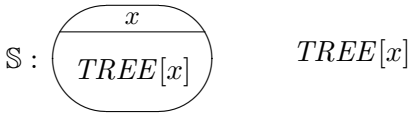
> *We have intentional identity when a number of people, or one person on different occasions, have attitudes with a common focus, whether or not there actually is something at that focus.* [15, p. 627]

Intentional reification, like intentional identity, goes without ontological commitment, and can be seen to merely present a joined or coordinated focus of a variety of attitudes, or intentions, broadly conceived.

It may be noticed that the presentation of intentional identity, the result of intentional reification, appears to escape the standard formalisms of (modal) quantification theory, if one does not want the intentional objects to be existentially quantified, which we clearly would not want to. However, the intuitions are clear, I believe, and also show from the formulation of Fauconnier's Access Principle. Moreover, Hintikka's own early work on quantified modal logic has in addition supplied us with the tools, and the concepts, to formally specify the realization conditions of focused attitudes, or focused mental spaces, in terms of individuating functions. [20] Hintikka's individuating functions can be coordinated on points in an abstract space presenting conceivable alternatives to the actual one, without including the actual one, and it appears that more than this is not really needed.[19]

The use of Fauconnier's Access Principle, intentional reification, that is, is ontologically non-committal, but it does, of course induce factual commitments. If one construes attitudes or intentions, or interprets plans, as having a common focus, such should have a bearing on the behavior of the persons said to have these attitudes, or those claimed to be maintaining these intentions, or those carrying out those plans. I do however believe that it is not the task of a philosopher, or a linguist, to determine what type of behavior would supply the required evidence for this. Regarding the delicate subject of attitude reports, it is the users of a language that have to come to mutual agreement on the support for such attitude or intention reports. Even so, one might expect that actually settled mutual agreements make at least some sense to outsiders that are speaking the same language. This will be the case more in particular when attitudes and intentions are reported that are, or are said to be, realized. I therefore want to conclude this paper with two somewhat marginal remarks about such realizations, the first more extensive than marginal.

We can formally present the realization of an intentional object by reifying it with a real one. In the case of a perception, it could have been established that someone is seeing a tree, for instance, because he said so. Now we may also establish that the person is seeing an actual tree, and reify the intentional object with our own presentation of that tree. The situation can be displayed, then, schematically, as follows:



But someone might be mistaken, and, as we say, be *seeing things*. In such a

[19] [29] has advanced the use of these tools; [11] elaborates on their use in modeling intentional identity.

case we say, e.g., that he sees a tree, or that he thinks he is seeing a tree, and that the tree does not exist. In such a case, I would not want to say that what we have here is this special object, a tree that is seen, which has the particular property of non-existence. We can keep to our own observation that someone is seeing something, and present a tree in a visual/mental space, while also firmly keeping to the claim that there is nothing, that there exists literally *no thing*, that the person is seeing. The tree only intentionally exists. Period.[20]

If we return to the case in which someone is actually seeing some real thing, we should also note that we here reify the intentional object with a supposed real one, and that such is not a case of relating two objects, but just of identifying one. In his phenomenological mode Husserl has already observed that it would be inappropriate to conceive of this otherwise.

> *Das Ding, das Naturobjekt nehme ich wahr, den Baum dort im Garten; das und nichts anderes ist das wirkliche Objekt der wahrnemenden "Intention".*
> *Ein zweiter immanenter Baum oder auch "inneres Bild" des wirklichen, dort draußen vor mir stehenden Baumes ist doch in keiner Weise gegeben, und dergleichen hypothetisch zu supponieren, führt nur auf Widersinn.* [22, §90]

Analogous observations can be made about intentional objects of intentions, properly speaking, that are seen or said to be realized. Having established that an agent, or a group of agents, has an intention to realize a certain object, we may later on decide that the intention is realized, or not. We may report that they planned to build a bridge, that the construction of it took several years, and that the planned bridge was finally there. Their plan has been realized, and the bridge, that did not exist before, does exist now. So much is common lingo. In all this, we report of an intention towards the existence of a bridge, we have the bridge as an intentional object, and we have the possibility to reify the object of the intention with the real bridge existing now. We also have the possibility to not identify them.

In the first case, if we reify, we can arguably say that this bridge that is actually existing now, actually is the bridge that they have planned from

[20]There are of course cases in which someone is reported, arguably correctly, to see a tree, which in fact is not one, but only looks like a tree. A similar case is the well-known situation of a stick halfway in the water, where people see a broken stick which is not a broken stick. We can reify the broken stick that is seen, and explain the way these people reason about the thing as a broken stick, as taken up in their own intentional space. What they see in reality, however, or what we say they see in reality, still is just a straight stick, and nothing else. Because we can talk in two different ways about what these people see, one might again feel compelled to posit two sticks: one seen, and one real. But there is actually only one stick, actually a straight one. The fact that these people see *it*, the straight stick, as a broken stick, does not yield some mysterious duplication of sticks.

the beginning. For, the original, proper, intention of course consisted in the realization of the plan, not in just *having_a_plan*. But this of course should not lead us into thinking, upon pain of inconsistency, that the actual bridge existing now was there at the time of the plan as the object of their intention. It is *us*, who are *now* in the position to observe that, over time, and in accordance with the way things have turned out to be, the real bridge that is existing now is that one that was the future object of the plan (i.e., its intended realization).[21] If we pay due respect to the temporal aspects of things, and to the various ways in which things may turn out to be, I think our talk of the realization of the bridge can be presented properly in a way analogous to our display of a veridical perception above.

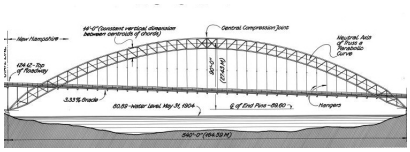
However, as said, we may equally choose not to identify the planned bridge with whatever would result from the plan. For, as said, at the time of building it, the bridge that was going to result, viz., the actual bridge existing now, was not actually there, of course, so it could not be identified as the intended realization of the plan, then. Even worse, at the time, it might have been undetermined whether or not in the end the planned bridge would ever be actually realized, so that the intended bridge at best were *a possible future bridge*.

The reflection upon these possibilities may lead to some state of *aporia*, from which one may recover by simply accepting that these are just two different possible, and acceptable, ways to speak of the planned bridge, and that there is *not one and only one correct* way. For if the planned bridge has not been reified with an actual object, if it is not presented as realized, it is not assumed to exist, and then there *is no question* about identity. And if it is reified with an actual object, that object settles its identity. Neither construal excludes the other. Surely *we* can distinguish the two possibilities of construing things, that is true, but it seems there is nothing in the situation itself that would make any one of the possibilities the right one.

To make things more concrete, suppose we dispose of both the plan and the eventual material realization of a bridge. We here have a sketch of the plan of the Bellows Falls Bridge, and a photograph of the result, when it still existed:[22]

[21] We cannot even say that this particular bridge that exists now at the time of the plan was the real object of the plan *as a future object* because, for all we know, at that time we still might have ended up in a different course of events, and hence, a different real future object.

[22] The Bellows Falls Bridge officially existed from 1905 to 1982, while it retired in 1971. (`https://en.wikipedia.org/wiki/Arch_Bridge_(Bellows_Falls)`) The design and drawing (1904) are by Joseph R. Worcester; the construction is by Lewis F. Shoemaker and Co.



One can imagine the superintendent, in 1904, pointing at the sketch on the left, and stating that:

(21) *This* is the bridge we are building.

Arguably, he points, through the sketch, to the planned bridge. We can also imagine his descendants, later, in 1974, pointing at the picture on the right and stating that:

(22) *This* is the bridge they were building.

Arguably, they point, through the photograph, to the thing that has been in heavy duty most of the 20-th century. Both statements are perfectly understandable, I guess. The question that one might raise, then, is *do (21) and (22) report of the same thing?* And I am inclined to reply: *it depends*. But it does not depend on the facts, but only on the way in which one decides to present the situation.[23]

There is no matter of fact that decides the question, because it seems that such would presuppose that either (i) there are actually two 'things' talked about which either stand or do not stand in the 'being identical relation', or in a counterpart relation, or what have you. Or, (ii), all along, willingly or unwillingly, (a.) (21) and (22) were both about one and the same thing, or (b.) they have been about two different things all the time, and we have to find out which of these situations we find ourselves in. Both options under (ii) seem unacceptable. Even after we have seen that the bridge has been realized (and after it has been destroyed), it is quite unacceptable to say that the superintendent was talking about a material realization which was not there at the time of his speaking, and such that, at that time, it could easily be possible that it would never be realized. A rigid identification, option (iia.), thus seems out. But option (iib.) seems to lead to the conclusion that the bridge they were building, according to what the superintendent said in 1904, is not the bridge they were building, according to what his descendant said in 1974. This

[23]One of the reviewers wondered about using the locution "This WAS the bridge they were building." Arguably such would appear to be more appropriate if one wants to account for the fact that the bridge no longer exists. However, this alternative locution also strongly suggests that it is no longer true that they were building this bridge, which no longer exists, and this suggestion appears to be more inappropriate. Such temporal details, however, no matter how intriguing, are not pertinent to the point I want to make in what follows.

seems unacceptable, too. Since option (ii) appears to be out, it seems we are left with option (i), the suggestion that we have to distinguish two bridges, a planned bridge and a material one, which can be taken to stand in, let us say, a realization relation. Conceiving of this option as a 'way of speaking', I can see it as acceptable, but not when it is taken literally as speaking of two 'things', which stand in this so-called relation.[24] For this opens up the discussion for this domain of 'things' that may not exist, 'things' out there, that can be thought, planned, pointed out, but things that nevertheless are not there—an area, as said, that we by all means should seek to avoid.

I believe there is no way of resolving the issue this way, and more importantly that there just need not to be such resolution, once we realize that the issue of the identity of the thing planned and the one realized, does not have a true or false answer, but only depends upon our way of construing things, and that this is a matter of our *choice* or *decision*. Listening to the descendants in 1974 we participate in a construal in which the bridge planned according to the drawing on the left is identified with the material object of which we have a photograph on the right. The first, then, literally is (identity) the plan of the second. (And, one might say, it belonged to the original intention that it would be so.) If we, slightly late, make sense of the superintendent's pep talk in 1904, we don't do so, of course. We can make sense of that talk only if we do not identify that talk as relating to any existing object. Upon this construal there is not even the question of the identity of the bridge talked about, because it does not even exist. How do the two types of talk relate? They talk of one and the same building activity, and of what people wanted, intended, and saw it has lead to. Upon one construal of only part of the situation, a beginning part, there is only an intentional object, which means there is nothing, besides, only, an intention to construing a bridge. Upon the other construal, which includes the final part of the project, we conceive of the planned bridge as actually realized. Upon the latter construal the plan is the plan of that real bridge, upon the first it is not. Surely we, here and now, can distinguish these two options, and choose between them. The point is, while a choice does change our presentation of the whole situation, it does not change the situation depicted.[25]

[24] As Ludwig Wittgenstein put it: "(...) to say of two things that they are identical is a nonsense (...)." [45, #5.5303]

[25] For those who know the 'puzzle' from [30], this actually is the 'solution' that Kripke can be unwillingly seen to have supplied to the question, that he willingly still believed pertinent: "But none of this answers the original question. Does Pierre, or does he not, believe that London is pretty? I know of no answer to *this* question that seems satisfactory. It is no answer to protest that, in some *other* terminology, one can state 'all the relevant facts."' (p. 259) The fact that one can decide either way, and that one can state all the relevant facts in another terminology, really is the full answer. If it is a protest, it should be a protest

The above concludes the first, extensive, marginal remarks about realizations. The second one is as marginal as concise. By means of intentional reification without ontological commitment we can hold on to an extensional picture of an external world, in keeping with the philosophy of Quine. But the picture itself is not an extensional one. It is the way we present the world, in our language, in our minds, and in presentations like the ones we have used in this paper. The external world is supposed to be a realization of these presentations. The upshot of this is about the stuff that we talk about, and that if it turns out to only intentionally exist, it does not exist. But surely, if it's real, it is real, of course.

5 Conclusion

In the first section we have mirrored the classical Aristotelian combinators and uncovered a transparent system of syllogistic reasoning. Mirroring the classically acknowledged generalized quantifiers in the second section next uncovered systematic, some hitherto unacknowledged, aspects of their use, even if the discussion remained confined to purely extensional evaluation. In the third section we have seen that classically construed quantifiers in turn mirror conversely construed ones in intentional contexts. For a proper appreciation of the conventional construal in intentional contexts, we however had to discharge the domain presupposition associated with the classical construal from its default extensional (i.e., existential, i.e., ontological) commitment. The fourth section then has been largely concerned with resisting an *extensional* interpretation of apparent quantification over *intentional* domains. Key to the understanding of the phenomenon has been the concept of intentional reification without ontological commitment, a phenomenon that is easily observed, but somehow hard to properly present verbally and formally.

A principle that we have wanted to preserve is that intentional objects only intentionally exist. Intentional objects, thus, do not actually exist, and they, therefore, do not figure in identity relations. Existing intentionally, they however can be presented as one and the same intended object, and, thus, license intentional reification. Once we realize that the extensional domain is likewise presented, in discourse and thought, real objects can be acknowledged to be intentional too. But surely, they cannot be intended otherwise than real.

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