LINSKY, QUINE, AND SUBSTITUTIVITY

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It has been argued by Linsky that the principle of inter-substitutivity salva veritate of co-referential singular terms in sentences (PS) is "just false," that it is such that "no two terms obey it" ([I], 100). What Linsky has criticized is a characterization of PS provided by Quine in "Reference and Modality" ([II], 139). An alternative characterization of PS has been employed by Quine in Word and Object ([III], 143). I will argue that Linsky's criticisms, given a certain qualification, are appropriate when construed as criticisms of PS as characterized in [II]; but I will subsequently argue that Quine's characterization in [III] both (1) entirely escapes Linsky's criticisms and (2) constitutes an adequate analysis of PS.

Quine's characterization of PS in [II] is: "given a true statement of identity, one of its two terms may be substituted for the other in any true statement and the result will be true" ([II], 139). This statement is in a certain respect ambiguous. Before pointing out its ambiguity, some symbolism will be introduced for the sake of providing precise formulation of PS.

Suppose given some language L. Let $L^{=}$ be a language exactly like L except that for any expression e of L, if e flanked by two singular terms of L is a statement of identity of L, the result of replacing e with '=' is a statement of identity of $L^{=}$; and the only statements of identity of $L^{=}$ are statements formed in this manner. Where

$$'e_1', \ldots, 'e_n'$$

denote strings of symbols of $L^{=}$,

$$'\text{concat}(e_1, \ldots, e_n)'$$

will denote that string of symbols of $L^{=}$ which results from concatenating what $'e_1', \ldots, 'e_n'$ (in that order) denote. Moreover,

$$U_i^n(e_1, \ldots, e_n) = e_i;$$

that is,

$$'U_i^n(e_1,\ldots,e_n)'$$

is a function expression which denotes what its i-th argument expression denotes. Finally, the predicate letter 'T' will mean '...is true in $L^=$'.

Given this symbolism, one way in which PS might be formulated on the basis of Quine's characterization of it in [II] is:

$$(u)\ (v)\ (\ T(\text{concat}(u,\ '=',\ v)) \longrightarrow (t_1)\ldots(t_n)(s)$$

$$((\ s=\text{concat}(t_1,\ldots,t_n)\ \&\ (\exists i)\ (\ i\leq n\ \&\ U_i^n(t_1,\ldots,t_n)=$$

$$u\ )) \longrightarrow (\ T(s) \longleftrightarrow T(\text{concat}(t_1,\ldots,t_{i-1},v,t_{i+1},\cdots$$

$$,t_n)))))).$$

The variables are to be construed as having as values strings of symbols of some language $L^=$, for which language 'T' is to be construed as a truth predicate. In particular, 'u' and 'v' are to have singular terms of $L^=$ as values, 's' a sentence of $L^=$, and 't_1',...,'t_n' any strings of symbols of $L^=$. Hence, according to this formulation, for any singular terms u, v, if u and v are understood, then for any sentence s, if u occurs in s, then v may replace u in s and the resulting sentence will have the same truth value as s.

In [II] Quine has remarked:

> An expression which consists of another expression between single quotes constitutes a name of that other expression; and it is clear that the occurrence of that other expression or a part of it, within the context of quotes, is not in general referential...not subject to the substitutivity principle.
>
> ([II], 140, my italics)

What this quotation indicates is that Quine's statement that "given a true statement of identity, one of its two terms may be substituted for the other in any true statement and the result will be true," is a characterization of the conditions under which a singular term is (to use Quine's phrase) subject to PS.

PS is manifestly about substituting one singular term for another co-referential singular term in sentences of a certain specified class: for the requisite substitution must be made in some sentence(s) or other, and these "some sentence(s) or other" constitute the specified

class. Let S be the specified class of sentences. To say, as Quine does, that a singular term t is subject to PS in a given sentence is just to say that, where t and t' are co-referential singular terms, t' may be substituted for t at one or more of t's occurrences in any member s of S and the resulting sentence will have the same truth value as s. But "t' may be substituted for t" means the same as "t may be replaced with t'." Moreover, to say that a singular term t is partially replaceable salva veritate in a given sentence is just to say that, where t and t' are co-referential singular terms, t may be replaced with t' at one or more of t's occurrences in any member s of S and the resulting sentence will have the same truth value as s. Therefore, to say, as Quine does, that a singular term t is subject to PS in a given sentence s is just to say that t is partially replaceable salva veritate in s.

'...is partially replaceable salva veritate in...' is to be preferred to '...is subject to PS in...' simply in order to avoid equivocating on 'the principle of substitutivity', for this phrase denotes the entire formulation of PS, whereas adoption of the second-mentioned predicate requires using 'the principle of substitutivity' also to denote a proper part of the entire formulation of PS, viz., the conditions specified therein.

Let 'R' be introduced to mean '...is partially replaceable salva veritate in...'. Then PS, as characterized by Quine in [II], might be formulated as follows:

$$(u)\,(s)\,(\,R(u,s) \longleftrightarrow ((\exists t_1)\ldots(\exists t_m)\,(\,s=\mathrm{concat}(t_1,\ldots,t_m)\ \&\ (\exists i)\,(\,i\leq m\ \&\ U_i^m(t_1,\ldots,t_m)=u\,))\ \&\ (v)\,(\,T(\mathrm{concat}(u,'=',v)) \longrightarrow (t_1)\ldots(t_n)(s')\,((\,s'=\mathrm{concat}(t_1,\ldots,t_n)\ \&\ (\exists i)\,(\,i\leq n\ \&\ U_i^n(t_1,\ldots,t_n)=u\,)) \longrightarrow (\,T(s') \longleftrightarrow (T(\mathrm{concat}(t_1,\ldots,t_{i-1},v,t_{i+1},\ldots,t_n))))))).$$

The variables are to be construed as having the same range of values as for the previous formulation, with 's'' ranging over sentences of $L^{=}$. Hence, for any singular term u, for any sentence s, u is partially replaceable salva veritate in s if, and only if, u occurs in s and for any singular term v, if u and v are co-referential, then for any sentence s', if u occurs in s' then v may replace u in s' and the resulting sentence will have the same truth value as s'. I will henceforth refer to this latter formulation as PS-2 and to the former as PS-1.

PS-2 is a correct formulation of PS as characterize by Quine in [II]. For Quine is therein concerned to spe-

cify the conditions under which a singular term is partially replaceable salva veritate in a given sentence: Quine is not therein stating that these conditions are always satisfied. Moreover, Quine therein acknowledges a number of "exceptions"--singular term-sentence pairs $\langle t,s \rangle$ such that t is not partially replaceable salva veritate in s; and such an admission is plainly incompatible with a supposition that the conditions in question are always satisfied.

Linsky has presented two arguments on the basis of which he rejects what he takes to be Quine's formulation of PS in [II]. Linsky's first argument is as follows:

> The 'law', however, it seems, is just false, for it is possible that Smith knows that Venus is the morning star and yet does not know that Venus is the evening star, though 'The morning star is the evening star' is a 'true statement of identity'. Again, from
>
> (1) Cicero is Tully
>
> and
>
> (2) 'Cicero' is spelled with six letters
>
> it does not follow that
>
> (3) 'Tully' is spelled with six letters.

Linsky uses each of these examples to show that PS is "just false." Linsky goes on to argue that PS is such that "no two terms obey it":

> Not only is it possible to produce counter-examples to Leibniz's law, it can be shown that no two terms obey it. Let $\underline{t}$ and $\underline{t}'$ be different terms and consider any true statement of the form
>
> (4) Jones explicitly denied that $t = t'$.
>
> Surely one cannot substitute $\underline{t}$ for $\underline{t}'$ in (4) in order validly to obtain
>
> (5) Jones explicitly denied that $t = t$.
>
> No statement of the form (5) follows from the corresponding statement of the form (4), even though $\underline{t} = \underline{t}'$ be true.
>
> ([I], 100-101)

Any of these examples clearly does show that PS-1 is false. Moreover, PS-1 will be such that no two terms obey it, for, given PS-1, obeying PS would require that a singular term be partially replaceable salva veritate with any co-referential singular term in any sentence; and Linsky's examples are clearly examples of failure of such replaceability.

From Linsky's second argument it follows that no singular term is partially replaceable salva veritate in

any sentence, where such replaceability is analyzed as by PS-2. Hence, PS-2 will be such that no two terms obey it. But in this case PS-2 will be true, for each of its instantiations will be a bi-conditional each side of which is false.

It follows that Linsky's conclusion that PS is "just false" is appropriate only for PS-1, although Linsky's conclusion that PS is such that "no two terms obey it" is appropriate for both PS-1 and PS-2. It also follows that if 'R' is to be true of any singular term-sentence pairs, an alternative formulation of PS must be provided.

This has been done by Quine in [III] as is clear from the following several passages:

> The positions that we have been classifying into purely referential and other are positions of singular terms relative to sentences that contain them...For positions in sentences, what it [PS] says is that the containing sentence keeps its truth value when the contained singular term is supplanted by any other having the same reference.
>
> ([III], 143)

What Quine has done in [III], which he had not done in [II], is to relativize the required replaceability to a specific containing sentence.

PS, as characterized by Quine in [III], may be formulated thus:

$$(u)\ (s)\ (\ R(u,s) \longleftrightarrow (\exists t_1)\ldots(\exists t_n)\ ((\ s=\mathrm{concat}(t_1,\ldots,t_n)\ \&\ (\exists i)\ (\ i\leq n\ \&\ U^n_i(t_1,\ldots,t_n)=u\ ))\ \&\ (v)\ (\ T(\mathrm{concat}(u,'=',v)) \longrightarrow (\ T(s) \longleftrightarrow T(\mathrm{concat}(t_1,\ldots,t_{i-1},v,t_{i+1},\ldots t_n)))))).$$

The variables are to be construed as having the same ranges of values as above (p. 30). Hence, for any singular term u, for any sentence s, u is partially replaceable salva veritate in s if, and only if, u occurs in s and for any co-referential singular term v, the sentence which results from replacing u with v will have the same truth value as s. I will henceforth refer to this formulation as PS-3.

The difference between PS-2 and PS-3 is of considerable importance. According to PS-2, a certain singular term, say, 'Tully', given its occurrence in a sentence s,

is partially replaceable salva veritate in s if, and only if, any singular term having the same reference as 'Tully' may replace 'Tully' in any sentence in which 'Tully' occurs, salva veritate; whereas according to PS-3, given that 'Tully' occurs in a sentence s, 'Tully' is partially replaceable salva veritate in s if, and only if, any singular term having the same reference as 'Tully' may replace 'Tully' in that sentence, salva veritate. This difference is effected by eliminating.

$$'(t_1)\ldots(t_n)(s')\ ((\ s'=\text{concat}(t_1,\ldots,t_n)\ \&$$

$$(\exists i)\ (\ i\leq n\ \&\ U_i^n(t_1,\ldots,t_n)=u\ ))'$$

from the right side of the principal bi-conditional of PS-2 and replacing 's'' at its remaining occurrence with 's'.

It should be clear that PS-3 escapes Linsky's criticism that PS is such that no two terms obey it. For consider the sentence 'Nixon was a president of the United States' as uttered, say, by an historian in the course of a lecture on American history. Any singular term having the same reference as 'Nixon' may replace 'Nixon' in this sentence salva veritate.

It should be equally clear that PS-3 is immune to the sort of counter-example employed by Linsky in his first argument, and that, therefore, PS-3 escapes Linsky's first criticism as well.

What remains to be considered is whether PS-3 provides an adequate analysis of PS. PS-3 provides an adequate analysis of PS just in case PS-3 provides an adequate analysis of 'R', for the whole point of PS is just to provide an analysis of 'R'. Necessary and sufficient conditions of adequacy of an analysis of 'R' are (a) that 'R' be analyzed so as to be true of some singular term-sentence pairs and (b) that the suggested analysis incorporate the essential features of partial replaceability salva veritate of co-referential singular terms in sentences.

Where u is a singular term, the essential features of u's being partially replaceable salva veritate in a sentence s are (i) that u occurs in s and (ii) that any sentence which results from replacing u with a co-referential singular term has the same truth value as s.

PS-3 does provide an adequate analysis of 'R'. That clause (i) is satisfied is accounted for by the requirement that

$$(\exists t_1)\ldots(\exists t_n)(\ s=\text{concat}(t_1,\ldots,t_n)\ \&\ (\exists i)\ (\ i\leq n\ \&\ U_i^n(t_1,\ldots,t_n)=u\ )).$$

That clause (ii) is satisfied is accounted for by the requirement that

$$(v)\ (\ T(\text{concat}(u,'=',v))\longrightarrow(\ T(s)\longleftrightarrow(t(\text{concat}(t_1,\ldots,t_{i-1},v,t_{i+1},\ldots,t_n))))).$$

Hence, clause (b) is satisfied. As indicated above, clause (a) is satisfied as well.

It follows that PS-3 provides an adequate analysis of 'R'. And since the point of PS is to provide an analysis of 'R', it follows that PS-3 provides an adequate analysis of PS.

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