What it Takes to be * Missing

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At first glance, the predicate *be* missing appears to be an ordinary verb of absence to be analyzed along the lines of Quine (1956) or more recent implementations and alternatives. On closer inspection, though, this particular specimen turns out to give rise to some surprising semantic complexity – which is what the present note is about.

As always with referentially opaque verbs, one may distinguish between specific (or ‘objectual’) and unspecific (or ‘notional’) readings, the latter being typical of indefinites whereas proper names tend to be restricted to the former. Thus, whereas (1) does not seem to be ambiguous in the relevant sense, (2) may but need not be used to report about a specific screw:

(1) Peter is missing.

(2) A screw is missing.

Although specific, (1) is heavily underspecified: just what Peter is missing from – an event, a group, an institution, a representation, . . . – is left open; it is something the context would have to make sufficiently clear lest the utterance of (1) should be felicitous. More likely than not, (1) is elliptic, and an appropriate prepositional phrase of the form from X is missing – from (1), that is – whereupon a general resolution procedure sees to it that the utterance context provides a suitable referent for X. Analogous remarks apply to (2), and indeed to any underspecified uses of *be* missing, including ones in which the predicate occurs in an embedded position. In the following, I will therefore assume that missing expresses a binary relation (in intension) the second argument of which will be represented by a variable (of type e):  

(3) \( M_e(p, x) \)

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2 Cf. Sæbø (1996) for the kind of mechanism involved.

3 Until further notice, all formulae are meant to be terms of Gallin’s (1975, §8) two-sorted type theory; i, j, k etc. stand for variables of type s, referring to points in Logical Space, a.k.a. indices, with i denoting the (default) point of evaluation. In case the argument is a variable, functional application is frequently expressed by subscripts instead of parentheses.
(3) is but a first approximation to the semantic analysis of (1) in that the predicate is represented by a constant \( M \) (of type \( s(e(et)) \)) the interpretation of which still needs to be specified. Given that \( x \) is the object John is missing from according to (1), (3) should imply some kind of incompleteness of \( x \). Which kind depends on the nature of \( x \) and, once more, contextual factors: completeness may relate to features as diverse as proper functioning, accuracy, or even memorability – if \( x \) is, respectively, an appliance, a ceremony, or a party. In general, completeness amounts to having a property alluded to by the speaker and understood by the audience. In the following, these contextual factors will not play a role, so that completeness may be indicated by a mere constant \( C \) (of type \( s(et) \)). Given this caveat, (3) ought to imply:

\[ (4) \quad \neg C_i(x) \]

To be sure, (3) ought to say more than (4). According to (1), whatever Peter may be said to be missing from (\( = x \)) is not only incomplete – it is incomplete without Peter. Hence, in addition to (4), (3) would also have to imply:

\[ (5) \quad \neg I_i(p, x) \]

– where the constant \( I \) (of the same type as \( M \)) expresses the relation of being part of, taking part in, being in, being with – or whatever may be appropriate in the context at hand. Again, the exact nature of this relation will not be my concern here.

(3) is clearly stronger than the conjunction of (4) and (5). After all, Peter cannot be said to be missing from the German government \( x \) just because it happens to have a vacancy (4) and Peter does not happen to be a minister (5). On top of (4) and (5), Peter’s missing from \( x \) means that \( x \)’s completeness requires Peter’s participation, i.e. that \( x \) can only be complete with Peter. This modal fact may be captured by some standard representation of counterfactual reasoning\(^4\). For current purposes, a constant \( > \) of type \( e(s(st)) \) as characterized by postulate (6), comes in handy:

\[ (6) \quad j \triangleright_x \ i \equiv \]

\[ \begin{align*} 
& (C_j(x) \land \forall y[I_i(y, x) \rightarrow I_j(y, x)]) \land \\
& \neg (\exists k < i \exists j)[C_k(x) \land (\forall y[I_i(y, x) \rightarrow I_k(y, x)])] 
\end{align*} \]

According to (6), a point \( j \) is \( \triangleright_x \)-accessible from \( i \) (for given \( x \)) just in case (a) \( x \) is complete at \( j \) without (b) any parts or participants present in \( i \) lacking (i.e., being

\^4\ Cf. Stalnaker (1968); Lewis (1973), etc. The pertinent relation of comparative similarity will be denoted by a constant \(<\) of type \( s(s(st)) \); \( k < i, j \) then reads: ‘\( k \) is more similar to \( i \) than \( j \) is’.
substituted), and (c) otherwise only minimally differs from i. One may thus think of such j as specifying a completion of x relative to i. Given this notation, (3) may be expanded as:

(7) \[-I_i(p, x) & (\forall j \rhd x \ i) I_j(p, x)\]

According to (7), a predication like (1) splits into a contingent and a modal part. This analysis immediately carries over to (2) by existentially generalising the subject:

(8) \[(\exists y)[S_i(y) & I_i(y, x) & (\forall j \rhd x \ i) I_j(y, x)]\]

Arguably, (8) covers a specific reading of (2), which may be used to report the loss of a particular screw. However, (2) also truthfully applies to appliances that never had enough screws to begin with. To capture this unspecific reading, it appears that its screws in place but lacks something else – a nut, say; clearly, (2) is unequivocally wide. One may thus think of straightforward constellations along these lines matches the truth conditions of (2) under any reading:

(9) \[(\lambda P.[\exists y[S_i(y) & I_i(y, x) & (\forall j \rhd x \ i) I_j(y, x)] & & (\forall j \rhd x \ i) P_j(\lambda y. I_j(y, x))])\]

(10) \[(\lambda P.[\exists y[S_i(y) & I_i(y, x) & (\forall j \rhd x \ i) I_j(y, x)] & & (\forall j \rhd x \ i) P_j(\lambda y. I_j(y, x))])\]

(11) \[(\lambda P.[\exists y[S_i(y) & I_i(y, x) & (\forall j \rhd x \ i) I_j(y, x)] & & (\forall j \rhd x \ i) P_j(\lambda y. I_j(y, x))])\]

The formula in (9) embeds the existential quantifier denoted by the indefinite a screw immediately under the modal operator, while dropping the contingent part of missing altogether. (9) is true of an index i and an object x as long as any completion of x relative to i, contains a screw. In particular, (9) comes out true of an x that has all its screws in place but lacks something else – a nut, say; clearly, (2) is unequivocally wide under such circumstances, though. (10) adds the contingent conjunct to (9), closing it off by the existential. Again the result is too weak to be a reading of (2): it is already true (given x and i) if x contains some but not all screws in i. (11) escapes this embarrassment by embedding the quantifier under the negation in the contingent

\(^5\) (7) is in the spirit of Higginbotham’s (1989: 500) formulation: ‘for a thing x to be missing from y is for y not to have x when it ought to have x’. Note that (7) only says that x is not complete without Peter, not that x would be complete with Peter. This is as it should be: (1) may be true (at i) while someone apart from Peter is missing (from x).
part. Now the result is too strong, though; for (11) requires \( x \) to be totally screwless in \( i \).

The situation improves if we confine our attention to (objects \( x \) and) indices \( i \) for which some \( \succ x \)-accessible indices \( j \) exist. Given this non-triviality assumption, (7) turns out to be equivalent to:

\[(12) \quad (\forall j \succ x \; i)[\neg I_i(p, x) \& I_j(p, x)]\]

If we take (12) to be the representation of the truth conditions of (1), it will still give rise to the above specific reading of (2), because the existential generalisation (13) of (12) is equivalent to (8):

\[(13) \quad (\exists y) [S_i(y) \& \neg I_i(y, x) \& (\forall j \succ x \; i) I_j(y, x)]\]

However, (13) allows for a straightforward swap of operator scopes, resulting in a constellation that is not equivalent to any of (9) – (11), viz.:

\[(14) \quad (\forall j \succ x \; i) (\exists y) [S_j(y) \& \neg I_i(y, x) \& I_j(y, x)]\]

According to (14), any completion of \( x \) relative to \( i \) must contain a screw that is not already present at \( i \). In view of the definition (6) of the accessibility relation underlying the modal, this seems to correctly capture the truth conditions of (2) on its unspecific reading. According to the latter, the completeness of \( x \) requires there to be at least one screw that is not already present in \( i \), i.e. a screw on top of the ones (if any) \( x \) has in \( i \). In fact, in \( i \) such a screw does not even have to exist, let alone be a screw, as might be the case if its particular make-up, size or form does not match any existing screws, or if the total number of screws in \( i \) does not suffice to make \( x \) complete.

The above observations suggest that [be] missing is referentially opaque and expresses a modal operator to be combined with a nominal quantifier. The lexical anal-

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\( ^6 \) (11) comes close to Higginbotham’s (ibid.) paraphrase: ‘for an \( F \) to be missing from a thing \( y \) is for \( y \) not to have an \( F \), when it is supposed to have an \( F \).’

\( ^7 \) It may be noted that \( x \)’s completeness boils down to \( i \) itself being \( i \)-accessible. Hence the assumption does not prejudge the issue of whether \( x \) is complete at \( i \).

\( ^8 \) (12) looks more complex than (7) in that it involves a (modal) scope constellation that appears to necessitate explicit quantification over indices. However, applying the techniques developed in Staudacher (1984) and generalized in Zimmermann (1985, 1989), any nesting of bound variables can be made up for by higher-order intensional quantification, resulting in the following version of (12) in Montague’s (1970) *Intensional Logic*: \((\lambda p.(\lambda v.\Box [p \rightarrow [v \land I(p, x)]])).((\succ x) [\neg I(p, x)])\), where \( p \) and \( v \) are variables of type \( st \) and \( t \), respectively, and constants equivocate, using Gallin’s (1975, p. 61).
ysis (15) is a straightforward Montagovian implementation of this idea:

\[(15) \quad \text{[be] missing} = \lambda \mathcal{P}.(\forall j \triangleright_x i) \mathcal{P}_j(\lambda y.[\neg I_i(y, x) \& I_j(y, x)])\]

The unspecific reading (14) of (2) ensues by applying the operator in (15) to the intension of the existential quantifier expressed by the indefinite subject:

\[(16) \quad (\lambda \mathcal{P}.(\forall j \triangleright_x i) \mathcal{P}_j(\lambda y.[\neg I_i(y, x) \& I_j(y, x)])) (\lambda y.\lambda P.(\exists y)[S_j(y) \& P(y)])\]

\[\equiv (14)\]

The specific reading (13) is obtained by raising the existential above the modal operator, using a general scoping mechanism (like quantifier raising):

\[(17) \quad (\lambda P.(\exists y)[S_i(y) \& P(y)]) (\lambda y.(\lambda \mathcal{P}.(\forall j \triangleright_x i) \mathcal{P}_j(\lambda y.[\neg I_i(y, x) \& I_j(y, x)]))(y^*)\]

\[\equiv (8)\]

The same procedure may be applied to other nominal (generalized) quantifiers as in (18), resulting in the respective specific construals (19):

(18)  
\[a. \quad \text{Exactly five screws are missing.}\]
\[b. \quad \text{The screw is missing.}\]
\[c. \quad \text{Every screw is missing.}\]
\[d. \quad \text{Most screws are missing.}\]

(19)  
\[a. \quad (\exists=5 y) \ [S_i(y) \& \neg I_i(y, x) \& (\forall j \triangleright_x i)I_j(y, x)]\]
\[b. \quad (\exists y) \ [(\forall z)[S_i(z) \leftrightarrow z = y] \& \neg I_i(y, x) \& (\forall j \triangleright_x i)I_j(y, x)]\]
\[c. \quad (\forall y) \ [S_i(y) \rightarrow [\neg I_i(y, x) \& (\forall j \triangleright_x i)I_j(y, x)]]\]
\[d. \quad (\exists y : S_i(y))[-I_i(y, x) \& (\forall j \triangleright_x i)I_j(y, x)]\]

(19a) expresses that there are (precisely) five particular screws (in \(i\)) that are not in \(x\) and without which \(x\) is incomplete. This does not exclude that \(x\) lacks more than five screws (or other parts), as long as there are (precisely) five particular screws that \(x\) lacks, as would be the case if (precisely) five screws were lost, but \(x\) had been incomplete even with them. The minimality requirement (6c) on the indices \(j\) that are \(\triangleright_x\)-accessible from \(i\), should then see to it that, at any such \(j\), the lost screws are back in place. To the extent that this is a plausible contextual restriction on the implicit modality, (19a) appears to express a possible (specific) reading of (18a).

(19b) expresses that there is only 1 screw \(y\) (in \(i\)), that \(y\) is not in \(x\) and that \(x\) is incomplete without \(y\). This excludes that \(x\) contains any other screw \(z\) – otherwise

\[^9\text{Adapting the notation of Montague (1973), } y^* \text{ is short for } \lambda j.\lambda P. P(y^*), \text{ i.e. the type-shifted (Montague-lifted) trace } y, \text{ which is needed to form the specific reading. The equivalences in (16) and (17) are easily established by series of } \beta\text{-conversions.}\]
there would be more than one screw in \( i \) (viz. \( y \) and \( z \)). On the other hand, it does not exclude that \( x \) lacks more than one screw. This seems to count against (19b) as a (specific) reading of (18b), as does the very uniqueness condition itself. However, the latter can be mitigated by contextually restricting quantification to salient referents;\(^{10}\) although there may be several screws around, the most salient one is the one that ought to be, but is not, in \( x \). Given this amendment, (18b) may even be appropriate when \( x \) lacks more than one screw – in particular, when \( y \) has been talked about before. Hence, (19b) may well be a (specific) reading of (2). A similar manoeuvre reveals that (19c) is less inappropriate as a possible (specific) reading of (18c) than it would first seem. For if the nominal quantifier is somehow restricted to objects relevant to the discourse, then the fact that all screws in \( i \) would have to belong in \( x \) weighs less heavily against the use of (19c) in a situation \( i \) where, say, \( x \) is screwless although there are more screws in the world (and at index \( i \)) than those particular ones \( x \) is missing. And if the quantifier in (19d) is understood as ranging over the screws \( y \) that belong in \( x \), the sentence again becomes a possible reading of (18d), saying that those \( y \) which, at \( i \), are in their proper place \( x \), constitute a minority. In sum, as readings of the corresponding sentences under (18), the formulae in (19) gain plausibility once the nominal quantifiers are sufficiently contextually restricted. As far as its prediction of the specific readings is concerned, the traditional analysis (15) of \textit{missing} is thus not obviously mistaken.

The situation with the predicted unspecific readings is different. Before turning to them, it ought be noted that all of the sentences under (18) do have unspecific readings to begin with, i.e. readings in which the subject does not take wide scope\(^{11}\).

In fact, any of them can be true under (respective) circumstances \( i \) in which a Swedish furniture assembly kit \( x \) has been delivered incomplete; and under no such \( i \) would any of the specific readings be true. Thus, e.g., if 15 screws are needed according to the construction manual though the package only contains 10, then (18a) would be true. However, (19a) would not – because the manual does not fully determine the identity of the screws and hence allows for various ways of completing the set \( x \). Indeed, this is precisely as the unspecific reading of (18a) according to analysis (15) would have it:

\(^{10}\) Cf. Lewis (1973, p. 111ff.); (1979, p. 348ff.).

\(^{11}\) I am indebted to Cécile Meier (p.c.) for drawing my attention to cases like (18a) and (18c). Unspecific indefinities as in (2) and definite descriptions as in (18b) were already mentioned by Dowty (1985, p. 308), crediting Irene Heim and Emmon Bach, respectively. I should also mention that Frank Richter pointed out to me the natural affinity between the semantics of missing and the Northern European pastime of assembling furniture, referring to (2) as an IKEA sentence – a term he suspects to originate with Erhard Hinrichs.
According to (20a), each completion of the set \( x \) contains precisely 5 screws that are not in \( x \) at the point \( i \) of evaluation (delivery). While this analysis obviously matches the truth conditions of an unspecific construal (18a), the other three alleged unspecific readings under (20) do not. According to (20b), there would only be one screw after completing \( x \) — within or without \( x \). However, (18b) may well be true if the assembly kit \( x \) contained two screws of the wrong size for one particular nut; then even after completing \( x \), there could still be two (or maybe three\(^{12}\)) screws in the set, though only one of them has not been there before (in \( i \), that is) and is now in \( x \) — and (20b) would be false. Similar considerations show that (20c) and (20d) do not quite capture the unspecific readings of (18c) and (18d) either. More adequate accounts emerge if we reshuffle the material, moving part of the quantifiers’ scopes into their restrictors:

According to the construals under (21), any unfitting screws lying around in the set or elsewhere are irrelevant, quantification being restricted to those that end up completing \( x \). No such adjustment is necessary in the cases of (21a) or (14), where restrictor and scope are conjoined anyway; this is why, even without scope change, they are unobjectionable as analyses of the unspecific readings of (18a) and (2), respectively.

The remaining problem, then, is to derive (21) in some systematic way. To achieve this goal, the above analysis would have to be modified. There are four places for doing so, given that the alleged unspecific readings in (20) are the results of combining the pertinent semantic values of their immediate constituents \( (i) \) — i.e. the extension of the predicate \( miss' \) \( (ii) \) and the intensions \( \mathcal{P} \) of the respective subjects \( (iii) \) — by the operation \( \Gamma \) of functional application \( (iv) \):

\[ \Gamma(\text{miss'}, \mathcal{P}) \equiv \text{miss'}(\mathcal{P}) \]

\(^{12}\)The precise number depends on the similarity relation among indices; it may even vary across different completion scenarios. Note that I am assuming that none of the screws could change its size; I am not sure what happens if we include completions in which they could.
So in order to arrive at (21) instead of (20), either (I) the syntactic input would have to be rearranged altogether, or at least one of the three ingredients (ii) – (iv) to the compositional process (22) would have to be revised\textsuperscript{13}. In other words, we would either have to (I) split up (the unspecific readings of) the sentences under (18) into different pieces; or (II) modify the lexical assignment (15); or (III) fiddle around with the (standard generalized quantifier) meanings of the subjects; or (IV) specify an alternative semantic operation combining the meanings of subjects and predicate into (21). Let me briefly, and inconclusively, discuss what it takes to flesh out each option.

On its own, (IV) seems hopeless. As just remarked, an operation \( \Phi \) combining the predicate denotation (15) and the intensions of the subjects in (18) into the corresponding readings (21), would have to replace their restrictors by something more restrictive, i.e. (at each \( j \)) apply the original determiner extension to the intersection of the original restrictor (at \( j \)) with the set of objects in \( x \) (at \( j \)), effectively turning the / every / most screw(s) into the / every / most screw(s) ’in’ \( x \):

\[
(23) \quad \Phi(\text{miss}', \lambda j. \mathcal{D}_j(P_j)) \equiv \text{miss}((\lambda j. \mathcal{D}_j(\lambda y. [P_j(y) \& I_j(y,x)]))
\]

Obviously, (23) cannot be used as (part of) a definition of a general operation \( \Phi \) because it makes the functional value depend on the form (or representation) of one of its arguments. In order to eliminate this potential source of inconsistency, (23) would have to be rewritten in a more general format, thereby generalising the second argument and making the value depend on it – and dissecting it, as it were:

\[
(24) \quad \Phi(\text{miss}', \mathcal{Q}) \equiv \text{miss}'((\lambda j. \mathcal{D}_j \upharpoonright (\lambda y. I_j(y,x))))
\]

In (24) \( \mathcal{Q} \) is a variable of type \( s((et)(et)) \), ranging over intensions of (unary) quantifiers, and \( \upharpoonright \) is supposed to denote an operation of type \( (et)((et)) \) restricting a (unary) quantifier as its left argument by intersecting its ‘domain’ with its second argument – where the domain of a quantifier is the restrictor of the determiner defining it. It is well known that no such general operation \( \upharpoonright \) of restricting unary quantifiers exists\textsuperscript{14}. Hence any attempt of refining (23) along the lines of (24) is bound to fail. Maybe there is another way of getting at a general operation \( \Phi \) satisfying (23). In the absence of a specific proposal, I remain sceptical though and regard option (IV) as a non-starter, unless it is supported by (at least) one of (I)–(III). Analogous remarks

\textsuperscript{13} We are thus facing a Type 2 compositionality problem in the classification of Zimmermann (to appear).

\textsuperscript{14} Vide Heim & Kratzer (1998, p. 178ff.) and the literature cited there. The problem is that unary quantifiers do not uniquely determine the denotations of the determiners (binary quantifiers) defining them – although (given certain assumptions) they do determine their restrictors; cf. Johnsen (1987).
apply to option (II) on its own, which would involve the same tinkering with the verb’s quantifier argument as in (24), as readers may care to verify for themselves.

However, there is a compositional way to arrive at (21) by (II) adapting the verb meaning to a (III) relational reading of the (surface) subject. More specifically, if screw expressed the binary relation (25) holding between a screw and anything it is part of, then by type-shifting the determiner extension as in (26), the subjects of (18) and (2) could be interpreted as parameterized dyadic quantifiers, where $R$ is a variable of type $e(et)$:

\begin{align}
(25) \quad \text{screw}^2 &= \lambda x.\lambda y.\neg S(y) \land I_i(y, x) \\
(26) \quad \text{Det}^2 &= \lambda x.\lambda R.\text{Det'}(\lambda y.R(y, x))
\end{align}

The lexical assignment (15) would then only have to be type-adapted as in (27), where $\mathcal{R}$ ranges over intensions of parameterized dyadic quantifiers, i.e. objects of type $s(e((e(et))t))$:

\begin{align}
(27) \quad [\text{be}] \text{ missing} &= \lambda R.\forall j \triangleright_x i) \mathcal{R}_j(x)(\lambda y.\neg I_i(y, x))
\end{align}

This relational approach is far less ad hoc than it would seem. In particular, the apparent coincidence that the same binary relation (denoted by $I$) happens to be constitutive both for the relational reading (25) of the noun screw and the type-adapted meaning (27) of the predicate, can be explained by reducing it to a contextual possessor variable. As it turns out, this unification process is not uncommon, and sometimes even obligatory, in relational interpretations of unspecific objects\textsuperscript{15}. In effect, a relational interpretation of binary missing as in (28) – which could be obtained by abstracting away from the parameter $x$ in (27) – would get it close to (29):

\begin{align}
(28) \quad \text{The set is missing a screw.} \\
(29) \quad \text{Jones is looking for a friend.}
\end{align}

Still, a full-length reduction of the predicate of (2) to that of (28) would constitute an instance of (IV) and ought to be based on independent syntactic evidence, which may not be easy to come by\textsuperscript{16}.

Simpler and somewhat more simple-minded approaches to the intended readings

\begin{footnotesize}
\begin{itemize}
\item\textsuperscript{15} Cf. Burton (1995, p. 143ff.). Despite this parallel, the unspecific subjects in (18) range far wider than the unspecific objects of opaque verbs like seek, owe, resemble etc., which have been argued to be confined to predicatives; cf. Zimmermann (1993) and van Geenhoven & McNally (2005).
\item\textsuperscript{16} Crediting Richard Larson, Higginbotham (1989, p. 499) argues that the subject of miss as in (2) is V-internal. This by itself does not imply the relational analysis sketched here, but maybe it helps deriving it – I don’t quite see how, though.
\end{itemize}
\end{footnotesize}
(21) concentrate on (III) the subjects in (18). The most obvious way to go about is to restrict the quantifiers in (20) so that the readings come out as equivalent to (21). However, whereas the reasoning in defense of (19) as specific readings of (18), could rely on contextually restricted domains of quantification, the constellations in (20) call for a more principled approach. In order for the readings in (20) to come out as in (21), the quantifiers over individuals would have to be restricted to the objects in $x$ at $j$. Hence, whether a given object $y$ should be included in the domain of quantification depends on the specific completion of $x$ in $j$; and a screw that ends up in one completion, may have to be left out of consideration in another one. In other words the appropriate quantificational domains are index-dependent, which means that the context would have to specify a property rather than just a set of objects. And it seems that this property would have to be that of being in $x$. This is quite a burden for pragmatics to carry, especially since it does not seem possible to override the restrictions needed. In the absence of a general pragmatic derivation of the desired domains, one should therefore explore alternative ways of obtaining the intended interpretations (21).

The approaches sketched so far are all in line with the propositionalist strategy of reducing any kind of intensionality to some form of clausal embedding, in an attempt to do away with non-propositional intensional entities\(^{17}\). However, some recent accounts to intensional constructions rely on naïve, intentionalist quantification as reconstructed in terms of Logical Space\(^{18}\). In the case at hand, this strategy amounts to a widening of the domains of quantification in the wide-scope specific readings (19) to arrive at the unspecific readings in (21), doing away with the narrow-scope readings altogether. More specifically, the noun screw would have to include in its extension (at a given point $i$) both ordinary screws and missing ones. The latter may be constructed from material objects (ordinary screws) and elements of Logical Space (indices), viz. as partial functions assigning the former to the latter. To adequately account for quantification, though, not every such function should qualify as a missing screw (at a given index); together, the functions quantified over must form a suitable cover $C$. For concreteness, we may imagine a situation $i$ in which there are twelve screws, seven of which are in the set $x$; moreover, $x$ ought to have contained ten screws (at $i$), so that at any $j$ that is $\triangleright_x$-accessible from $i$, there are 15 screws

\(^{17}\)The strategy goes back to Quine (1956), where it was used as an intermediate step to explain away intensional entities altogether. See Szabó (2003), Forbes (2006, ch. 4), and Montague (2007) for critical views.

altogether – the twelve original ones plus three completing $x^{19}$. Then whatever $C$
may look like at large, it must contain exactly 15 (possibly partial) functions $f$ such
that $f_k$ is a screw whenever $k$ is identical to or $\triangleright_\tau$-accessible from $i$; moreover, 12
of these $f$ constantly yield the screws in $i$, respectively, and no two $f$ ever deliver the
same screw at any such $k$. Hence $C$ consists of methods for identifying screws, e.g.
by their position, size, form, etc.; but the screws so identified need not be part of the
actual situation $i$. If they are, i.e. if $f_i$ exists, they (or the $f$ identifying them) are in
the ordinary extension of screw (at $i$); if not, i.e. if $f_i$ is undefined but $f_k$ (if defined)
is always a screw, then $f$ itself will end up in the extension of a more inclusive variant
screw$^+$ of screw. If the constant $S$ is adapted accordingly and the individual variables
in (17) and (19) are then taken to range over both ordinary individuals and members
of $C$, they express the corresponding readings in (16) and (20)$^{20}$. Thus the difference
between the specific and the unspecific readings of (2) and (18) comes out as
largely a matter of polysemy and coercion; of course, this is typical of intentionalist
approaches to intensionality.

The elaboration of the delicate details of this approach will have to be left for future
research. However, let me briefly point out that an intentionalist analysis is more
likely to cope with attributive uses of missing, which – in the light of paraphrases like
(31) – suggest an intersective interpretation:

(30)  Two missing screws have been replaced.
(31)  Two screws that were missing, have been replaced.

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$^{19}$ For simplicity, I am thus settling the open issues addressed in fn. 12 by fiat.
$^{20}$ Of course, this requires a three-valued extension of Gallin’s (1975) $Ty_2$ so as to deal with partiality;
   cf. Lepage (1992) and the literature cited there. In particular, $\neg$ must be interpreted as weak negation.
References


