Conceptual Realism and the Nexus of Predication: Lecture Five
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1 Introduction

A universal, we have said, is what can be predicated of things.[1] But what exactly do we mean in saying that a universal can be predicated of things? In particular, how, or in what way, do universals function in the nexus of predication?

In nominalism, there are no universals, and the only nexus of predication is the linguistic nexus between subject and predicate expressions. What this means in nominalism is that only predicates can be true or false of things.

But what are the semantic grounds for predicates to be true or false of things? Are there really no concepts as cognitive capacities involved in such grounds? What then accounts for the unity of a sentence in nominalism as opposed to a mere sequence of words? Can nominalism really explain the unity of the linguistic nexus?

In logical realism, which is a modern form of Platonism, universals exist independently of language, thought, and the natural world, and even of whether or not there is a natural world. Bertrand Russell and Gottlob Frege, as we have noted in our previous lecture, described two of the better known versions of logical realism.[2] In Russell's early form of logical realism, for example, universals are constituents of propositions, where the latter are independently real intensional objects. The nexus of predication in such a proposition, according to Russell, is a relation relating the constituents and giving the proposition "a unity" that makes it different from the sum of its constituents.[3] Thus, accord-

[1] Cf. Aristotle, *De Interpretatione*, 17^a39.

[2] We have in mind here mainly the 1903 Russell of *The Principles of Mathematics.* Russell's later turn in 1914 to logical atomism is a turn to a form of natural realism.

[3] See Russell 1903, §55, p. 52. Russell is unclear in1903 about what relation is the unity of the proposition expressed by 'Socrates is human' and others of this type. A solution is proposed in Cocchiarella 1987, chapter 2, §5, where this proposition is rephrased as 'Socrates is a human being', where the verb 'is' stands for the relation of identity, and 'a human being' stands for what Russell in 1903 called a denoting concept.

ing to Russell, "a proposition ... is essentially a unity, and when analysis has destroyed this unity, no enumeration of constituents will restore the proposition. The verb [i.e., the relation the verb stands for], when used as a verb, embodies the unity of the proposition ...."[4]

Now a relation, in Russell's modern form of Platonism, can also occur in a proposition as a term, i.e., as one of the constituents related. That is why we can have formulas of the form $R(x, R)$ as well as $R(x, y)$.

> But then how can a relation occur in some propositions as a term and in others, and perhaps even in the same proposition, as the unifying relating relation? That is, how can a relation have a predicative nature holding the constituents of a proposition together and also an objectual nature as one of the objects held together by the relating relation of that proposition?
>
> This was something Russell was unable to explain.[5]

Frege introduced a fundamental new idea regarding the unity of a proposition and the nexus of predication.[6] This was his notion of an *unsaturated function*, which applies to the nexus of predication in language as well as to propositions as abstract entities. On the unsaturated nature of a predicate as the nexus of predication of a sentence, Frege claimed that

> this unsaturatedness ... is necessary, since otherwise the parts [of the sentence] do not hold together.[7]

On the unsaturated nature of the nexus of predication of a proposition, Frege similarly claimed that

> "not all parts of a proposition can be complete; at least one must be 'unsaturated', or predicative; otherwise, they would not hold together."[8]

It is the unsaturated nature of a predicate and the properties and relations it stands for that accounts for both predication in language and the unity of a proposition, according to Frege.[9]

Now in Frege's ontology properties and relations of objects are functions that assign the truth values "the true" or "the false" to objects. These truth values are abstract objects, but, apparently, they are not the properties truth and

[4] Russell 1903, p. 50.

[5] Ibid.

[6] Frege used the word '*Gedanke*' for what we are here calling a proposition. A *Gedanke* in Frege's ontology is not a thought in the sense of conceptualism but an independently real intensional object expressed by a sentence.

[7] Frege 1979, p. 177.

[8] Frege 1952, p. 54.

[9] Frege usually reffered to properties (*Eigenshaften*) as concepts; but we will avoid that terminology here so as not confuse Frege's realism with conceptualism.

falsehood that propositions have in Russell's form of Platonism. In any case, all functions, including functions from numbers to numbers, have an unsaturated nature according to Frege. Objects, on the other hand, and only objects, have a saturated nature, and therefore functions, being unsaturated, cannot be objects. This distinction between functions and objects is fundamental in Frege's ontology, and, as we will see, it has a counterpart in conceptualism.

Predication in Frege's ontology, as we have noted, is explained in terms of functionality, which is contrary to the usual understanding of functionality in terms of predication, i.e., in terms of many-one relations.[10]

Conceptually, it is predication that is more fundamental than functionality.

We understand what it means to say that a function assigns truth values to objects, for example, only by knowing what it means to predicate concepts, or properties and relations, of objects. Nevertheless, aside from this reversal of priority between predication and functionality,

> Frege's real contribution to the analysis of the nexus of predication is his view of the unsaturated nature of universals as the ground of their predicative nature.

Something like this view is basic to the way the nexus of predication is explained in conceptualism.

2 The Nexus of Predication in Natural Realism

Natural realism is different from logical realism, we have noted, in that for natural realism universals do not exist independently of the natural world and its causal matrix. Universals exist only in things in nature, or at least in things that could exist in nature, and whether or not a predicate stands for such a universal is strictly an empirical, and not a logical, matter.

Logical atomism is a form of natural realism that provides a clear and useful account of predication in reality. In particular, in the *Tractatus Logico-Philosophicus*, Wittgenstein replaced Frege's unsaturated logically real properties and relations (as functions from objects to truth values) with unsaturated "material", i.e., natural, properties and relations as the modes of configuration of atomic states of affairs. Reality, on this account, is just the totality of atomic facts—i.e., the states of affairs that obtain in the world; and the nexus of predication of a fact is the material property or relation that is the mode of configuration of that fact (atomic state of affairs). This is similar to Russell's theory of a relating relation as what unifies a proposition, except that instead of a proposition as an abstract intensional entity we now have facts, or states of affairs, and instead of a logically real relation we have a natural property or relation as the nexus of such a state of affairs. Also, because natural properties and relations have an unsaturated nature as the nexuses of predication, they

[10] Cf. Russell 1903, p. 83.

cannot themselves be objects in states of affairs, unlike the situation in Russell's early Platonist ontology.

One of the major flaws of logical atomism, however, is its ontology of simple material objects (bare particulars?). The idea that the complex natural world is reducible to ontologically simple objects and atomic states of affairs is a difficult, if not impossible, thesis to defend. It is even more difficult to defend the added claim, which is also made in logical atomism, that all meaning and analysis must be based on ontologically simple objects and the atomic states of affairs in which they are configured.

But having natural properties and relations as modes of configuration of states affairs—i.e., as the nexuses of predication in reality—is an important and useful view. In fact, we can retain this view of natural properties and relations even though we reject the idea of simple objects. Something very much like this is exactly what we have in conceptual natural realism, where instead of the simple material objects of logical atomism we have complex physical objects as the constituents of states of affairs. Conceptual natural realism, as we noted in our introductory lecture, is a modern counterpart to Aristotle's natural realism, just as conceptual intensional realism is a mitigated, modern counterpart to conceptual Platonism; and both are taken as part of what we mean by conceptual realism. Also, if we add to the logic of conceptual natural realism the modal operator $\Box^c$ for a causal or natural necessity and also add a logic of natural kinds, then we get a modern form of Aristotelean essentialism.[11] But this is a topic we will turn to and develop in more detail in a later lecture.

3 Conceptualism

What underlies our capacity for language and predication in language, according to conceptualism, is our capacity for thought and concept formation, a capacity that is grounded in our evolutionary history and the social and cultural environment in which we live. Predication in thought is more fundamental than predication in language because what holds the parts of a sentence together in a speech act are the cognitive capacities that underlie predication in thought.

> There are two major types of cognitive capacities that characterize the nexus of predication in conceptualism. These are (1) a referential capacity, and (2) a predicable capacity.

These capacities underlie our rule-following abilities in the use of referential and predicable expressions. Predicable concepts, for example, are the cognitive capacities that underlie our abilities in the correct use of predicate expressions. When exercised, a predicable concept is what informs a speech or mental act with a predicable nature—a nature by which we characterize or relate objects

[11] See Cocchiarella 1996 for a more detailed account of conceptual natural realism and its extension to a modern form of Aristotelian essentialism.

in a certain way. A predicate expression whose use is determined in this way is then said to stand for the concept that underlies its use.

Referential concepts, on the other hand, are cognitive capacities that underlie our use of referential expressions. Referential concepts are what underlie the intentionality and directedness of our speech and mental acts. When exercised a referential concept informs a speech or mental act with a referential nature. A referential expression whose use is determined in this way is said to stand for the concept that underlies that use.

> Referential and predicable concepts are *a kind of knowledge*, more specifically a *knowing how* to do things with referential and predicable expressions. They are not a form of propositional knowledge, i.e., a knowledge that certain propositions about the rules of language are true, even though they underlie the rule-following behavior those rules might describe.
>
> Referential and predicable concepts are objective cognitive universals.

Their objectivity does not consist in being independently real universals, i.e., they do not have the kind of objectivity universals are assumed to have in logical realism.

> The objectivity of referential and predicable concepts consists in their being intersubjectively realizable cognitive capacities that enable us to think and communicate with one another.

As intersubjectively realizable cognitive capacities, moreover, concepts are not mental *objects*—e.g., they are not mental images or ideas as in the traditional conceptualism of British empiricism—though when exercised they result in objects, namely speech and mental acts, which are certain types of events. In particular,

> as cognitive capacities that (1) may never be exercised, or (2) that may be exercised at the same time by different people, or (3) by the same person at different times, concepts are not objects at all but have an unsaturated nature analogous to, but not the same as, the unsaturated nature concepts are said to have in Frege's ontology.

Unlike the concepts of Frege's ontology, however, which are functions from objects to truth values, the concepts of conceptualism are cognitive capacities that when exercised result in a speech or mental act (which may be either true or false).

Another important feature of predicable and referential concepts is that each has a cognitive structure that is complementary to the other—a complementarity that is similar to, but also different from, that between the functions that predicates stand for and those that quantifier phrases stand for in Frege's ontology.

> In conceptualism, it is the complementarity between predicable and referential concepts that underlies the mental chemistry of language and thought. In particular, as complementary, unsaturated cognitive capacities, predicable and referential concepts mutually saturate each other when they are jointly exercised in a speech or mental act.

In conceptualism, in other words, the nexus of predication is the joint exercise of a referential and a predicable concept, which interact and mutually saturate each other in a kind of mental chemistry.

A judgment or basic speech act of assertion, for example, is the result of jointly exercising a referential and a predicable concept that underlie the use, respectively, of a noun phrase (NP) as grammatical subject and a verb phrase (VP) as predicate:

$$\begin{array}{c} \text{S} \\ \swarrow \quad \searrow \\ \text{NP} \ \ \ldots \ \ \text{VP} \\ \Uparrow \\ \text{(nexus of predication)} \end{array}$$

In conceptualist terms this act can be represented as follows:

$$\begin{array}{c} \text{Assertion} \\ \text{(Judgment)} \\ \swarrow \qquad\qquad \searrow \\ \text{referential act} \quad \ldots.. \quad \text{predicable act} \\ \Uparrow \\ \text{(nexus of predication)} \\ \text{(mutual saturation)} \end{array}$$

Here, of course, by a referential act we mean the result of exercising a referential concept, and by a predicable act the result of exercising a predicable concept.

4 Referential Concepts

Now by a referential expression, i.e., the kind of expression that stands for a referential concept, we do not mean just proper names and definite descriptions, such as 'Socrates' and 'The man who assassinated Kennedy', but any of the types of expressions that functions in natural language as grammatical subjects, which includes quantifier phrases such as 'All citizens', 'Most democrats', 'Few voters', 'Every raven', 'Some raven', etc.[12] Also, because only a quantifier phrase has the

[12] We will not deal with the logic of determiners such 'most', 'few', 'several', etc., in these lectures. Instead we restrict ourselves to the universal and existential quantifier phrases.

kind of unsaturated structure that is complementary to a predicate expression, we will represent all of these different kinds of referential expressions as quantifier phrases.

> Referential concepts are what quantifier phrases stand for in conceptual realism, just as predicable concepts are what predicate expressions stand for.

Consider, for example, a judgment that every raven is black. In conceptual realism, this judgement is analyzed as the result of jointly exercising, and mutually saturating, (a) the predicable concept that the predicate phrase 'is black' stands for with (b) the referential concept that the referential phrase 'Every raven' stands for.

$$\begin{array}{ccc} \multicolumn{3}{c}{[\text{Every raven}]_{NP}\ [\text{is black}]_{VP}} \\ \swarrow & & \searrow \\ (\forall x Raven) & ... & Black(x) \\ \searrow & & \swarrow \\ \multicolumn{3}{c}{(\forall x Raven)Black(x).} \end{array}$$

A negative judgment expressed by 'Some raven is not black' is analyzed similarly as:

$$\begin{array}{ccc} \multicolumn{3}{c}{[\text{Some raven}]_{NP}\ [\text{is not black}]_{VP}} \\ \swarrow & & \searrow \\ (\exists x Raven) & ... & [\lambda x \neg Black(x)](\ ) \\ \searrow & & \swarrow \\ \multicolumn{3}{c}{(\forall x Raven)[\lambda x \neg Black(x)](x).} \end{array}$$

The negation in this judgment is internal to the predicate, which is analyzed as the complex predicate expression $[\lambda x \neg Black(x)](\ )$.

Now what this view of referential expressions requires is that the logical grammar of conceptual realism must be expanded to include a category of common nouns, or what we instead call common names.[13] Common names, as the above examples indicate, will occur as parts of referential-quantifier phrases.

Actually it is not just common names that can occur as parts of quantifier phrases, but proper names as well. In other words, instead of a category of common names, what we now add to the logical grammar of conceptual realism is *a category of names*, which includes proper names as well as common names. The nexus of predication in conceptual realism, as we have said, is the mutual saturation of a referential act with a predicable act, which means that singular reference, e.g., the use of a proper name as a grammatical subject, is not essentially different from general reference, such as the use of the quantifier phrases

[13] We will restrict ourselves to common names that are common count nouns. The logic of mass nouns will not be covered in these lectures.

'Every raven' and 'Some raven' in the above examples. Thus, instead of proper names and common names being different types of expressions, in conceptual realism we have just one logical category of *names*, with common names and proper names as two distinct subcategories.

$$\begin{array}{ccc} & \text{Names} & \\ \swarrow & & \searrow \\ \text{proper names} & & \text{common names} \end{array}$$

What the difference is between proper names and common names is a matter we will take up in the next section in our discussion of singular reference.[14]

Now in addition to complex predicates, which are accounted for by λ-abstracts, we also need to account for complex referential expressions. What we mean by a complex referential expression is a quantifier phrase containing a complex common name, i.e., a common name restricted by a defining relative clause. To syntactically generate a complex common name, we use a forward slash, '/', as a binary operator on (a) expressions from the category of common names and (b) formulas as defining relative clauses. For example, by means of this operator we can symbolize the restriction of the common name 'citizen' to 'citizen (who is) over eighteen', or more briefly, 'citizen (who is) over-18', as follows:

$$\begin{array}{ccc} \multicolumn{3}{c}{\text{Citizen (who is) over 18}} \\ \downarrow & & \downarrow \\ \text{Citizen} & & \text{who}_x \text{ is over 18} \\ & \searrow \quad \swarrow & \\ \multicolumn{3}{c}{Citizen/Over\text{-}18(x)} \end{array}$$

An assertion of the sentence 'Every citizen (who is) over eighteen is eligible to vote' can then be symbolized as:

$$\begin{array}{ccc} \multicolumn{3}{c}{[\text{Every citizen (who is) over eighteen}]_{NP} \ [\text{is eligible to vote}]_{VP}} \\ \swarrow & & \searrow \\ (\forall x Citizen/Over\text{-}18(x)) & & Eligible\text{-}to\text{-}vote(x) \\ \searrow & & \swarrow \\ \multicolumn{3}{c}{(\forall x Citizen/Over\text{-}18(x)) Eligible\text{-}to\text{-}vote(x)} \end{array}$$

There is a difference in conceptual realism, we should note, between an initial level at which the logical analysis of a speech or mental act of a given context is represented, and a subsequent, lower level where inferences and logical deductions can be applied to those analyses. This means that we need rules to connect the logical forms that represent speech and mental acts with the logical forms that represent the truth conditions and logical consequences of those acts in a more logically perspicuous way. For example, where the standard

[14] See Cocchiarella 2002 for a detailed description and separate development of the logic of names.

quantifier phrases of our previous lectures are now understood at least implicitly as containing the ultimate, superordinate common name 'object', i.e., where the quantifier phrases

$$(\forall x) \qquad \text{and} \qquad (\exists x)$$

are now read as

$$(\forall x Object) \qquad \text{and} \qquad (\exists x Object).$$

then we can connect our new way of representing speech and mental acts on the initial level of logical analysis with the more standard way on the lower, deductive level, by means of such rules as the following:

$$(\forall xA)F(x) \leftrightarrow (\forall x)[(\exists yA)(x = y) \rightarrow F(x)] \tag{\textbf{MP1}}$$

$$(\exists xA)F(x) \leftrightarrow (\exists x)[(\exists yA)(x = y) \wedge F(x)] \tag{\textbf{MP2}}$$

For example, by means of these rules we can see why the argument:

$$\begin{array}{ll} & (\forall xA)F(x) \\ & (\exists yA)(b = y) \\ \therefore & F(b) \end{array}$$

is valid in this logic.

Complex referential expressions can also be decomposed by such rules so that the relative clause is exported out. The following rules suffice for this purpose:

$$(\forall xA/G(x))F(x) \leftrightarrow (\forall xA)[G(x) \rightarrow F(x)], \tag{\textbf{MP3}}$$

$$(\exists xA/G(x))F(x) \leftrightarrow (\exists xA)[G(x) \wedge F(x)]. \tag{\textbf{MP4}}$$

Thus, with these rules we can see why the argument:

$$\begin{array}{ll} & (\forall xA/G(x))F(x) \\ & (\exists yA)(b = y) \wedge G(b) \\ \therefore & F(b) \end{array}$$

is also valid in this logic.

5 Singular Reference and Proper Names

The previous examples involve forms of general reference, in particular to *every raven* and to *some raven*, respectively. This is different from most modern theories of reference, which deal exclusively with singular reference. The sentence 'Socrates is wise', for example, is usually symbolized as $Wise(Socrates)$, or more simply as $F(a)$, where F represents the predicate 'is wise' and a is an objectual constant representing the proper name 'Socrates'. Some philosophers have even argued against the whole idea of general reference, claiming that logically there can be only singular reference.[15] We will turn to such arguments in a later section.

Now, as we have noted in our second lecture, a proper name can be used either with or without an existential presupposition that the name denotes. As it turns out, it is conceptually more perspicuous and logically appropriate that we use the quantifiers $\exists$ and $\forall$ to indicate which type of use is being activated in a given speech or mental act. Thus, for example, we can use $(\exists x Socrates)$ to represent a referential act in which the proper name 'Socrates' is used with existential presupposition, i.e., with the presupposition that the name denotes.

$$
\begin{tikzcd}[column sep=small]
[\text{Socrates}]_{NP} \arrow[d] & & [\text{is wise}]_{VP} \arrow[d] \\
(\exists x Socrates) \arrow[dr] & & Wise(\ ) \arrow[dl] \\
& (\exists x Socrates) Wise(x) &
\end{tikzcd}
$$

In this initial-level analysis, the existential quantifier phrase $(\exists x Socrates)$ indicates that a presupposition that the name 'Socrates' denotes is being made in the referential act. In a lower-level analysis, where deductive transformations occur, both proper names and common names can be transformed into a singular terms and allowed to occur in place of objectual variables as well as parts of quantifier phrases. In this lower-level logical framework, the above expression is equivalent to the form it has in first-order "free" logic; i.e., the following is valid in the lower-level logical framework:

$$(\exists x Socrates) Wise(x) \leftrightarrow (\exists x)[x = Socrates \wedge Wise(x)].$$

Note that although the right-hand side has the same truth conditions as the left, it does not represent the cognitive structure of the speech or mental act in question. What the right-hand side says is:

Some object is identical with Socrates and it is wise.

Now just as the existential quantifier, $\exists$, indicates that a proper name is being used with existential presupposition, so too the universal quantifier, $\forall$, indicates that the name is being used without existential presuppositions. A referential use of the proper name 'Pegasus', for example, might well be without an existential presupposition that the name denotes, in which case it is appropriate to represent that use as $(\forall x Pegasus)$. Thus, the sentence 'Pegasus flies', where the name 'Pegasus' is not being used with existential presupposition can be symbolized as

$$(\forall x Pegasus) Flies(x),$$

[15] See, e.g., Geach 1980. A more detailed refutation of Geach's arguments against general reference are given in Cocchiarella 1998.

which in our lower-level logical framework is equivalent to

$$(\forall x)[x = Pegasus \rightarrow Flies(x)].$$

Again, although the latter has the same truth conditions as 'Pegasus flies', it does not represent the cognitive structure of that speech act. Rather, what it says is,

> Every object is such that if it is (identical with) Pegasus, then it flies.

6 Definite Descriptions

Like proper names, definite descriptions can also be used to refer with, or without, existential presuppositions. For example, there can be a context in which a father who asserts,

> The child of mine who gets the best report card will receive a prize,

might not in fact presuppose that just one of his children will get a report card better than the others. The father realizes, in other words, that two or more of his children might do equally well, in which case his use of the definite description is not intended to refer to exactly one child. In other words, the father's referential act is without existential presuppositions. Logically,what the father asserts in that context has the same truth conditions as,

> If there is just one child of mine who gets a report card
> better than the others,then s/he will receive a prize.

But, as we have already noted, having the same truth conditions in conceptual realism is not the same as representing the same cognitive structure of a speech or mental act.

The distinction between using a definite description with and without existential presuppositions requires the introduction of two new quantifiers, $\exists_1$ and $\forall_1$. For example, where A is a common name and F and G are monadic predicates, an assertion of the form, 'The A that is F is G' can be analyzed as follows:

$$\begin{array}{ccc} & [\text{The } A \text{ that is } F]_{NP}\ [\text{is } G]_{VP}, & \\ \swarrow & & \searrow \\ (\exists_1 xA/F(x)) & & G(x) \\ \searrow & & \swarrow \\ & (\exists_1 xA/F(x))G(x) & \end{array}$$

On the other hand, a assertion of the same sentence but in which the use of the definite description is without existential presupposition will symbolized as

$$\begin{tikzcd}[column sep=small] & {[\text{The } A \text{ that is } F]_{NP}\ [\text{is } G]_{VP},} \arrow[dl] \arrow[dr] & \\ (\forall_1 xA/F(x)) \arrow[dr] & & G(x) \arrow[dl] \\ & (\forall_1 xA/F(x))G(x) & \end{tikzcd}$$

In neither case, we want to emphasize, is the definite description being interpreted as a singular term. In this regard, our analyses are similar to Bertrand Russell's in his famous 1905 paper, "On Denoting". In that paper, and thereafter, Russell did not represent definite descriptions as singular terms but analyzed them in context in terms of quantifiers and formulas. Of course, Russell did not distinguish between using a definite description with, as opposed to without, existential presuppositions, but, instead, he interpreted them all as being used with existential presuppositions. Russell's theory is easily emended, however, so as to include that distinction as well.

> There is a difference between our analysis and Russell's in that our analysis represents the cognitive structure of the speech or mental act in question, whereas Russell's represents only the truth conditions of that act.

The two analyses are logically equivalent, but only one represents the cognitive structure of the speech or mental act. Thus, given a slight reformulation of Russell's contextual analysis, we can formulate the equivalence as rules connecting the logical forms of the initial level of analysis, i.e., where the cognitive structure of our speech and mental acts are analyzed, with the logical forms of the lower level where truth conditions and deductive relations are represented. Thus, in the case where the definite description is used with existential presupposition, we have the following rule that connects our analysis with Russell's:

$$(\exists_1 xA/F(x))G(x) \leftrightarrow (\exists xA)[(\forall yA)(F(y) \leftrightarrow y = x) \wedge G(x)].$$

In the case where the definite description is used without existential presupposition we have the related but somewhat different rule:

$$(\forall_1 xA/F(x))G(x) \leftrightarrow (\forall xA)[(\forall yA)(F(y) \leftrightarrow y = x) \rightarrow G(x)].$$

It is instructive to note why it is that although Russell's contextual analysis provides a perspicuous representation of the truth conditions of the speech or mental act in question, it does not at all represent the cognitive structure of that act. First, note that regardless of whether or not the referential act is with or without existential presuppositions, it is in either case *the same predicable concept* that is being exercised, a fact that is explicitly represented by the logical forms given in our analysis above for conceptual realism. On Russell's contextual analysis, however, the predicable expressions, as represented by the bracketed formulas on the right-hand-side of each of the above biconditionals, are different.

Secondly, note that the referential import of the speech or mental act in question is properly represented in either case by a complex referential expression—namely, $(\exists_1 xA/F(x))$ or $(\forall_1 xA/F(x))$ —whereas the predicable aspect is represented by a simple predicate expression—namely, $G(x)$. The referential expressions used in Russell's analyses, on the other hand, are the simple quantifiers phrases $(\exists xA)$ in the one case, and $(\forall xA)$ in the other, and, as just noted, the predicate aspects are represented by complex formulas.

Russell's contextual analysis is not wrong in how it represents the truth conditions of a speech or mental act in which a definite description is used as a referential expression; but, unlike the analyses that are given in conceptual realism, it does not provide an appropriate representation of the cognitive structure of that act.

> In conceptual realism, the distinction between logical forms that represent the cognitive structure of a speech or mental act and those that give a logically perspicuous representation of the truth conditions of that act is fundamental and involves different levels of analysis.

The one type of logical form occurs on an initial level of analysis and is about the cognitive structure of our speech and mental acts, whereas the other occurs on a lower level where it is the truth conditions and logical consequences of those act that are perspicuously represented by logical forms.

7 Nominalization as Deactivation

Not all speech or mental acts are assertions in which a referential and a predicable concept are exercised. A denial, for example, is not an assertion in which a referential act is exercised. Nor for that matter is a conditional, where neither the antecedent nor the consequent are asserted. Unlike a basic assertion in which the nexus of predication is the mutual saturation of a referential and a predicable concept, no referential concept is being exercised in a conditional assertion.[16]

Similarly, unlike the negative judgment that some raven is not black, a denial that some raven is white is not an act in which reference is made to every raven and assert of it that it is not white, even though an assertion of the latter type has the same truth conditions as the denial. Grammatically, the denial can be analyzed as follows,

$$[\text{That some raven is white}]_{NP}[\text{is not the case}]_{VP}$$

where the sentence 'Some raven is white' has been nominalized and transformed into a grammatical subject. In this transformation the quantifier and predicate phrases of the sentence 'Some raven is white' are "deactivated," indicating that

[16] See Russell 1903, §38, for a similar view, and on how 'If p, then q' differs from 'p; therefore q', where in the latter case both p and q are asserted, whereas neither is asserted in the former.

the referential and predicable concepts these phrases stand for are not being exercised. The denial is not about a raven but about the propositional content of the sentence—namely, that it is false, i.e., not the case.

We could make this deactivation explicit by symbolizing the denial as,

$$Not([(\exists x Raven)White(x)]),$$

where the brackets around the formula $(\exists x Raven)White(x)$ indicate that the sentence has been transformed into an abstract singular term—i.e., an expression that can occupy the position of an object variable where it denotes the propositional content of the sentence. It is more convenient, however, to retain the usual symbolization, namely,

$$\neg(\exists x Raven)White(x),$$

so long as it is clear that, unlike the equivalent sentence,

$$(\forall x Raven)\neg White(x)$$

which is read (in non-idiomatic English) as 'Every raven is such that it is not white', no reference is being made to ravens in the speech or mental act in question. In conceptualism, as already noted, we distinguish the level of analysis at which a logical form represents the cognitive structure of a speech or mental act from a lower level at which a logically equivalent logical form gives a perspicuous representation of the truth conditions of that act.

Now deactivation applies to a predicate not only when it occurs within a nominalized sentence, but also when its infinitive or gerundive form occurs in a speech act as part of a complex predicate. In other words, deactivation also applies directly to nominalized predicates occurring as parts of other predicates. Consider, for example, the predicate phrase 'is famous', which can be symbolized as a λ-abstract $[\lambda x Famous(x)]$ as well as simply by $Famous(\ \ )$. The λ-abstract is preferable as a way of representing the infinitive 'to be famous', which is one form of nominalization:

$$\begin{array}{c}\text{to be famous}\\ \downarrow\\ \text{to be an } x \text{ such that } x \text{ is famous}\\ \downarrow\\ [\lambda x Famous(x)]\end{array}$$

Now the sentence 'Sofia wants to be famous' does not contain the active form of the predicate 'is famous' but only a nominalized infinitive form as a component of the complex predicate 'wants to be famous'. When asserting this sentence we are not asserting that Sofia is famous, in other words, where the predicable concept that 'is famous' stands for is activated, i.e., exercised; rather, what the complex predicate 'wants to be famous' indicates is that the predicable concept that 'is famous' stands for has been deactivated. The whole sentence can be symbolized as

$$\begin{array}{ccc} [\text{Sofia}]_{NP} & [\text{wants} & [\text{to be famous}]]_{VP} \\ \downarrow & \downarrow & \downarrow \\ (\exists y Sofia) & [\lambda y Wants(y, & [\lambda x Famous(x)])](y) \end{array}$$

Nominalized predicates do not denote the concepts the predicates stand for in their role as predicates, as we have already noted in a previous lecture, because the latter, as cognitive capacities, have an unsaturated nature and cannot be objects. As an abstract singular term, what a nominalized predicate denotes is the intensional content of the predicable concept the predicate otherwise stands for. In conceptual realism, what we mean by the intensional content of a predicable concept is the result of a projection onto the level of objects of the truth conditions determined by the concept's application in different possible contexts of use.

It is important to note here that the complex predicate

$$[\lambda y Wants(y, [\lambda x Famous(x)])]$$

does not represent a real relation between Sofia and the intensional object that the infinitive 'to be famous' denotes. What the complex predicate stands for is a predicable concept, which as a cognitive capacity has no more internal complexity than any other predicable concept. What is complex is the predicate expression and the truth conditions determined by the concept it stands for—i.e., the conditions under which the predicate can be true of someone in any given possible context of use.

It is a criterion of adequacy of any theory of predication that it must account for predication even in those cases where a complex predicate contains a nominalized predicate as a proper part, as well as the more simple kinds of predication where predicates do not have an internal complexity. What this criterion indicates is one of the reasons why conceptualism alone is inadequate as a formal ontology and needs to be extended to include an intensional realism of abstract objects as the intensional contents of both denials and assertions as well as of our predicable concepts.

8 The Intensional Content of Referential Concepts

The fundamental insight into the nature of *abstract objects* in conceptual realism is that we are able to grasp and have knowledge of such objects as the objectified truth conditions of the concepts whose contents they are. This "object"-ification of truth conditions is realized through a reflexive abstraction in which we attempt to represent what is not an object—e.g., an unsaturated cognitive structure underlying our use of a predicate expression—as if it were an object. In language this reflexive abstraction is institutionalized in the rule-based linguistic process of nominalization.

As already noted, we do not assume an independent realm of Platonic forms in conceptual realism in order to account for abstract objects and the logic of nominalized predicates. Conceptual realism is not the same as either logical realism or conceptual Platonism. Some of the reasons why this is so are:

> (1) The abstract objects of conceptual realism are not entities that are predicated of things the way they are in logical realism and conceptual Platonism—i.e., they are not unsaturated entities and therefore they do not have a predicative nature in conceptual realism.
>
> (2) The abstract objects of logical realism and conceptual Platonism exist independently of the evolution of culture and consciousness, whereas in conceptual realism all abstract objects, including numbers, are products of the evolution of language and culture. Nevertheless, although they are products of cultural evolution, they also have both a certain amount of autonomy and an essential role in the continuing evolution and development of knowledge and culture.
>
> (3) In logical realism, abstract objects are objects of direct awareness, whereas in conceptual realism all knowledge must be grounded in psychological states and processes. In other words, we cannot have knowledge of abstract objects if our grasp of them as objects must be through some form of direct awareness. According to conceptual realism we are able to grasp and have knowledge of abstract objects only as the intensional contents of the concepts that underlie reference and predication in language and thought. That is, we are able to grasp abstract objects as the "object"-ified truth conditions of our concepts as cognitive capacities.

The reflexive abstraction that transforms the intensional content of an unsaturated predicable concept into an abstract object is a process that is not normally achieved until post-adolescence. An even more difficult kind of reflexive abstraction also occurs at this time. It is a double reflexive abstraction that transforms the intensional content of a referential concept into a predicable concept, and then that predicable concept into an abstract object.

The full process from referential concept to abstract object is doubly complex because it involves a reflexive abstraction on the result of a reflexive abstraction. Where A is a name (proper or common, and complex or simple), and Q is a quantifier (determiner), we define the predicate that is the result of the first reflexive abstraction as follows:

$$[QxA] =_{df} [\lambda x(\exists F)(x = F \wedge (QxA)F(x))].$$

In this definition the quantifier phrase (QxA) is transformed into a complex predicate (λ-abstract), which can then be nominalized in turn as an abstract singular terms that purports to denote the intensional content of being a concept F such that $(QxA)F(x)$.

Consider, for example, an assertion of the sentence ‘Sofia seeks a unicorn’, which can be analyzed as follows:

$$\begin{array}{c}\text{[Sofia]}_{NP}\text{[seeks [a unicorn]]}_{VP}\\ \downarrow \qquad\quad \downarrow \qquad\qquad \downarrow\\ (\exists xSofia)[\lambda xSeek(x,[\exists yUnicorn])](x)\end{array}$$

No reference to a unicorn is being made in this assertion. Instead, the referential concept that the phrase ‘a unicorn’ stands for has been deactivated in the speech act. This deactivation is represented on the initial level of analysis by transforming the quantifier phrase into an abstract singular term denoting its intensional content. Note that the relational predicate ‘seek’ in this example is not extensional in it second argument position. What that means is that on the lower level of representing truth conditions and logical consequences, the sentence does not imply that there is a unicorn that Sofia seeks. But the different assertion that Sofia finds a unicorn, which is symbolized in an entirely similar way:

$$\begin{array}{c}\text{Sofia}_{NP}\text{[finds [a unicorn]]}_{VP}\\ \downarrow \qquad\quad \downarrow \qquad\qquad \downarrow\\ (\exists xSofia)[\lambda xFind(x,[\exists yUnicorn])](x)\end{array}$$

does imply that there exists a unicorn, and moreover that it has been found by Sofia. That is, the following

$$(\exists yUnicorn)(\exists xSofia)Finds(x,y).$$

is a logical consequence of the above sentence. Thus, even though the two different sentences,

$$(\exists xSofia)[\lambda xSeek(x,[\exists yUnicorn])](x)$$

$$(\exists xSofia)[\lambda xFind(x,[\exists yUnicorn])](x)$$

have the same logical form, only one of them implies that there is a unicorn.

The reason why the one sentence implies that there is a unicorn and the other does not is that the relational predicate ‘find’, but not the predicate ‘seek’, is extensional in its second argument position. The extensionality of ‘find’ is represented by the following meaning postulate:

$$[\lambda xFinds(x,[\exists yA])] = [\lambda x(\exists yA)Finds(x,y)].$$

By identity logic and λ-conversion, the following is a consequence of this meaning postulate,

$$(\exists x Sofia)[\lambda x Finds(x, [\exists y A])](x) \leftrightarrow (\exists x Sofia)(\exists y A) Finds(x, y)$$

Of course, there is no meaning postulate like this for the intensional predicate 'seek'.

Our analysis of the deactivation of quantifier phrases occurring as direct objects of transitive verbs such as 'seek' and 'find' is similar to the analysis given by Richard Montague in his paper "The Proper Treatment of Quantification in Ordinary English," except that Montague's framework is a type-theoretical form of logical realism.[17] There is a problem with Montague's analysis that would seem to apply to our approach as well. The problem arises when a quantifier phrase occurring as a direct-object of a complex predicate applies to two argument positions implicit in that predicate.

Consider, for example, an assertion of the sentence 'Gino bought and ate an apple', which has the quantifier phrase 'an apple' occurring as the direct object of the complex predicate 'bought and ate'. Now the complex predicate 'bought and ate' implicitly has two argument positions for the direct-object, one associated with 'bought', and the other associated with 'ate'. The problem is how can we distinguish in logical syntax a nonconjunctive assertion of the form

$$[x]_{NP} \text{ [(bought and ate) an apple]}_{VP}$$

from the different conjunctive assertion of

$$[x]_{NP} \text{ [bought an apple]}_{VP} \text{ and } [x]_{NP} \text{ [ate an apple]}_{VP}$$

where, as the direct object, the quantifier phrase 'an apple' has been deactivated in each assertion. This is a problem because although the nonconjunctive sentence 'x (bought and ate) an apple', implies on the deductive level the conjunctive sentence 'x bought an apple and x ate an apple', nevertheless the two sentences are not logically equivalent.

Now this is a problem because if we take the analysis of 'x (bought and ate) an apple' as having a deactivated occurrence of the quantifier phrase 'an apple' as the direct-object argument of the complex predicate 'to be a y such that x bought and ate y', that is,

$$\begin{gathered}\text{to be a } y \text{ such that } x \text{ bought and ate } y \\ \downarrow \\ [\lambda y(Bought(x, y) \wedge Ate(x, y))],\end{gathered}$$

which intuitively is the appropriate analysis of the complex verb 'bought and ate', then the sentence 'Gino bought and ate an apple' would be analyzed as

[17] See Montague 1974.

$$\begin{array}{c}
[\text{Gino}]_{NP}\ [(\text{bought and ate) an apple}]_{VP} \\
\swarrow \qquad\qquad\qquad\qquad \downarrow \qquad\qquad\qquad\qquad \searrow \\
(\exists x Gino) \qquad [\lambda x[\lambda y(Bought(x,y) \wedge Ate(x,y))]([\exists y Apple])] \\
\downarrow \qquad\qquad\qquad\qquad\qquad\qquad \downarrow \\
(\exists x Gino)[\lambda x[\lambda y(Bought(x,y) \wedge Ate(x,y))]([\exists y Apple])](x)
\end{array}$$

But then, by λ-conversion, this analysis not only implies that Gino bought an apple and Gino ate an apple, it is also implied by the latter, i.e., on this analysis the two are equivalent, which is contrary to the result we want.

Intuitively, what we want is to first "reactivate" the quantifier phrase 'an apple', i.e., to transform

$$[\lambda y(Bought(x,y) \wedge Ate(x,y))]([\exists y Apple])$$

to

$$(\exists y Apple)[\lambda y(Bought(x,y) \wedge Ate(x,y))](y),$$

before applying λ-conversion. This "reactivation is justified by the fact that 'bought' and 'ate' are both extensional in their direct-object positions, i.e., because for an arbitrary common name A,

$$[\lambda x Bought(x,[\exists y A])] = [\lambda x(\exists y A) Bought(x,y)]$$

and

$$[\lambda x Ate(x,[\exists y A])] = [\lambda x(\exists y A) Ate(x,y)]$$

are meaning postulates for the predicates 'bought' and 'ate'. It follows then that the conjunctive predicate 'bought and ate' is also extensional, i.e., then

$$[\lambda x[\lambda y(Bought(x,y) \wedge Ate(x,y))]([\exists y A])] = [\lambda x(\exists y A)(Bought(x,y) \wedge Ate(x,y))]$$

is valid as well.

One way to resolve the problem, accordingly, is to restrict λ-conversion so that it the argument-expression of a λ-abstract must be other than a nominalized quantifier phrase. That is, because λ-conversion could not then be applied to

$$[\lambda y(Bought(x,y) \wedge Ate(x,y))]([\exists y Apple]),$$

the above equivalence would not follow. But because the "reactivation" of $[\exists y Apple]$ still applies, then we do have the implication in the one direction; that is, 'Gino bought and ate an apple' then implies 'Gino bought an apple and Gino ate an apple', but not conversely, which is as it should be.

Although this solution is the most natural, and is the one we will adopt here, there is another way of resolving the problem. On this alternative, we assume that the sentence 'Gino bought and ate an apple' is synonymous with 'Gino bought an apple and ate it', which makes explicit the two direct-object positions, one occupied by the quantifier phrase 'an apple' and the other by the co-referential pronoun ‘it’. It is also synonymous with ‘Gino bought an apple and ate that apple’, which makes explicit the two direct-object positions as well.

Now we have given elsewhere a conceptualist analysis of co-referential pronouns in terms a variable-binding ‘that’-operator, $\mathcal{T}$, as in ‘that apple’, which we symbolize as $(\mathcal{T}yApple)$.[18] Thus, by means of the $\mathcal{T}$-operator, we can symbolize ‘Gino bought an apple and ate that apple’ as follows:

$$\begin{array}{cc}
[\text{Gino}]_{NP} & [\text{bought an apple and ate that apple}]_{VP} \\
\swarrow & \downarrow \\
(\exists x Gino) & [\lambda x(Bought(x,[\exists yApple]) \wedge Ate(x,[\mathcal{T}yApple]))] \\
\downarrow & \downarrow \\
\multicolumn{2}{c}{(\exists x Gino)[\lambda x(Bought(x,[\exists yApple]) \wedge Ate(x,[\mathcal{T}yApple]))](x),}
\end{array}$$

where both the quantifier phrase ‘an apple’ and its co-referential phrase ‘that apple’ occur deactivated in direct-object positions. Then, given that both ‘*Bought*’ and ‘*Ate*’ are extensional in their second-argument positions, the above sentence is equivalent to

$$(\exists x Gino)[\lambda x((\exists yApple)Bought(x,z) \wedge (\mathcal{T}yApple)Ate(x,z))](x),$$

which in turn, by the following rule for the $\mathcal{T}$-operator,[19]

$$(\exists yA)\varphi y \wedge (TyA)\psi y \leftrightarrow (\exists yA)(\varphi y \wedge \psi y),$$

is equivalent to

$$(\exists x Gino)(\exists yApple)(Bought(x,z) \wedge Ate(x,z)).$$

This last implies, but is not equivalent to

$$(\exists x Gino)(\exists yApple)Bought(x,z) \wedge (\exists x Gino)(\exists yApple)Ate(x,z)),$$

which is the result we wanted, because the latter does not imply any of the other sentences as well. Thus, the above problem about the deactivation of a quantifier phrase occurring as the direct-object position of a complex predicate can be resolved in this way as well in our fuller conceptualist theory of reference.

9 Concluding Remarks

We conclude by listing the following observations about the nexus of predication in conceptual realism.

[18] See Cocchiarella 1998, §7.

[19] This rule says that the sentence ‘Some A is φ and that A is ψ’ is equivalent to ‘Some A is such that it is φ and ψ’. An example of the rule is the equivalence between ‘Some man broke the bank at Monte Carlo and that man died a pauper’ and ‘Some man is such that he broke the bank at Monte Carlo and he died a pauper’.

To avoid problems that could otherwise arise, this rule must be applied before other logical operations, such as simplification to separate conjuncts.

• The nexus of predication in conceptual realism is what holds together in thought and speech the exercise of a referential and predicable concept.

• It is what accounts for the unity of a thought or speech act that is the result of jointly exercising a referential and predicable concept.

• A unified account of both general and singular reference can be given in terms of this nexus. Such a unified account is possible because the category of names includes both proper and common names.

• A unified account can also be given in terms of this nexus for predicate expressions that contain abstract noun phrases, such as infinitives and gerunds.

• The same unified account also applies to complex predicates containing quantifier (referential) phrases as direct-object expressions of transitive verbs, such as the phrase 'a unicorn' in 'Sofia seeks a unicorn'. Conceptually, the content of such a quantifier phrase and the referential concept it stands for is "object"-ified through a double reflexive abstraction that first generates a predicable concept and then the content of that concept by deactivation and nominalization. All *direct objects* of speech and thought are intensionalized in this way so that a parallel analysis is given for 'Sofia finds a unicorn' as for 'Sofia seeks a unicorn'. And yet, relations, such as *Finds*, that are extensional in their second argument positions can still be distinguished from those that are not, such as *Seeks*, by meaning postulates.

Finally, we note that there is much more involved in a conceptualist analysis of language and thought beyond our account of the nexus of predication. One such issue, which we will take up in our seventh lecture, is how both proper and common names can be transformed into singular terms occurring as denotative arguments of predicates, which is different from their referential role in as parts of quantifier phrases. Such singular terms denote classes as many, as opposed to sets as classes as ones. In addition to providing another account of "the one and the many", classes as many also provide truth conditions for plural reference and predication. Classes as many also lead to a natural representation of the natural numbers as properties of classes as many.

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