ON PROCESSING

Rob van der Sandt

Dept. of Philosophy
University of Nijmegen

On Denoting 1905–2005

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1905–2005

- 1905: On denoting
- 1950: On referring
- Fin de siècle: On processing

> The truth of the matter ... is that Russell's account is correct, but needs to be supplemented by an account of the conventions relating to the dynamics of discussion or argument ...
>
> Wilfred Sellars (1954)

The Theory of Descriptions: the central tenets

- Both definites and indefinites are quantifying.
- Both are analysed by means of existential quantifiers.
- Truthconditionally definites only differ from indefinites in that they carry a uniqueness condition.

(1) A man walks $\rightsquigarrow$ $\exists x[\text{man} \wedge \text{walk}(x)]$

(2) The man walks $\rightsquigarrow$
$\exists x[\text{man}(x) \wedge [\forall y[\text{man}(x) \rightarrow x = y] \wedge \text{walk}(x)]]$

The theory gets its power from the interaction of three features

- It allows for the analysis of descriptions of arbitrarily complexity;
- it generates scope; and
- allows quantifiers to bind into descriptions.

Principia Mathematica

in modern notation

*14.01 $[(\imath x)(Fx)]G(\imath x)(Fx) =_{\text{def}} \exists y \forall x[(Fx \leftrightarrow x = y) \wedge Gx]$

*14.02 $E!(\imath x)(Fx) =_{\text{def}} \exists y \forall x[Fx \leftrightarrow x = y]$

Scope

- Scope operator: $[(\imath x)(Fx)]\{\ldots\}$
- The description must be eliminated from the entire formula enclosed within these brackets.
-
  - $[(\imath x)(Fx)]\{\neg\, G(\imath x)(Fx)\} \quad \rightsquigarrow$
    $\exists y \forall x[(Fx \leftrightarrow x = y) \wedge \neg Gx]$
    primary occurrence
  - $\neg\,[(\imath x)(Fx)]\{G(\imath x)(Fx)\} \quad \rightsquigarrow$
    $\neg\exists y \forall x[(Fx \leftrightarrow x = y) \wedge Gx]$
    secondary occurrence

Scope . . .

Thus . . . $(\imath x)\phi$ . . . may be rewritten no matter how complex the surrounding material is.

$$\neg \,\mathrm{bald}\, \imath x KF(x)$$

is not part of the language but an underspecified structure which may either be expanded to

- $\exists x[\forall y[\mathrm{KF}(y) \rightarrow y = x] \wedge \neg\, \mathrm{bald}(x)]$

  or to
- $\neg\, \exists x[\forall y[\mathrm{KF}(y) \rightarrow y = x] \wedge \mathrm{bald}(x)]$

Russell's theory of descriptions is a very powerful device. By repeated application of *14.01 and *14.02 we can eliminate all descriptions and thus turn any formula in logically equivalent description free formula.

'Intermediate' scope

(i) The number of planets might have been necessarily even.

Kripke (1977)

- $\Diamond \Box \exists! x\,[\text{number\_planets}(x) \wedge \text{even}(x)]$
  The description is interpreted locally;
  de dicto; (presumably) false
- $\exists! x\,[\text{number\_planets}(x) \wedge \Diamond \Box \text{even}(x)]$
  The description is interpreted globally;
  de re; false
- $\Diamond \exists! x\,[\text{number\_planets}(x) \wedge \Box \text{even}(x)]$
  Intermediate scope; true!

Open descriptions

Descriptive phrases may contain free variables,

$$\text{his mother: } \iota x\, \text{mother}(x, y)$$

which may be bound by external quantifiers:

- Someone had a child and his child was bald.
  $\exists x \exists y\, [C(x, y) \wedge B\, \iota z C(z, y)]$
- If a dog gets angy, his boss gets frightened.
  $\forall x[(Dx \wedge Ax) \rightarrow F\, \iota z B(z, x)]$
- Every man kissed the girl who loved him.
  $\forall x[\text{man}(x) \rightarrow \text{kiss}(x, \iota y[\text{girl}(y) \wedge \text{love}(y, x)])]$

Something missing?

Presuppositionality?

- The king of France is bald.
  $\exists x[\forall y[\mathrm{KF}(y) \rightarrow y = x] \wedge \mathrm{bald}(x)]$
- France has a king and the king of France is bald.
  $\exists x\, \mathrm{KF}(x) \wedge \exists x[\forall y[\mathrm{KF}(y) \rightarrow y = x] \wedge \mathrm{bald}(x)]$

- The logical translations are equivalent;
- they don't seem to convey the same message, though.

Strawson 1950

Russell is fundamentally mistaken: descriptions are referring expressions!

- Russell would be committed to the claim that '. . . anyone who utters the sentence [The King of France is wise] would be jointly *asserting* [my italics] three propositions . . . ' (Strawson (1950:27).
- Russell confuses '(1) using an expression to make unique reference; and (2) asserting that there is one and only one individual which has certain characteristics.' (ibid.:38)

Strawson 1950 . . .

He concludes

- Descriptions are not quantified but referring expressions;
- Truth and falsity apply to statements instead of sentences;
- If there is no unique descriptum the statement has no truth value.

Strawson 1950 . . . . . .

Strawson's critique is misguided and suffers from an unfortunate ambiguity in the notion of statement or assertion.
Strawson's remarks have been interpreted as

1. an attempt to base the semantics of descriptive phrases on notions from speech act theory;
2. anticipating the character/content distinction; or
3. proposing some non standard logic (partial/trivalent).

Strawson 1950 .....

Ad 1

- Russell is not committed to the claim that in uttering 'The king of France' is wise, he asserts both that there is such a unique individual and that he is wise; and
- Sentences may be true or false quite independently of their being 'felicitous', 'appropriate' or 'confusing'.

Strawson 1950 . . . . . .

Ad 2

- Russell's claim: Sentences containing descriptions are truthconditionally equivalent to the quantificational expansion from which the descriptions have been eliminated.
- or in terms of 'content': the content of a statement made (in a particular circumstance) is equivalent to the content of what would (in the same circumstances) be expressed by the expansion from which the descriptions are eliminated.

Searle

> . . . the theory of descriptions fails to conform to any coherent general theory of illocutionary acts.
>
> Searle 1969: 158

This comes down to the claim that a Russellian account cannot be implemented in Searle's version of speech act theory.

Searle

the claims

- 'Reference is a speech act, and speech acts are performed by speaker in uttering words, not by words' (Searle 1969: 28)
- Russell 'presents the propositional act of definite reference [...] as equivalent to the illocutionary act of asserting a uniquely existential proposition [...] Under no condition is a propositional act identical with the illocutionary act of assertion'

But . . .

Russell is not committed to such claims.

- Neither is reference an act;
- nor does he claim that descriptive phrases are referring expressions;
- nor that the speaker 'asserts' the existence of a unique description.

Open descriptions again

Searle recognizes the fact that descriptions can be internally complex and contain other descriptions

- 'John's brother';
- 'the woman who is married to the man who is drunk' (1969: 81)

But what about

- 'his brother' $\rightsquigarrow$ $\iota x\,\mathrm{brother}(x, y)$
- 'the woman who is married to the man who saved her' $\rightsquigarrow$ $\iota x\,[\mathrm{woman}(x) \wedge \mathrm{married}(x, \iota y\,[\mathrm{man}(y) \wedge \mathrm{save},(y, x)]]$

Open descriptions again ...

Such expressions

- either link up to some contextually given antecendent; or
- get bound by an external quantifier.

In neither of these cases can the expression be treated as referring.

- Someone had a child. His child was bald.
- Every man kissed the girl who loved him.

Preliminary conclusions

- Strawson's and Searle's criticisms are unfounded
- Russell's theory can be applied to all descriptions, no matter how complex and no matter in what environments they occur.
- The alternative may have some intuitive appeal with respect to simple sentences like 'The present king of France is bald'; but
- given the phenomenon of e.g. open descriptions is totally unclear how such alternative accounts can be made to work for a wider range of data.

Preliminary conclusions . . .

The account is incomplete

We want to account for the fact that the following are not admissable in the same contexts and don't convey the same message.

- The king of France is bald.
- France has a king and the king of France is bald.

i.e. want to acccount for contextual binding

- France has a king. He is bald.

Dynamic theories

- Dynamic theories: *meaning* as mapping input to output contexts.
- Discourse Representation Theory: a level of representation which may be reconstructed as an underspecified representation of semantic and pragmatic meaning.

Dynamic theories . . .

The latter may improve on Russell

- by capturing the Strawsonion intuitions distinguishing between input and output contexts;
- by generalizing the theory of descriptions to all (or most) constructions that have been labelled 'presupposition inducers'; and
- adding an pragmatically driven resolution mechanism.

Preliminary suggestions

- A (neo-)Russellian account yields the correct outputs;
- such an account may be supplemented by (partly pragmatic) constraints on input contexts;
- the assignment of Russellian scope may also be constrained by mechanisms of a Gricean nature.

The anaphoric account of presupposition

- Presuppositions are anaphoric expressions that search for suitable antecedents.
- If they find an antecedent they will be bound and the descriptive information associated with the presuppositional anaphor will be transferred to its binding site.
- If a presuppositional anaphor cannot be bound, it will be accommodated at the highest possible level of discourse structure

Since definite descriptions are presupposition inducers such an account subsumes the Russellian one.

Implementation in DRT

2-stage interpretation

- the syntactic component builds preliminary DRS from the parse of a sentence
- a resolution algorithm
  - merges this structure with incoming DRS
  - resolves the anaphoric expressions (at some accessible position)

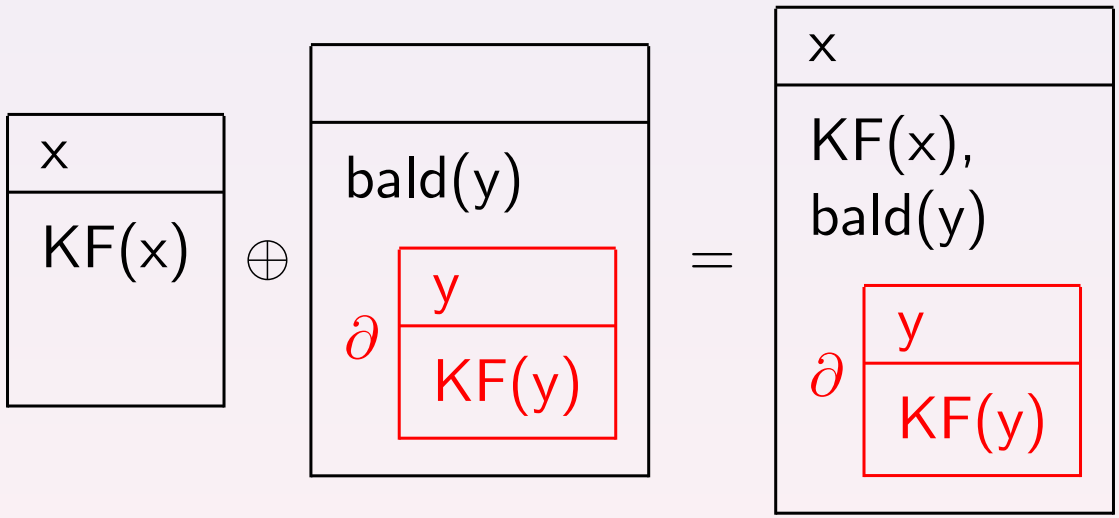
Note:

- Resolution is constrained by accessibility; and
- guided by 'pragmatic' factors.

Descriptions resolved I

binding

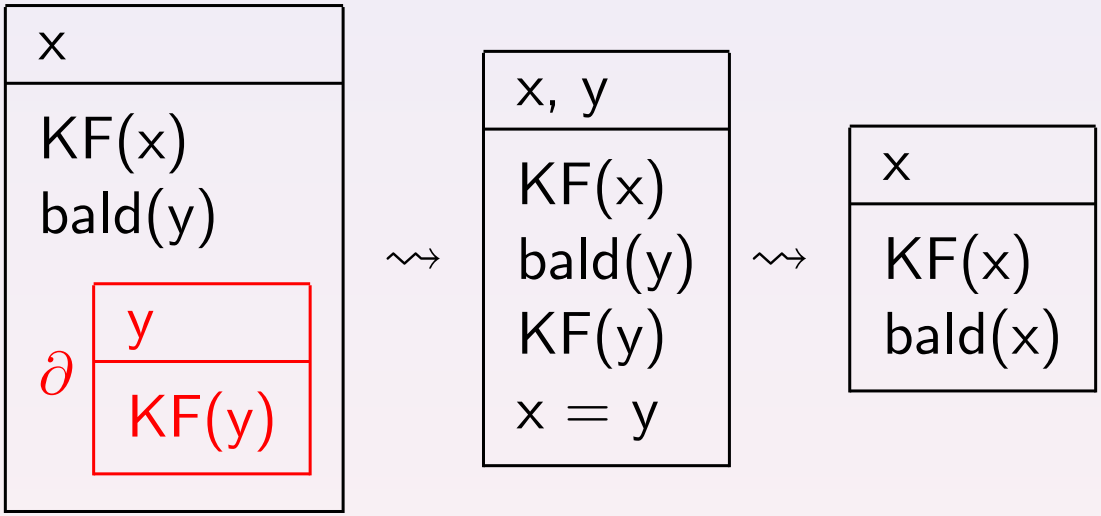
- France has a king. The king of France is bald.



the merge with the incoming context

Descriptions resolved I

binding . . .



resolve; set y to x

The output captures the Russellian truth-conditions

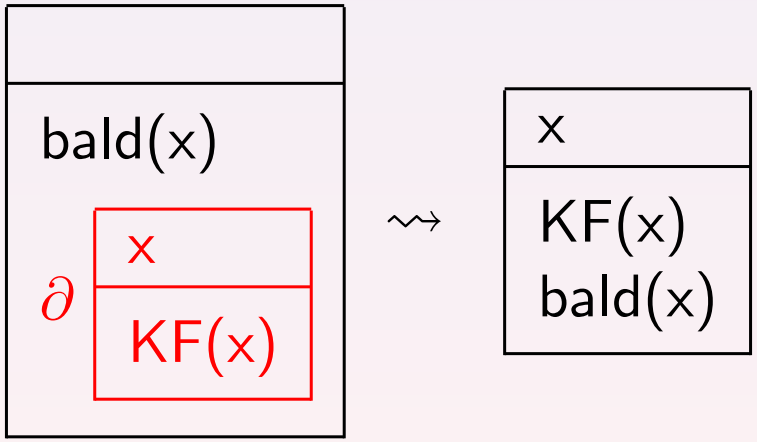
[but for the unicity condition – which could easily be added]

Descriptions resolved II

accommodation

Accommodation restores the context by adding the missing information.

- The King of France is bald.



Descriptions resolved II

accommodation . . .

(i) The king of France is bald.

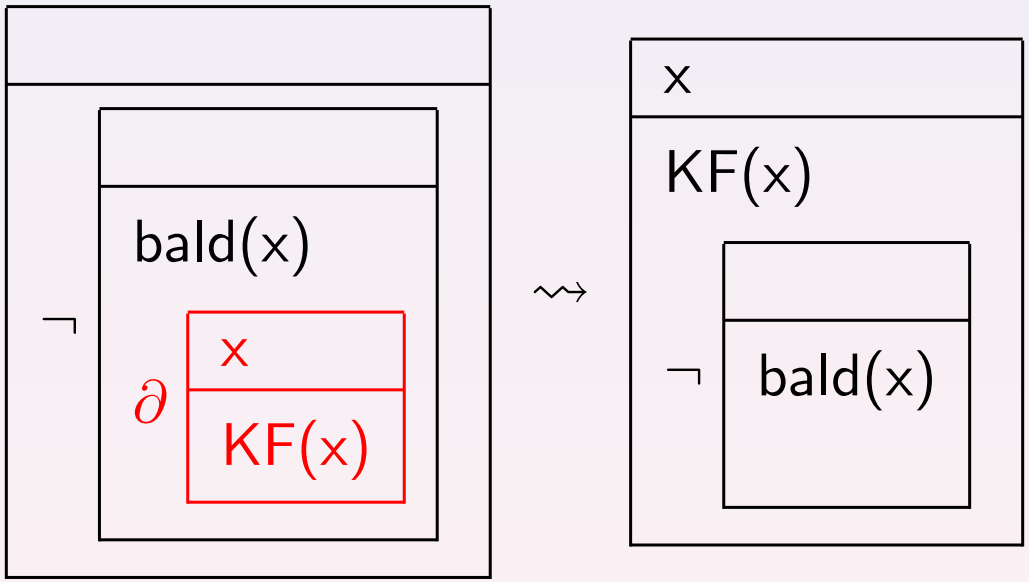
(ii) France has a king and the king of France is bald.

- Binding and accommodation yield the same output context;
- the conditions on the input differ though.
- Processing (ii) requires a context wich does not contain the information that France has a king, but (i) does;
- thus (i) and (ii) differ in dynamic meaning.

Scope

Descriptions are generated *in situ*; projections assigns scope

- The king of France is not bald.

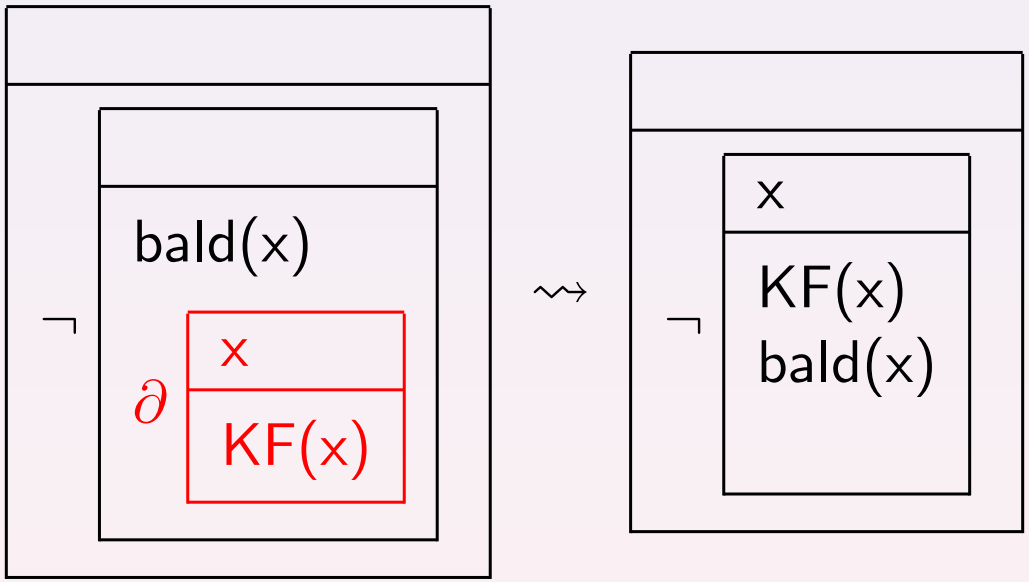


$$\exists x[\mathrm{KF}(x) \wedge \neg \mathrm{bald}(x)]$$

Scope . . .

Descriptions are generated *in situ*; projections assigns scope . . .

- The king of France is not bald.

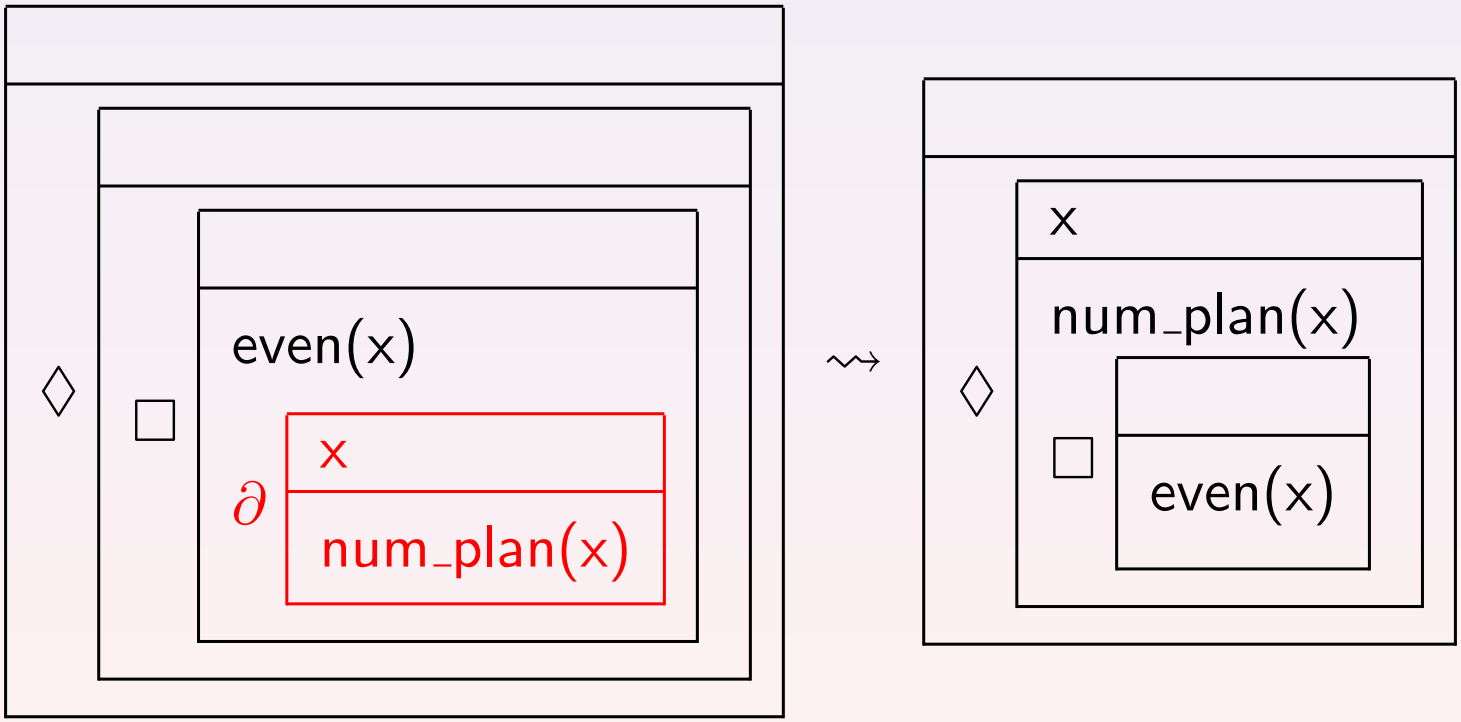


$$\neg\exists x[\mathrm{KF}(x) \wedge \mathrm{bald}(x)]$$

Scope

intermediate

- The number of planets might have been necessarily even.
  $\Diamond \exists x\,[\text{number\_planets}(x) \wedge \Box\,\text{even}(x)]$



Beyond Russell: accessing the restrictor of quantifiers

- In dynamic theories variables occurring in the nuclear scope of a quantified structure may access discourse markers that are introduced in the restrictor.
- This yields an additional position to accommodate definites.

(i) Every German loves his car.

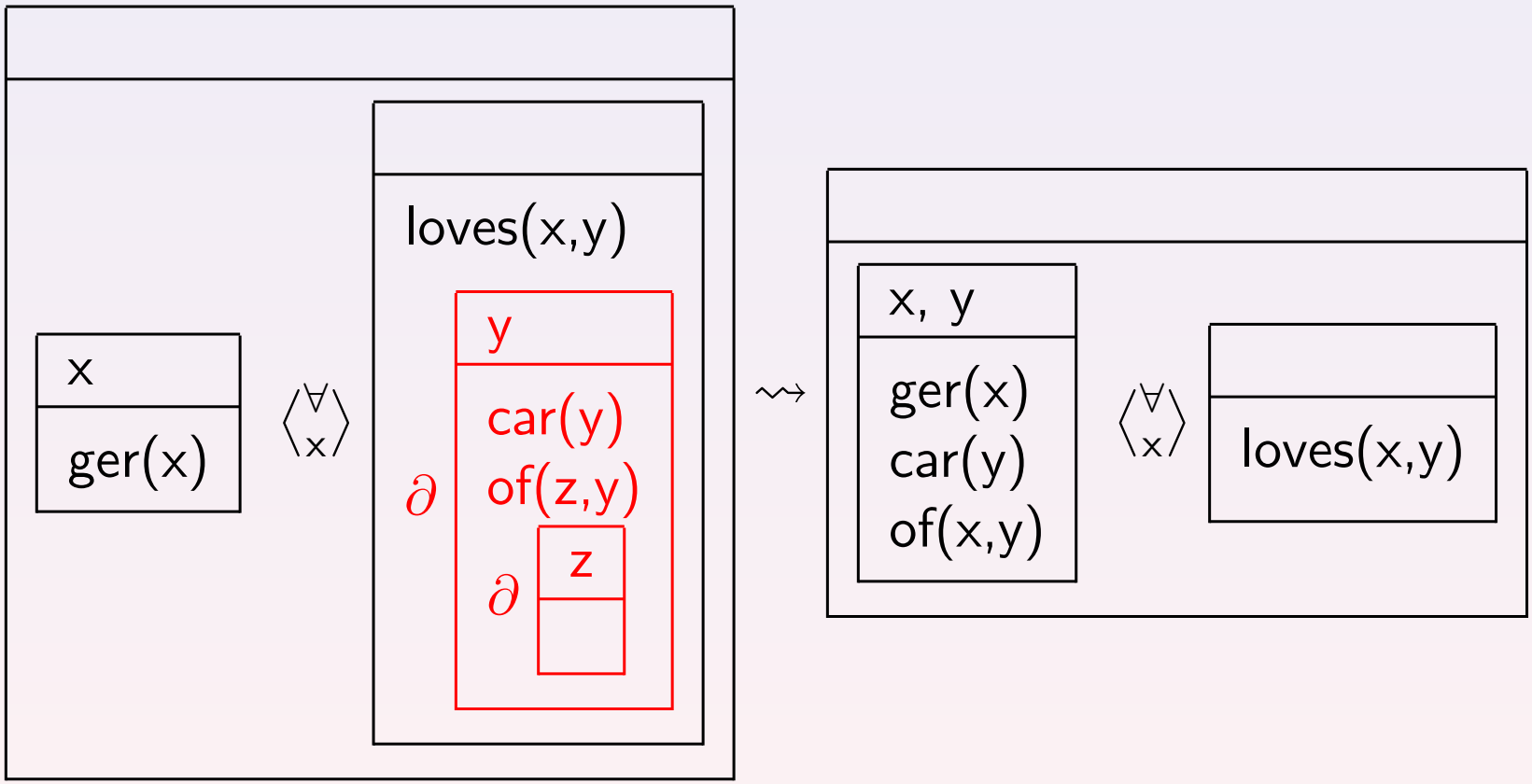
(i′) Every German has a car and loves it. [local]

(i″) Every German who has a car, loves it. [restrictor]

Note that the description cannot take wide scope, since the pronoun *his* is bound by the quantifier.

Beyond Russell: accessing the restrictor of quantifiers

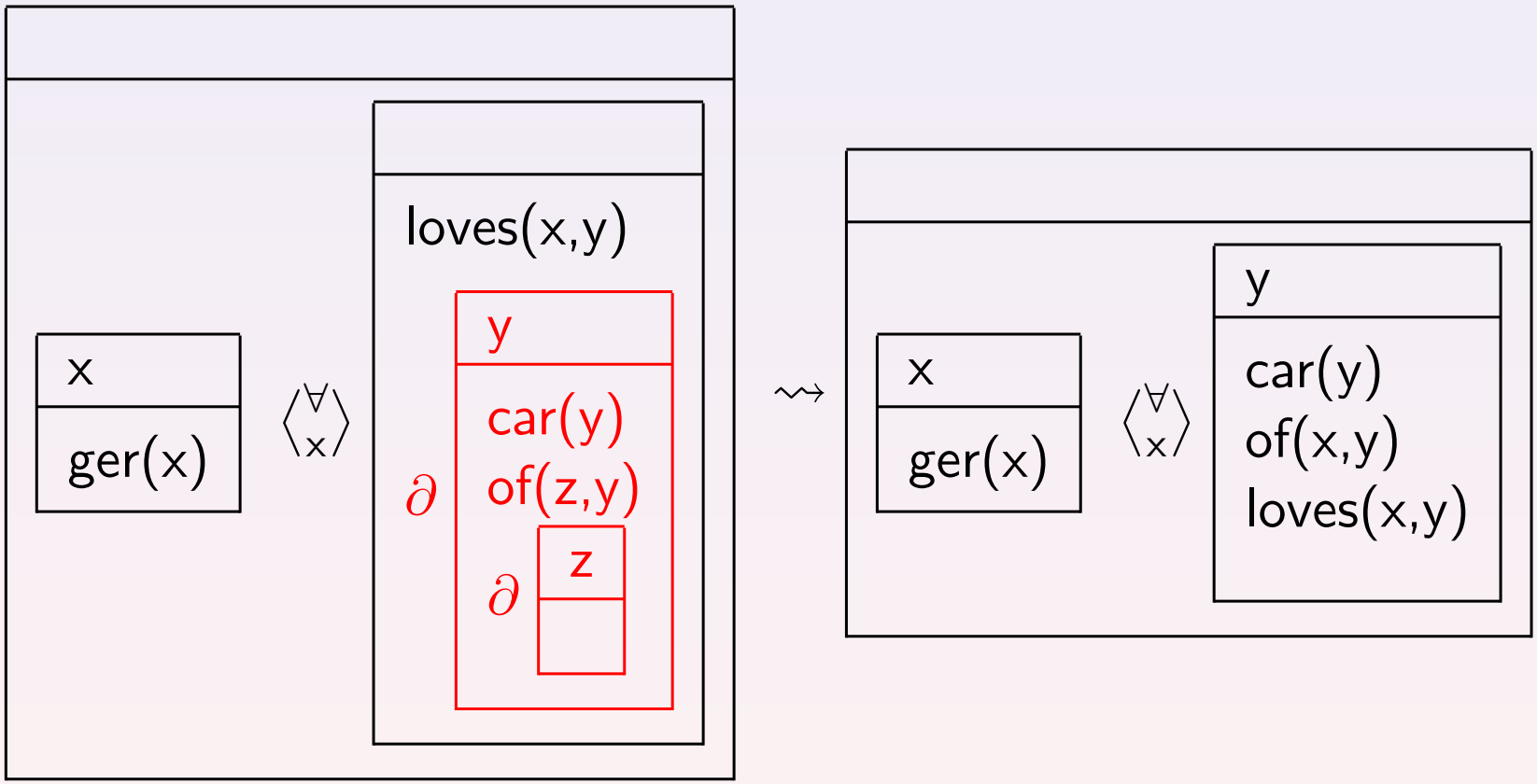
intermediate



set z to x

Beyond Russell: accessing the restrictor of quantifiers

local



set z to x

Beyond Russell: accessing the restrictor of quantifiers

generalized

- The phenomenon is general;
- Anaphoric or backgrounded material which is induced in the nuclear scope of a quantified construction, is intercepted in the restrictor.

Beyond Russell: accessing the restrictor of quantifiers

generalized

Nominal and adverbial quantifiers

(i) Everyone should leave their camera at the reception desk.

(i′) Cats always land on their feet.

Tense

(ii) Floppy will always be happy.

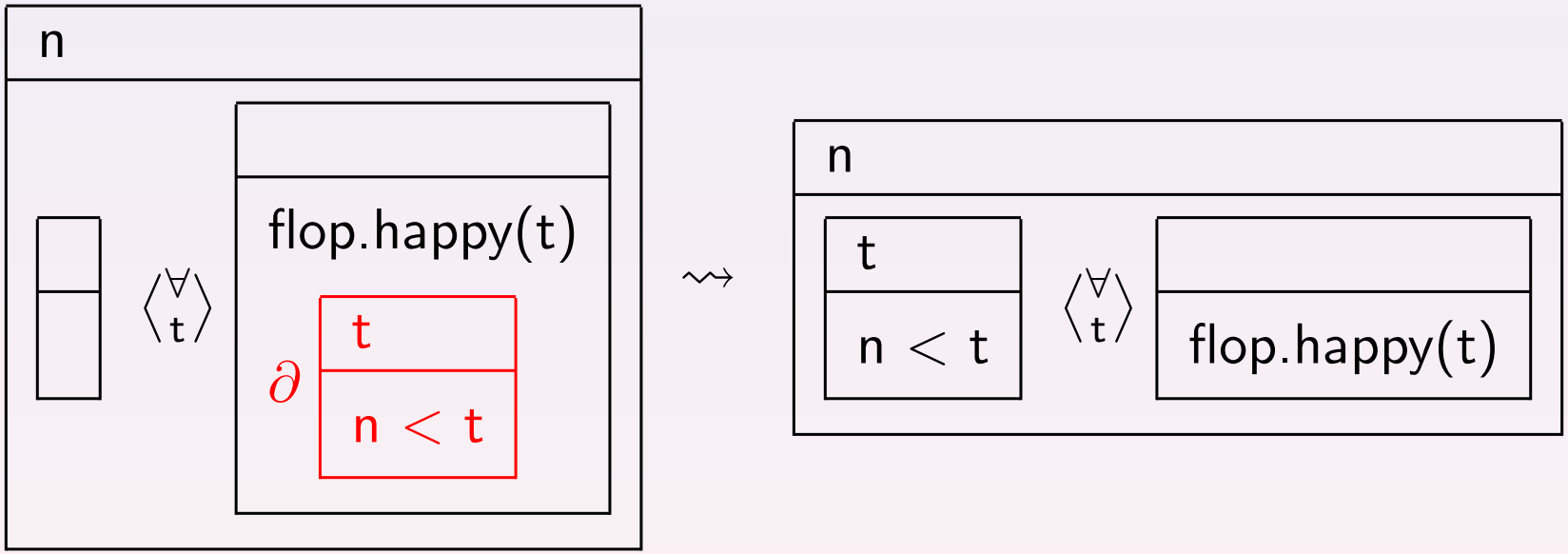
Focal backgrounds

(iii) Most Californians voted for $[\text{Schwarzenegger}]_F$.

Beyond Russell ...

tense

- Floppy will always be happy.



Trapping: The temporal information cannot be accommodated any higher without unbinding the anaphoric variable of the temporal frame

Conclusions

- Russell's theory generates correct static truth conditions and has a much wider range of applications than Strawsonian alternatives.
- Strawson's intuitions were fruitful though his criticism was mistaken.

Conclusions . . .

When implementing an essentially Russellian account in a dynamic and representational framework,

- we may keep the advantages and reinstall Strawson's intuitions;
- improve on Russell's original account by
  - extending the scope of his theory to other presupposition inducers; and
  - allowing additional scope possibilities.

Conclusions . . . . . .

- The Strawsonian intuition that presupposition failure may result in truth-value gaps is respected without violating Russellian feelings.
- The incoming context may conflict with input conditions. In such cases the resolution algorithm does not come to an end and the question of truth or falsity does not even arise.