Contextual theories of truth

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1. The Revenge Liar

Contextual theories of truth are motivated by a powerful version of the liar paradox, sometimes called the *revenge liar*. We start with the following sentence:

(L) L is not true.

L is semantically defective – so it follows that L is not true. But then we've just inferred the liar sentence L - so L says something true, and we're landed back in paradox. Or consider the sentence:

(P) P does not express a true proposition.

We can infer that, on pain of contradiction, P does not express a (true or false) proposition, and so does not express a true proposition. And from this it follows that P is true. The general pattern here is that the assessment of the liar sentence as semantically defective entails the conclusion that the liar sentence is true.

This is a particularly powerful version of the liar paradox because it seems unavoidable. Surely any approach to semantical paradox *must* declare liar sentences defective in some way or other – liar sentences fail to have a truth value or fail to express a proposition, or they're not grounded or not determinately true or not stably true, and so on. But then a liar sentence that ascribes to itself one or other of these semantic defects says something true.

Contextual theories take this revenge paradox to be at the heart of the problem raised by the liar. For many other approaches, the revenge liar is a threat that is waiting in the wings.[1] But for contextual theories, the revenge liar is the appropriate place to begin. In the course of revenge reasoning the liar sentence shifts in semantic status from defective to true. We assess the sentence L as defective, and then as true; we reason that P fails to express a proposition, and go on to reason that it's true. It seems that the reasoning in each case is natural and valid, and the shifts in semantic status are genuine phenomena that call for explanation. For the contextualist about truth, these shifts indicate that truth is *context-dependent* in some way - context plays a crucial role in fixing the semantic status of liar sentences.

In section 2, I set out a revenge discourse. In section 3, I review recent work by philosophers, semanticists and linguists on the kinematics of context-change. In section 4, I show how contextual accounts of the revenge liar can draw on this literature. In sections 5-8, I review the two main kinds of contextualist theories. According to the first, the truth predicate itself is context-sensitive (see, for example, Burge 1979, Koons 1992, and Simmons 1993). According to the second, the context-dependence of the liar sentence is derived from a more general source, the context-dependence of the background domain (see, for example, Parsons 1974, Glanzberg 2001, Barwise and Etchemendy 1984). In sections 5 and 6, I turn to theories of the first kind, and in sections 7 and 8, to theories of the second kind. In section 9, I consider two major challenges to all contextual theories of truth.

(2) A revenge discourse

Contextualists about truth take revenge liar discourses as their principal data. Here is one example of a revenge discourse. Start with:

(R) The sentence written at the third line of Section 2 of this article is not true.

Suppose R is true – then it isn't. Contradiction. Suppose R is false – then it's not true. But that's what R says of itself – so R is true. Contradiction, again. So we reach the conclusion that R is semantically defective. But that is not the end of the matter; our reasoning need not stop here. If we look carefully at ways in which the reasoning can be extended, three distinct phenomena emerge, phenomena that call for explanation. To give them labels, these phenomena are *Repetition, Rehabilitation*, and *Oscillation*.

Repetition. Given that R is defective, we may infer:

(S) The sentence written at the third line of Section 2 of this article is not true.

S is validly inferred from the truth that R is defective – so S is true. This shows that we can *repeat* the words of a liar sentence and thereby produce a truth.

Rehabilitation. We may continue: since R and S say exactly the same thing, and S is true, we may conclude that R is also true. Here we *rehabilitate* the Liar sentence R – we declare R true, because it's true that the sentence written at the 4th line of Section 2 of this article is not true, and that's exactly what R says.

Oscillation. We've now evaluated R as true. But then, given what R says, it follows that R is not true. But if R is not true, then that's what it says, so it's true. And so on. We now *oscillate* between opposing values for R.

The reasoning that generates *Repetition*, *Rehabilitation* and *Oscillation* appears natural and intuitive. In each case, we are led to a surprising or troubling conclusion: that two tokens of the same type with the same linguistic meaning differ in semantical status (repetition); that the semantic status of a single sentence shifts from defective to true (rehabilitation); that one and the same sentence has opposing truth values (oscillation). Contextual accounts seek to provide an adequate explanation of these phenomena while respecting the naturalness and intuitiveness of the reasoning – this valid reasoning is not to be blocked in an artificial way.[2] The three phenomena are to be regarded as significant data which require explanation.

(3) Context and content

We're familiar with the idea that context acts on content, as with indexical terms like 'I' and 'now'. But increasingly it is recognized that the reverse direction holds as well: *content acts on context*. Stalnaker writes:

> "context constrains content in systematic ways. But also, the fact that a certain sentence is uttered, and a certain proposition expressed, may in turn constrain or alter the context. ... There is thus a two-way interaction between contexts of utterance and contents of utterances."[3]

At a given point in a discourse, the context will in part depend on what has been said before. For example, the context may change as new information is added. According to Stalnaker, the connection between context and available information is very tight indeed. Stalnaker writes:

> "I propose to identify a context (at a particular point in a discourse) with the body of information that is presumed, at that point, to be common to the participants in the discourse."[4]

To put it another way, a context is to be represented by the shared presuppositions of the participants - or the 'common ground', to use a phrase from Grice.[5] As new utterances are produced, and new information is made available, the context changes. For a specific example, consider the speech act of assertion: "Any assertion changes the context by becoming an additional presupposition of subsequent conversation."[6]

The shared presuppositions of conversants also figure in David Lewis's account of context-change. Lewis introduces the notion of a *conversational score*.[7] Following Stalnaker, Lewis identifies the set of shared presuppositions of the participants (at a given stage of a conversation) as one component of the conversational score. "Presuppositions can be created or destroyed in the course of a conversation"[8] - and as the set of presuppositions changes, the conversational score changes. Of course, the notion of conversational score is a vivid way of capturing the notion of context. A change in the set of presuppositions is a change of context.

Another component of the conversational score, according to Lewis, is the *standard of precision* that is in force at a given stage of the discourse. Suppose I say 'France is hexagonal'. If you have just said 'Italy is boot-shaped', and got away with it, then my utterance is true enough. The standards of precision are sufficiently relaxed. But if you have just denied that Italy is boot-shaped, and carefully pointed out the differences, then my utterance is far from true enough - the standards of precision are too exacting. The acceptability of what I say here depends on the conversational score, on the context, which in turn depends on what has been said before. The extension of 'hexagonal' shifts with changes of context. Or, for another example, suppose I say 'The pavement is flat' under standards of flatness where the bumps in the pavement are too small to be relevant. Then what I say is true. But if the conversational score changes, and I say 'The pavement is flat' under raised standards of flatness, what I say will no longer be true. But "[t]hat does not alter the fact that it *was* true enough *in its original context*."[9] Like the extension of 'hexagonal', the extension of 'flat' changes with the context.

According to Stalnaker, contexts may be identified with the shared presuppositions of conversants; according to Lewis, the shared presuppositions are a component of the context. From their accounts of context we can extract the idea of tracking context-change by keeping a running record of shifts in the salient information presumed to be available to the participants. A number of semanticists and linguists have also developed this idea. It can be found, for example, in Irene Heim's file change semantics,[10] Grosz and Sidner's dynamic theory of discourse structure[11], and the literature on the distinction between 'given' and 'new' information.[12]

(4) A contextual analysis of revenge

Contextualists about truth, of both types, can draw on this conception of context-change to provide a plausible account of the revenge discourse. For simplicity, I shall illustrate the application of this literature to the revenge liar in terms of the first type of theory, where 'true' is taken to be context-sensitive. But the second type of theory can equally well draw on this account of context and context-change, as we will see.

Let's return to our revenge discourse. There are two initial segments: (1) the production of the revenge sentence R, and (2) the reasoning to the conclusion that R is semantically defective. Turning first to *repetition*, we add two further segments: (3) the inference to the sentence S, and (4) the conclusion that S is true. Consider the transition from the second to the third segment of the discourse. The culmination of the reasoning of the second segment is the proposition that R is semantically defective. This is new, salient information that becomes part of the common ground. So in the transition from the second segment to the third, there is a context change - a shift in the body of information that is presumed to be available. According to Heim's account, for example, I will register this shift by updating the file card that stores information about R: I will now add the entry 'is semantically defective '. Grosz and Sidner's focusing structure distinguishes the salient objects, properties and relations at each point of the discourse - and as we move from the second segment to the third, it will distinguish the defectiveness of R.

Let us say that the new context associated with the third segment is *reflective with respect to R*. In general, a context associated with a given point of a discourse is *reflective with respect to a given expression* if at that point it is part of the common ground that the expression is semantically defective or pathological. So as we move from the second segment to the third, there is a context-change - a shift to a context that is reflective with respect to R. This context-change is an essential ingredient of revenge reasoning. It is the mark of such reasoning that we shift to a context which is reflective with respect to a semantically defective expression.

Thus far, we have seen that content acts on context - newly available information changes the context. But there is a two-way interaction between context and content: context also acts on content. Recall the challenge posed by *repetition*: (R) and (S) are tokens of the same type with the same linguistic meaning, yet one is semantically defective and the other is true. The task is

to explain how the changes in context produce this phenomenon. If context acts on content, we would expect there to be an expression in the discourse that is sensitive to context-change. On the present contextual account, 'true' is that expression. (Looking at the terms that appear in the revenge discourse, it is very hard to see a viable alternative.)

Let c_R be the initial context associated with the first segment in which R is produced. The first use of 'true' is a component of the sentence R, and so occurs in the context c_R. So we represent this first use of 'true' by '$true_{cR}$', so that R is represented by:

(R) The sentence written at the third line of Section 2 of this article is not $true_{cR}$.

This representation does not commit us to the claim that 'true' is context-sensitive - we are only marking the fact that this use of 'true' occurs in context c_R. We will continue to attach the subscript 'c_R' to each subsequent use of 'true' if there is no change of extension. (If context has no effect on the extension of 'true' - if 'true' is a predicate constant - then the continued appearance of the subscript 'c_R' is vacuous and will indicate no more than this: every use of 'true' is coextensive with every other. If, on the other hand, 'true' is context-sensitive, then the subscript c_R will reappear only if subsequent uses of 'true' inherit the extension that the context c_R determined for this first use of 'true'.)

Now R assesses a certain sentence as not $true_{cR}$. Under what conditions is a sentence $true_{cR}$ or not? That's determined by the $truth_{cR}$-schema:

s is $true_{cR}$ iff p

where s is an expression that refers to the sentence p. Now, given the empirical circumstances, R assesses itself. So we apply the $truth_{cR}$-schema to R.[13] Suppose R is $true_{cR}$ (that is, we suppose the left-hand-side of the schema) – then, given the schema, it follows that the sentence written at the second line of Section 2 of this article is not $true_{cR}$ (that is, we infer the right hand side). So we reach a contradiction. Suppose that R is $false_{cR}$ – then the sentence written at the second line of Section 2 of this article is not $true_{cR}$, and, by the $truth_{cR}$-schema, it follows that (R) is $true_{cR}$, and we have a contradiction again. This is the reasoning at the second segment of the revenge discourse: when we assess R by the $truth_{cR}$-schema, we find that it's semantically defective, since it cannot be given $truth_{cR}$ conditions.

Now when we infer that R is not true, and thereby *repeat* R, our use of 'true' in the third segment is again to be represented by '$true_{cR}$' – we infer that R is not $true_{cR}$, since R neither

$true_{cR}$ nor $false_{cR}$, and cannot be evaluated by the $truth_{cR}$-schema. So S is to be represented this way:

(S) The sentence written at the third line of Section 2 of this article is not $true_{cR}$.

In a strict sense, then, S does indeed repeat R - it is composed of the same words with the same meanings *and* the same extensions. But here R is repeated in a context that is *reflective with respect to R* – that is, where it is recognized that R is semantically defective. And R is defective because it cannot be evaluated by its associated schema, namely the c_R-schema.

So at the third segment, the effect of the shift of context is to break the link between R and the $truth_{cR}$-schema.[14] The $truth_{cR}$-schema is abandoned as an evaluating schema for R. And since S is an exact repetition of R, the $truth_{cR}$-schema cannot serve as an evaluating schema for S either. To anticipate the fourth segment, we are able to conclude that S is true just because we have abandoned the $truth_{cR}$-schema.

At the fourth segment we conclude that S is true. This occurrence of 'true' does not inherit its extension from earlier occurrences – unlike the occurrence of 'true' in S. Here we should keep in mind that we've come to a true conclusion through valid reasoning. According to our conclusion, S is true. However, S is not $true_{cR}$ – if we assess S by the $truth_{cR}$-schema, we obtain a contradiction, just as we did with R. But our conclusion is not contradictory – it is true. So here, there is a shift in extension – S is not $true_{cR}$, but S *is* $true_{rR}$, let us say, where the subscript 'r_R' stands for the context associated with the third and fourth segments, a context reflective with respect to R. The occurrences of 'true' represented by '$true_{cR}$' and '$true_{rR}$' have different extensions: S is in the extension of '$true_{rR}$' but not in the extension of '$true_{cR}$'.

What produces this shift in the extension of 'true'? The change in context - specifically, the shift to a context which is reflective with respect to R. At the third stage, the reflective character of the context had the effect of disengaging R from the c_R-schema. Now, at the fourth stage, it has the effect of engaging a new schema - the reflective r_R-schema.[15] When we assess S, and declare that it is true, we assess it in a context where it is part of the common ground that R is pathological. The schema by which we assess S provides an assessment of S in the light of R's pathologicality. Here's what the instance of the r_R-schema looks like:

S is $true_{rR}$ iff the sentence written at the third line of Section 2 of this article is not $true_{cR}$.

Given the information that forms part of the common ground at the third and fourth segments – that R is defective and is not true (that is, not true_{cR}) – the right hand side of the biconditional holds, and so we infer the left-hand side. And that is what is going on in the fourth segment.

In a nutshell, we explain our different assessments of R and S this way: we assess R by the unreflective c_R-schema, and we assess S by the reflective r_R-schema. With the change in context, there is a change in the evaluating schema. There is no intrinsic difference between R and S - the difference lies in the schema by which they are assessed.

The analysis of *Repetition* extends naturally to *Rehabilitation*. On the present contextual analysis, R and S do say exactly the same thing, and so we conclude that R, like S, is true – that is true_{rR}, where R, like S, is assessed by the reflective truth_{rR}-schema. We evaluate R on the basis of its defectiveness – R is defective, and so not true (that is, not true_{cR}), and it says that it's not true_{cR}, and so we evaluate it as true (that is, true_{rR}). Compare Lewis's treatment of 'hexagonal' or 'flat'. Sometimes an utterance of 'France is hexagonal' (or 'The pavement is flat') is true, and sometimes it isn't. The extension of the predicates 'hexagonal' or 'flat' depend on the conversational score, in particular on the standards of assessment that are in force. In an analogous way, whether or not it is true to say that R is true will depend on the standard of assessment: do we apply the unreflective c_R-schema or the reflective r_R-schema?

And now we can also give an account of *oscillation*. The oscillation between opposing values for R is analyzed as the oscillation between the two sides of the reflective truth_{rR}-schema for R:

R is true_{rR} iff the sentence written at the second line of Section 2 of this article is not true_{cR}.

R is true_{rR} just in case R is not true_{cR} – but there is no contradiction. Indeed, (R) is true_{rR} because R is not true_{cR}, and that's what it says.

When we use 'true' in an evaluation of R, the extension of the truth predicate depends on whether or not the given context is reflective with respect to R. We have identified a contextual parameter – the *reflective status* of a context – to which the term 'true' is sensitive. If we do not attend to revenge reasoning, the claim that 'true' is a context-sensitive term may come as a surprise, and *reflective status* will not be an obvious contextual coordinate (unlike the familiar coordinates of speaker, time and place, for example). But on the present contextual line, once we pay careful attention to revenge discourses where we reason past pathology, it seems natural and

intuitive to conclude that 'true' is indeed sensitive to the reflective status of a context. Cresswell wrote:

> "It seems to me impossible to lay down in advance what sort of thing is going to count [as a relevant feature of context] … The moral here seems to be that there is no way of specifying a finite list of contextual coordinates."[16]

Along with Cresswell, Lewis, Stalnaker and others, we should be open to contextual coordinates beyond the familiar ones. If we recognize that content acts on context, that new information or new presuppositions can change the context, then we can identify contextual coordinates that we might otherwise miss. Reflective status is such a coordinate.

(5) Truth and hierarchy

The first type of contextualist theory claims that 'true' is a context-sensitive predicate – in the course of the revenge reasoning, there is a shift in the extension of 'true'. What is the relation between the occurrences of 'true' that we have distinguished as 'true_{cR}' and 'true_{rR}'? According to Burge, these occurrences correspond to distinct levels in a Tarskian hierarchy (Burge 1979). This contextual-hierarchical account is endorsed in Koons 1992.[17] We can think of 'true' as it occurs initially in R as indexed to a certain level represented by the number i.[18] So now we represent the initial occurrence of 'true' as 'true_i', replacing the contextual subscript 'c_R' by the numerical subscript that indicates the level fixed by the context. And when we 'rehabilitate' R, and declare it true, we do so at a higher level than i, say k: (R) is not true_i, but it is true_k, where $k>i$.

According to Burge, the level of a sentence is established in context by certain material principles of interpretation: Justice, Verity, Beauty (or Minimalization).[19] To motivate Justice, consider for example a loop, where Plato and Aristotle each say of the other's utterance at time t that it isn't true. It would be arbitrary to treat these utterances differently – both should count as pathological, and each should be assigned the same level. According to Justice, then, "one should not give one statement truth conditions instead of another without some reason".[20] According to Verity, subscripts on 'true' should be assigned "so as to maximize the interpreter's ability to give a sentence truth conditions by way of a truth schema" (p109). So, for example, if I say "Everything Descartes said that does not concern mechanics is true", then the subscript on 'true' should be high enough to give truth conditions to everything Descartes said that does not

concern mechanics (where the level may be quite unknown to me or an interpreter of my utterance). Descartes might have evaluated utterances that themselves contain the truth predicate; if so, and if Descartes' evaluations are not looped with others, or in some way implicated in paradox, then my utterance will be at a level higher than any of Descartes's utterances, so as to confer truth conditions on Descartes' non-mechanical statements. By Verity, we need only worry about paradox if it is forced upon us - as it is with the sentence R, since R itself satisfies the definite description that occurs in R. While Verity requires the level to be high enough to fit the interpreter's purposes, Beauty requires the level to be the lowest compatible with Justice and Verity. Burge's main motivation for Beauty is that it simplifies his formal account (Burge 1982, p359). The application of these pragmatic principles allows truth to find its own level – the level is not merely a product of the speaker's or hearer's intentions, but also of facts about the context of use and general conventions.[21]

In his formal account, Burge offers three alternative constructions, all of which aim to define the notion of a pathological$_i$ sentence (that is, a sentence that fails to have truth$_i$ conditions). On the first construction – an analogue of Tarski's construction – the pathological$_i$ sentences are all and only those sentences that contain 'true$_k$', for $1 \leq i \leq k$.[22] (To put things the other way around, a sentence has truth$_i$ conditions only if any occurrence of 'true' it contains is of a level lower than i.) And the truth-schema takes a conditional form:

If ⌜φ⌝ is not pathological$_i$, then ⌜φ⌝ is true$_i$ iff φ.

Burge's second construction liberalizes the definition of a pathological$_i$ sentence. This construction accommodates the intuition that if the sentence 'Snow is white' is true$_i$, then the sentence 'Snow is white or a is true$_k$' (where 'a' denotes a sentence) should also count as true$_i$, even where $i \leq k$.[23] In general, on the second construction, any logically valid$_i$ inference from true$_i$ sentences counts as true$_i$. Burge's third construction is still more liberal: it counts as true$_i$ not only logically valid$_i$ inferences from true$_i$ sentences, but also any sentence that says of a true$_i$ sentence that it is true$_i$.[24] Though the second and third constructions are more liberal than the first, at the heart of all three is the application of Tarski's levels-of-language idea to natural language.

Burge goes on to show how his account can handle cases thought by some to be problematic for Tarskian approaches. Here is an example adapted from Kripke[25]. Suppose Dean asserts

(1) All of Nixon's utterances about Watergate are untrue,

while Nixon asserts

(2) Everything Dean says about Watergate is untrue.

This loop poses a problem for an orthodox 'levels' approach, where a statement of a given level can speak only of the truth or falsity of statements of lower levels. It seems that Dean intends (1) to include Nixon's utterance within its scope – and Nixon likewise intends (2) to include Dean's utterance in its scope. But suppose (1) and (2) are assigned the same level – then neither can include the other in its scope. And if (1) is assigned a higher level than (2), then (2) cannot include (1) in its scope; and *vice versa*. But, as Kripke points out (Kripke 1975, p.60), it is perfectly possible for (1) and (2) to have unambiguous truth values. For example, suppose Dean has made at least one true statement about Watergate. Then (2) is untrue. And if everything else that Nixon says about Watergate is untrue as well, then (1) is true. These intuitive assignments require each statement to include the other in its scope.

Burge resolves the case as follows.[26] By Justice, 'true' in (1) and (2) receive the same subscript, say i. By Verity, i is high enough to allow application of the truth_i schema to any utterance of Dean's or Nixon's other than (1) or (2), and, by Beauty, no higher. The level is fixed by the pragmatic principles and the empirical facts – the level need not be known by anyone. On the third construction (Burge's preferred account in Burge 1982), the results are as follows. If Dean made at least one true statement about Watergate (by Verity, this will be a true_i statement), (2) is untrue_i. (This is because the negation of (2) is true_i, since it is a logically valid_i inference from a true_i sentence). And if everything else that Nixon says about Watergate is untrue (that is, untrue_i, by Verity), then (1) is true_i. These are the intuitive assignments. Now the empirical circumstances may instead conspire to make (1) and (2) defective – suppose that all of Dean's utterances about Watergate other than (1), and all of Nixon's other than (2), are all untrue_i. Then (1) and (2) are caught in a loop – each depends on the other for its truth value. Then each is pathological_i – they have no truth_i conditions and so are not true_i. But that's what each says about the other – so both are true_{i+1}. At this higher level of language, where (1) and (2)

are evaluated in the light of their pathology, the statements are evaluated as true. This seems to be the intuitively correct result, and runs parallel to the intuitions associated with the revenge liar.

(6) Truth and singularities

Like Burge's theory, the singularity theory takes 'true' to be a context-sensitive predicate.[27] But while Burge endorses a Tarskian hierarchy for natural language, the singularity theory does not stratify truth into levels. Rather, a particular use of 'true' is minimally restricted, applying globally except for certain 'singularities', where its application breaks down. These singularities of 'true' vary with the context.

The singularity theory is in the spirit of remarks of Gödel's. Gödel notes that Russell's theory brings in a new idea for the solution of the paradoxes:

> It consists in blaming the paradoxes ... on the assumption that every concept gives a meaningful proposition, if asserted for any arbitrary object or objects as arguments.[28]

Gödel goes on to say that the simple theory of types carries through this idea on the basis of a further restrictive principle, by which objects are grouped into mutually exclusive ranges of significance, or types, arranged in a hierarchy. Gödel suggests that we reject this principle, while retaining the idea that not every concept gives a meaningful proposition for any object as argument:

> It is not impossible that the idea of limited ranges of significance could be carried out without the above restrictive principle. It might even turn out that it is possible to assume every concept to be significant everywhere except for certain 'singular points' or 'limiting points', so that the paradoxes would appear as something analogous to dividing by zero. Such a system would be most satisfying in the following respect: our logical intuitions would then remain correct up to certain minor corrections, i.e. they could then be considered to give an essentially correct, only somewhat 'blurred', picture of the real state of affairs.[29]

The singularity theory applies this tantalizing idea to truth, suggesting that a use of 'true' in natural language has singularities determined by the context.

Consider again the Liar sentence R. According to the contextual analysis of Section 4, the occurrence of 'true' in R is represented by 'true_{cR}', and the associated evaluating schema is the truth_{cR}-schema. So we can represent R by the ordered triple $<\text{type}(R),c_R,c_R>$, where the first member of the triple indicates the type of R, the second indicates that the occurrence of 'true' in

R is represented by 'true_{cR}', and third indicates that the associated schema is the truth_{cR}-schema. The repetition S may be represented by <type(R),c_R,r_R>, since type(S)=type(R). The triples for R and S have the same first two members – S is a repetition of R. But R and S have different associated schemas. The schema associated with S is the truth_{rR}-schema, which is reflective with respect to R. The only difference between R and S is the schema by which they are assessed in the course of the revenge reasoning. Call the representation of R by <type(R),c_R,c_R> the *primary representation* of R, because the third member of the triple indicates R's associated schema – R can be assessed by other schemas, but we are primarily interested in the schema by which it is assessed in the revenge reasoning. Similarly, the primary representation of S is <type(R),c_R,r_R>.

The main task of the singularity theory is to identify singularities of a given occurrence of 'true'. We understand by a *sentence* a sentence type in a context. Let the *determination set* of a given sentence σ be the set of those sentences to which σ makes reference. In the case of R, this is the unit set containing just R. The *primary tree* for σ is constructed as follows. At the top is the primary representation of σ. At the second tier are the primary representations of the members of σ's determination set. At the third tier are the primary representations of the members of the determination sets of sentences represented at the second tier. And so on. The primary tree for R looks like this:

<type(R),c_R,c_R>
|
<type(R),c_R,c_R>
|
<type(R),c_R,c_R>
.
.
.

This is a (single-branched) tree with an infinite branch, indicating semantic pathology: R cannot be assessed by its associated schema, the truth_{cR}-schema. In general, if the primary representation <type(σ),c_α,c_β> of a sentence σ repeats on an infinite branch of σ's primary tree, then σ is pathological, and a *singularity* of '$\text{true}_{c\beta}$'. In particular, R is pathological, and a singularity of 'true_{cR}'. According to the singularity theory, if σ is a singularity of '$\text{truth}_{c\beta}$', then

σ is excluded from the extension of '$\text{true}_{c\beta}$'. So R is excluded from the extension of 'true_{cR}'. So R isn't true_{cR}, just as R says. And this explains *Rehabilitation*: once we reflect on R's pathology, and exclude the singularity R from the extension of true_{cR}, we evaluate R as true upon reflection – that is, true_{rR}.

The primary tree for S is:

$$\langle \text{type(R)}, c_R, r_R \rangle$$
$$|$$
$$\langle \text{type(R)}, c_R, c_R \rangle$$
$$|$$
$$\langle \text{type(R)}, c_R, c_R \rangle$$
$$.$$
$$.$$
$$.$$

The primary representation of S does not repeat on this infinite branch, so S is not pathological. Unlike R, S *can* be assessed by its associated schema: S is true_{rR}. This explains *Repetition*.

In the case where Nixon's (1) and Dean's (2) produce pathology, their primary trees – which will have many branches, given the size of the determination sets - will each have an infinite branch which cycles continuously through (1) and (2).[30] These branches indicate that (1) and (2) are pathological, and that (2) is a singularity of 'true' in (1), and (1) is a singularity of (2). Since these singularities must be excluded, (1) and (2) are to be both be reflectively evaluated as true.[31]

A guiding principle of the singularity theory is *Minimality*: restrictions on occurrences of 'true' are kept to a minimum. We are to restrict the application of 'true' only when there is reason to do so. Suppose you say: "'Snow is white' is true". Here your use of 'true' is quite unproblematic. Should R be excluded from its extension? Minimality says no. R *isn't* true_{cR}, and that's what it says - and that's why it's true_{rR}. And for the same reason, R can be counted as true in your neutral context of utterance – we have no reason to tie your innocent utterance to R's pathology. By Minimality, if we can count R as true in a given context of your utterance, then we must so count it. Minimality treats your use of 'true' as reflective with respect to R - though not, of course, as explicitly so.[32] In general, given an occurrence of 'true', we exclude from its

extension only those sentences we have to – its singularities.[33] The Tarskian truth schema is minimally restricted:

For any context α, if ⌜σ⌝ is not a singularity of 'true_α', then ⌜σ⌝ is true_α iff σ.

It can be argued that by adopting Minimality, we respect a basic intuition about predicates: intuitively, we take a predicate to pick out everything with the property that the predicate denotes. According to the singularity account, the scope of 'true' on any occasion of use is as close to global as it can be.[34]

(7) Context and quantifier domains

Both Burge's Tarskian theory and the singularity theory locate the context-sensitivity associated with the liar in the truth predicate – 'true' shifts its extension according to context. Another major contextualist approach locates the context-sensitivity elsewhere, in a more general setting not limited to truth. If I say "There's no beer left", I do not mean there is no beer left in the entire world – I mean there's none left in the refrigerator. Context determines the domain of quantification here. The idea that the context-dependence of truth is derived from the context-dependence of quantifier domains was first suggested by Parsons and developed in a fully rigorous way by Glanzberg.

Parsons suggests that we can accommodate the conclusion of our revenge reasoning, that the liar sentence is true, if we assume that this evaluation "presupposes a more comprehensive scheme of interpretation than the discourse up to that point" (Parsons 1974, p.35). The final evaluation "involves a semantical reflection that could be viewed as involving taking into one's ontology a proposition that had not been admitted before" (*ibid.*). Glanzberg makes these ideas precise in Glanzberg (2001) and Glanzberg (2004).

Glanzberg takes *propositions* to be the bearers of truth, preferring propositions to the two main alternatives, sentence-context pairs and utterances.[35] Sentences are true only in a derivative sense: a sentence is true iff it expresses a true proposition. So we should consider the Liar sentence P, introduced above:

(P) P does not express a true proposition.

This yields a revenge liar in terms of propositions. The reasoning that Glanzberg lays out rests on three natural assumptions.[36] First, a sentence expresses a unique proposition – this is

uncontroversial, since, in deriving the paradoxical conclusion, Glanzberg assumes that context plays no role of any kind (and ambiguity is set aside). Second, truth is an extensional property of propositions (if propositions q and r are identical, then q is true iff r is true). The third assumption connects truth and the expression relation:

(T-Exp) If the sentence ⌜σ⌝ expresses the proposition q, then q is true iff σ.

The revenge liar reasoning runs as follows:[37]

(1) Suppose that the sentence P expresses a proposition p.

(2) Suppose p is true.

Then, (3) P does not express a true proposition (from (2), by T-Exp).

So, (4) p is not true (from 3).

(5) Suppose p is not true.

Then, (6) P expresses a true proposition (by T-Exp).

So, (7) p is true (from 6).

From lines (2)-(7), we have established that p is true iff p is not true, under the assumption at (1). So we have a *reductio* proof that the supposition at (1) is false. That is, we conclude:

(8) P does not express a proposition.

But we need not stop here. It follows from (8) that

(9) P does not express a true proposition.

But this is just P again. (This may be regarded as a propositional version of *Repetition*.) So we have proved P – and so P is true. (This is *Rehabilitation*.) But for a sentence to be true is just for it to express a true proposition. It follows that:

(10) (P) does express a proposition.

(8) and (10) are contradictory, and we are landed in paradox.

Glanzberg focuses on (8) and (9). Both are true, because both are established by sound reasoning. But since (8) is true, there is no proposition expressed by (P). But for (9) – that is, P – to be true, there is a proposition expressed by P. We *proved* that P cannot express a proposition, and then we *proved* that it can. The proofs rest on the three assumptions, but these assumptions seem beyond any suspicion.[38] But how can it be that P at first fails to express a proposition, and then succeeds? Without admitting the context-dependence of the liar sentence, the question seems unanswerable. According to Glanzberg, we are forced to conclude that P

exhibits some context-dependence. Since propositions are the truth bearers, and the truth values of propositions do not vary from context to context, the predicate 'true' will not itself be context-dependent. But things are different with the expression relation: it is perfectly possible for a sentence to express a proposition in one context but not in another. So we have a way of answering the question: in the context of (8), there is no proposition expressed by the liar sentence P, but in the context of (9), there is. There is a shift in the domain of the propositional quantifier. The domain of propositions associated with the context of (8) does not contain a proposition for P to express; the expanded domain associated with the context of (9) does. The challenge now is to show how this expansion fits with standard ideas from linguistics and philosophy of language.

To meet this challenge, Glanzberg makes use of the idea articulated in Section 3 above, that context provides a running record of information available at a given point in a discourse. In particular, Glanzberg draws on the extensive work in the literature on the notions of *salience* and *topic*, in order to make it clear that taking context to include a running list of salient items is well-motivated, and quite independent of the liar.[39] These salient items may be individuals, relations or domains.[40] Glanzberg calls this component of context the *salience structure*.

Consider now the contexts of (8) and (9). The context of (8) involves an assertion of '(P) does not express a proposition'. This is the first point in the proof where there are no undischarged premises (at this point, we complete the *reductio* argument that we started at (1)). So this is the first point in the proof where an unconditional assertion involving the expression relation is produced. Consequently, Glanzberg argues, it is here that the expression relation is accepted as *salient* in the discourse – and there is an expansion of the salience structure to include the expression relation. So between (8) and (9) there is a genuine difference in context.

Glanzberg goes on to show how this expansion of the salience structure can lead to an expansion of the domain of truth conditions, so as to allow the expression of a proposition that could not previously be expressed. Glanzberg begins with the familiar idea that when we express a proposition in a context, we divide the class of possible worlds into the class of those in which the claim is true, and those in which it is not true. Truth conditions are understood as possible worlds, and a proposition is identified with the class of those possible worlds (truth conditions) in which it is true. But now speakers do not, of course, survey an independently

given domain of worlds, and decide which are in the proposition and which are not. Rather, they have to rely on linguistic resources to identify worlds and decide which are in and which are out. So the worlds, or truth conditions, associated with propositions should not go beyond those that can be differentiated by linguistic means. According to Glanzberg, then, the domain of truth conditions (worlds) is constrained by the resources speakers have for expressing propositions. And these resources may shift as the context shifts. So the context dependence associated with the Liar is of an *extraordinary* kind – as Glanzberg puts it, "it is the dependence of the background domain of truth conditions upon context" (2004, p.19). Where we have *ordinary* context dependence, the truth conditions of a sentence can change with a change in context – but there is no shift in the domain of truth conditions itself. But the context dependence exhibited by the liar is not of an ordinary kinhd: the domain of truth conditions *itself* shifts with context.[41]

It remains to be shown that the domain of truth conditions can not only change with a shift in context, but can *expand* with a shift in context. The relevant shift in context is the expansion of the salience structure to accommodate the *expression* relation. Glanzberg points out that if speakers have available semantic predicates such as 'express' or 'true', they can individuate very complicated truth conditions. Using 'true', for example, speakers can accommodate truth conditions associated with sentences of potentially infinite length. Consider, for example, the sentence "Everything the Pope says is true" – this is equivalent to an infinite conjunction of conditionals (of the form 'If the Pope says ⌜s⌝, then s'), and it has truth conditions of enormous complexity. So when the semantic relation of expression is added to the salience structure, it is to be expected that the domain of truth conditions will expand, given that this domain is constrained by the resources that speakers have available in a context.

This is a sketch of a solution to what Glanzberg calls 'the expansion problem', and in Glanzberg (2004), he goes on to provide a formal model of extraordinary context dependence and expansion. The main components are: a formal treatment of salience structures as contexts; the construction of a domain of truth conditions relative to a salience structure; and a proof that as the context changes in the course of the revenge discourse, this domain of truth conditions expands.[42] This provides a formal underpinning for a resolution of the Liar. We were confronted by apparently paradoxical conclusions at (8) and (9): according to (8), the Liar sentence does not express a proposition, but (9) requires that it does. But both (8) and (9) are in fact true: relative

to the initial context, with a smaller domain of truth conditions, there is no proposition for P to express. Relative to the expanded domain of the new context, there is.[43]

(8) Situations and the liar

For Glanzberg and Parsons, the key to a solution to the revenge liar is the context dependence of quantifier domains – versions of *Repetition* and *Rehabilitation* are explained by a contextually determined expansion of the background truth conditions. Barwise and Etchemendy also explain revenge in terms of a contextually determined expansion – but of *situations*, not quantifier domains.[44]

Barwise and Etchemendy employ two main tools, the notion of a situation taken from situation semantics,[45] and Aczel's set theory,[46] which provides a set-theoretical way of modeling circular propositions. A situation is a partial state the world might be in – for example, the situation in which Claire has the ace of hearts. Now suppose I say on some occasion: 'Claire has the ace of hearts'. Following Austin, Barwise and Etchemendy claim that my statement expresses a proposition that involves two components: a *historical situation* (determined by "demonstrative conventions") and a *type* (determined by "descriptive conventions"). Thus all propositions include a contextually determined feature, the situation they are about. And the proposition is true if the demonstrated situation is of the type described. Notice that if I am mistaken, and it's Dana at the table, not Claire, then the proposition is false, since the situation the proposition is about is not of the right type. And the proposition remains false even if Claire has the ace of hearts in a game across town.[47]

Barwise and Etchemendy introduce *states of affairs* (SOAs) as the building blocks of situations. States of affairs are states of the world, and situations are represented set-theoretically as sets of states of affairs. The state of affairs where Claire has the ace of hearts is represented as <H,c,a;1>, where H is the having relation, c is Claire, and a is the ace of hearts. If <H,c,a;1> belongs to a situation s, then Claire has the ace of hearts in the situation s. Conversely, if <H,c,a;0> - the *dual* of <H,c,a;1> - is in s, then Claire doesn't have the ace of hearts in s. The situation in which Claire has the ace of hearts and Max has the jack of clubs is the set of the two states of affairs <H,c,a;1> and <H,m,j;1>.

The *type* of a state of affairs σ is represented by $[\sigma]$. So the type of the state of affairs in which Claire has the ace of hearts is represented by [<H,c,a;1>], which for convenience is written as [H,c,a;1]. The *proposition* that Claire has the ace of clubs has two components: the situation s that is demonstrated (a particular portion of the world), and the type of this situation. The proposition is represented by {s; [H,c,a;1]}. And this proposition is true if s is of the type [H,c,a;1]. Since we are modeling situations as sets of states of affairs, this proposition is true if and only if state of affairs <H,c,a;1> belongs to situation s.[48]

Now consider the liar. For each situation s, there is a liar proposition f_s which claims that its own falsity is a fact of s – where this fact is represented by $<Tr,f_s;0>$. This 'Austinian' liar is represented as $f_s = \{s; [Tr,f_s;0]\}$. Barwise and Etchemendy go on to depict the role the actual world plays in the Austinian framework by introducing the notion of a *model of the world*. Once we have this notion and several other related notions on board, we can prove key results about the liar proposition f_s.

A *partial model* Ψ of the world is a collection of states of affairs satisfying the following three conditions:

(i) No state of affairs and its dual are both in Ψ.

(ii) If the state of affairs <Tr,p;1> is in Ψ, then the proposition p is true.

(iii) If the state of affairs <Tr,p;0> is in Ψ, then the proposition p is false.

A situation s is *actual* in model Ψ if s is a subset of Ψ. A model Ψ is *total* if it is not properly contained in any other partial model.

We can now establish the following theorem:[49]

Theorem Let s be an actual situation in some model. Then the liar proposition f_s about s is false.

Proof: If f_s is true, then $<Tr,f_s;0>$ belongs to s. But s is actual in some model. So by the definition of a model of the world, f_s is false. Contradiction. So f_s is false.

In what follows, we fix a total model Ψ, and treat the notion of *actual situation* as relative to this model. And we need one further notion: a situation s is *F-closed with respect to a class of propositions P* if, for any false p in P, <Tr,p;0> is in s. We can now prove the following proposition:[50]

Proposition Let P be any set of propositions and let s be any actual situation which is F-closed with respect to P. Then the Liar proposition f_s about s is not in P.

Proof: Recall that f_s is {s; [Tr,f_s;0]}, so that f_s is true just in case <Tr,f_s;0> is in s. Suppose towards a contradiction that f_s is in P. Since s is F-closed with respect to P, then <Tr,f_s;0> is in s. So f_s is true. But by the above Theorem, f_s is false. Contradiction; so f_s is not in P.

Given this proposition, we can think of the liar sentence as providing a propositional function, from situations s to propositions f_s, that 'diagonalizes out' of any set P of propositions. When the liar sentence 'This proposition is not true' is used to make a statement about an actual situation s_1, it expresses the false proposition f_{s1}, but the fact that this proposition is false, represented by <Tr,f_{s1};0>, *cannot be in the situation* s_1 (though it is in the fixed model Ψ). If we add this fact to s_1, *then we get a different actual situation* s_2. And the proposition {s_2; [Tr,f_{s1};0]} is true, because <Tr,f_{s1};0> is in s_2. This proposition says, about the expanded situation s_2, that the Liar proposition f_{s1} is false – and this proposition is true. Similarly, the liar proposition f_{s2} about s_2 is also false – but the fact that it's false cannot be in the situation s_2. But if we add this fact to s_2 to obtain s_3, the proposition defined by {s3; [Tr,f_{s2};0]} is true. And so on, ascending a hierarchy of expanding situations.

In this way, a version of *Repetition* is explained. Given a Liar sentence, say,

(λ) The proposition expressed by λ is false,

we can step back and recognize the falsity of (λ), consider that new fact, and say:

(μ) The proposition expressed by λ is false.

If we suppose that the original liar proposition is about a situation s_i, then the proposition expressed by the sentence λ is defined by {s_i; [Tr,f_{si};0]}, and the fact <Tr,f_{si};0> cannot be in s_i. But μ expresses a different proposition, since this proposition is about a different *extended* situation – given by $s_i \cup$ {<Tr,f_{si};0>} – where the fact that the proposition expressed by λ is false is added to s_i. And so the proposition expressed by μ is true. Both λ and μ are of the same type, but they are about different situations. This version of the revenge liar is resolved by a contextually determined shift in what the two sentences are about – the domain of facts expands. Because of this expansion, μ can truly say something that λ cannot.[51]

There are clearly close connections between Barwise and Etchemendy's hierarchy of situations, Glanzberg's expanding quantifier domains, and Burge's hierarchy of indexed truth predicates. Glanzberg examines comparisons and contrasts between his account and Barwise and Etchemendy's situation-theoretic account in Glanzberg (2004). Barwise and Etchemendy note that there are significant points of similarity between their theory and those of Parsons

(1974) and Burge (1979). There are also parallels with Gaifman's pointer semantics (Gaifman 1988 and Gaifman 1992).[52] Similarities and differences between the accounts of Barwise and Etchemendy, Burge, and Gaifman are explored by Koons.[53]

(9) Challenges

There are two major challenges to contextual theories of truth. The first is to show that the contextual approach is well-motivated. It is not obvious that the truth predicate is context-sensitive, or that the liar involves a contextually determined shift in quantifier domains or situations, and so defenders of the contextual approach must meet the charge that the approach is *ad hoc*. The second major challenge is to address the threat of new paradoxes couched in terms of context – what about, for example, the sentence "This sentence is not true in any context"?

Perhaps enough has already been said about the first challenge. We saw that a contextual account of revenge fits easily into a familiar account of context and context-change, according to which we track context-change by keeping a running record of shifts in the salient information presumed to be available. In the course of the revenge reasoning, new salient information emerges - that the liar sentence is defective or pathological - and this produces a new context. Each of the contextual theories has somewhat different things to say about the effect on content of this contextual shift. According to both Burge's account and the singularity theory, the shift triggers the abandonment of the original truth schema and the adoption of a new one. For Glanzberg, the shift is an expansion of the salience structure which leads to an expansion of the domain of truth conditions. According to Barwise and Etchemendy, the new information allows us to step back and express a new proposition about a different extended situation. However these differences among the theories should be adjudicated, the contextual shift itself is well-motivated, drawing as it does on an entrenched account of context and context-change.

Any account of the liar faces the second challenge: there is always the threat of new paradoxes for old. Perhaps the very terms of the solution give rise to new paradoxes. We've seen the challenge posed by the revenge liar: any theory of truth must say that the liar is defective in some way (it's ungrounded, or unstable, or indeterminate, or fails to express a proposition…) – but then a revenge liar that says of itself that it's defective in this way will be true. It is an advantage of contextual theories that they are not undermined by this form of

revenge. The defectiveness of the liar sentence is not an absolute affair: assessment of the liar sentence breaks down in the initial context, but goes forward in the reflective context. In the case of R, for example, R has no truth_{cR} conditions, but is true_{rR}. And this accommodates revenge – indeed, as we noted at the outset, revenge is a major motivation for contextual theories.

But perhaps there are other paradoxes that threaten contextual theories, paradoxes that are tailored to the essentials of each theory. Consider Burge's Tarskian account, according to which any occurrence of 'true' is tied by context to a particular level of language. Then it may seem that a paradox is generated by the sentence 'This sentence is not true at any level'.[54] Burge responds that the attempt here to produce paradox is misguided – it tries, and inevitably fails, to 'de-indexicalize' 'true'. Even in the phrase 'true at some level', there is an implicit index on 'true', so the attempt to quantify out the indexical character of 'true' leads to incongruity (compare 'here at some place').[55]

A related challenge is posed by statements such as "All sentences are true or not" – how can such a global statement be accommodated if a use of 'true' is always tied to a definite level? If we take such a statement to be asserted in a particular context, with a particular index on 'true', then the broader import of the statement is compromised. In response, Burge distinguishes between *indexical* and *schematic* uses of 'true'. A predicate on an occasion of use is *indexical* if its extension depends on the context of use; it is *schematic* if it doesn't have a definite extension on that occasion, but through its use on that occasion provides general systematic constraints on the extension of the predicate on other occasions of use. Burge takes the formal principles of his theory to be stated schematically – and they are to be evaluated as true, where 'true' is being used schematically.[56] Likewise, the global statement above is a schematic generalization. Its formalization is: $(s)(\text{Tr}_i(s) \vee \sim \text{Tr}_i(s))$, where the subscripts stand open, ready to be filled in as the occasions arise. And when we evaluate this schematic statement as true, we are using 'true' schematically.

The singularity theory offers a different response to these challenges, since the theory is not hierarchical and does not stratify the truth predicate. To fix ideas, let L be a fragment of English that contains no semantic terms (and, further, for the sake of simplicity, no context-sensitive terms or vague terms). We obtain the language £ by adding to L the English predicate

'true'. £ is the language that the singularity theory is a theory of. The key claim here is this: the language in which the singularity theory is couched – call it $\mathfrak{I}$ – is *not* a Tarskian metalanguage for £. A full defense of this claim would require a detailed account of the singularity theory, but perhaps the broad outlines can be indicated here. The main job of the singularity theory is to identify singularities of a given occurrence of 'true', and this is done via notions such as *determination set* and *primary tree*. The resources of the singularity theory are relatively meager,[57] and nowhere does the language $\mathfrak{I}$ of the theory contain a predicate coextensive with any occurrence of 'true'. The theory does not provide a 'model' of English.[58] The language $\mathfrak{I}$ is a restricted theoretical language, free of context-sensitive terms, and since its sentences are not identified as singularities, every occurrence of 'true' will have the sentences of $\mathfrak{I}$ in its scope. Since we can regard $\mathfrak{I}$ as a classical formal language, it is subject to Tarski's theorem, and a Tarskian hierarchy can be generated from it. But since none of the theoretical sentences in this hierarchy are identified as singularities of 'true', the scope of the truth predicate of the object language £ arches over not only over $\mathfrak{I}$, but also over the languages of the hierarchy. In this strong sense, £ is expressively richer than $\mathfrak{I}$. $\mathfrak{I}$ is not a metalanguage for £.

But neither is £ a metalanguage for $\mathfrak{I}$. From the context-independent perspective of $\mathfrak{I}$, it seems natural enough to quantify over contexts and form the predicate constant 'sentence of £ true in some context'.[59] Since a given occurrence of the context-sensitive predicate 'true' in £ has singularities that are true in some (reflective or neutral) context, this predicate constant will apply to certain sentences that are beyond the scope of that particular occurrence of 'true'. The extension of this predicate constant neither includes nor is included in the extension of any use of the context-sensitive predicate 'true'. From the point of view of the singularity theory, one might draw this lesson from the liar: there is an essential reciprocity between context-sensitive and context-independent perspectives. Each can do something that the other can't. On a given occasion of use, our ordinary context-sensitive predicate 'true' comprehends *almost* all truths, including the truths of $\mathfrak{I}$ and of any hierarchy generated from it – any use of 'true' is as close to global as it can be. And though there are things that can be said in decontextualized theoretical languages that cannot be said via a given use of 'true', there is no one universal decontextualized language containing a global semantic predicate – one can always diagonalize out of such

languages. We cannot take up both perspectives, context-dependent and context-independent, at once. But everything that can be said can be said from one or other of these perspectives.

Since Glanzberg's theory resolves the liar via an expansion of the quantifier domain, a *universal* domain of quantification cannot be admitted. Glanzberg argues for the general claim that there are no absolutely unrestricted quantifiers. It is an advantage of Glanzberg's approach that this response is independent of special considerations about the liar, and so escapes any charge of adhocness. Glanzberg takes it as truistic that meaning is a matter of interpretation, and that interpretation must provide a domain of quantification. The key question is whether it is possible for a speaker to specify a domain of 'absolutely everything'. Usually domains are specified by using predicates, but what predicate could specify a universal domain? The predicate 'object' might be suggested, but this predicate seems too vague to yield a determinate domain, and does not provide, by itself, a preferred sharpening (even a nominalist will not claim that it's part of the *meaning* of 'object' that objects are concrete). The best hope for a maximally broad conception of object, Glanzberg suggests, is found in logic, via the logical notion of a singular term: an object is whatever a singular term refers to. Glanzberg gives his opponent this logical notion of object, but argues that it is still impossible to specify a domain of absolutely all objects – because of Russell's paradox. Given a specification of a domain, we can quantify over it and form the class term '{x:x=x}'. The class {x:x=x} cannot be in the domain over which x ranges, since if it were, the Russell set $\{x:x \notin x\}$ would be in the domain, by (restricted) comprehension. So we can never specify a domain of absolutely everything – something is always left out. And the argument need not be in terms of classes or sets: a general version of Russell's paradox can be formulated in terms of the notion of *interpretation*.[60] The process of interpretation itself can take us beyond the domain of any interpretation we produce. The logical notion of object is indefinitely extensible.

The claim that that there are no absolutely unrestricted quantifiers is in line with most quantification in natural language. Quantifiers are usually restricted by predicates ("There's no beer in the fridge') or by the context ("Everything was destroyed in the fire"). Moreover, the extensibility of the logical notion of object is a special sort of expansion – the additional objects are artifacts of the process of interpretation, so that this expansion of the background domain has little practical effect on what we say. There are, however, cases where it might seem

counterintuitive to give up on absolutely unrestricted quantification. Consider, for example, a logical truth such as "All objects are self-identical". Glanzberg argues that this logical truth seems to be about absolutely everything because its truth does not depend on what the domain is. Though its quantifier must be interpreted as ranging over some domain, it tells us something beyond this: it tells us, in an ambiguous way, something about any domain it might be interpreted as ranging over. Such statements exhibit *typical ambiguity*: though its meaning is still fixed by its interpretation, with a specified domain, we can recognize that it would hold whatever domain was specified.[61] Logical validities provide one case of typical ambiguity. Global semantic statements provide another: any utterance of 'Every proposition is true or not' comes with a contextually determined domain of truth conditions, but we can see that the statement would hold whatever the background domain. These special cases carry additional force – but that's because they're typically ambiguous, and not because they are genuine cases of unrestricted quantification.

Just as Glanzberg argues that we cannot specify a domain of all objects, or all propositions, so Barwise and Etchemendy claim that no proposition can be about the world as a whole. Though (Austinian) propositions can be about extremely comprehensive situations, the falsity of a liar proposition, though a feature of the world, cannot be a feature of the situation the proposition is about. There is a hidden parameter that the Austinian account of the liar makes explicit: the part of the world that the proposition is about. Now in general the boundaries of the situation a person is referring to may well be unclear. Barwise and Etchemendy argue that this vagueness injects ambiguity into the everyday use of language – it is easy to think that the falsity of the liar proposition is part of the situation that the liar is about (contrast λ and μ above). This can make the liar seem intractable. But once we take proper account of these boundaries, we can draw the lesson of the liar: we cannot make statements about the whole world, about the universe of all facts.[62]

Contextual theories respond to the threat of new paradoxes for old in a variety of ways, reflecting the variation among the contextual theories themselves. These responses lead us to issues that go beyond the immediate scope of the liar. It may be claimed that this is an advantage of contextual approaches. There are no quick revenge liars that compromise contextual theories of truth. Instead we are led to an array of broad and related issues - issues about indexical and

schematic uses of expressions, about the interplay between context-dependent and context-independent perspectives, about our ability to talk about absolutely everything. The hope is that by recognizing the context-dependence of truth, and taking on these broader issues, we can make progress towards a positive resolution of the liar.

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Bibliography

Aczel, Peter (1987). *Lectures on Nonwellfounded Sets*, CSLI Lectures No. 9.

Allerton, D.J. (1978). 'The notion of "givenness"', *Lingua* 44, Amsterdam, North-Holland, pp.133-168.

Antonelli, G. Aldo (1996). 'Review of Keith Simmons, *Universality and the Liar*', *Notre Dame Journal of Formal Logic*, 37:1, pp.152-59.

Austin, John L. (1950). 'Truth', *Proceedings of the Aristotelian Society*, suppl. vol. xxiv (1950). Reprinted in *Philosophical Papers*, J.O. Urmson and G.J. Warnock (eds.), Oxford, Oxford University Press (1961), pp.117-133.

Barwise, Jon (1975). *Admissible Sets and Structures*, Berlin, Springer-Verlag.

Barwise, Jon and Perry, John (1983). *Situations and Attitudes*, MIT Press.

Barwise, Jon and Etchemendy, John (1987). *The Liar*, Oxford University Press.

Beall, JC (2003). *Liars and Heaps*, Oxford University Press.

Beall, JC, and Armour-Garb, B. (eds.) (2005). *Deflationism and Paradox*, Oxford University Press.

Brown, G. and Yule, G. (1983). *Discourse Analysis*, Cambridge University Press.

Burge, Tyler (1979). 'Semantical Paradox', *Journal of Philosophy* 76, pp.169-198; reprinted with a postscript in R. L. Martin (ed.) 1984, pp. 83-117.

Burge, Tyler (1982). 'The Liar Paradox: Tangles and Chains', *Philosophical Studies* 41, pp.353-366.

Büring, D. (1999). 'Topic', in P. Bosch and R.van der Sandt, editors, *Focus: Linguistic, Cognitive, and Computational Perspectives*, Cambridge University Press, Cambridge, 1999, pp.142–165.

Chafe, W. (1976). 'Givenness, contrastiveness, definiteness, subjects, topics, and point of view', in C. Li (ed.), *Subject and Topic*, New York: Academic Press, 1976 pp.25-55.

Clark, H., and Clark, E.V. (1977). *Psychology and Language*, New York: Harcourt, Brace, Jovanovich.

Clark H., and Haviland S. (1977). 'Comprehension and the given-new contract', in R. Freedle (ed.), *Discourse Production and Comprehension*, Hillsdale, N.J.: Lawrence Erlbaum Associates, pp.1-40.

Cresswell, M. (1972). 'The World is Everything That is the Case', *Australasian Journal of Philosophy* 50, pp.1-13.

Field, Hartry (2008). *Saving Truth from Paradox*, Oxford University Press.

Gaifman, Haim (1992). 'Pointers to Truth', *Journal of Philosophy* 1992, pp. 223-261.

Gaifman, Haim (1988). 'Operational Pointer Semantics: Solution to Self-referential Puzzles I', *Proceedings of the Second Conference on Theoretical Aspects of Reasoning about Knowledge*, ed. M. Vardi and Morgan Kaufman, Los Altos, California, pp.43-60.

Gauker, Christopher (2006). 'Against Stepping Back: A Critique of Contextualist Approaches to the Semantic Paradoxes', *Journal of Philosophical Logic* 35, pp.393-422.

Glanzberg, M. (2001). 'The Liar in Context', *Philosophical Studies* 103, pp. 217-251.

Glanzberg, M. (2002). 'Context and Discourse', *Mind and Language*, 17, pp.333–375.

Glanzberg, M. (2004). ' A contextual-hierarchical approach to truth and the liar paradox', *Journal of Philosophical Logic* 33, pp.27-88.

Gödel, Kurt (1944). 'Russell's mathematical logic', in P.A. Schilpp (1944).

Grice, H.P. (1989). *Studies in the Way of Words*, Harvard University Press.

Grim, Patrick, and Mar, Gary (1989). 'On Situations and The World: A Problem for Barwise and Etchemendy', *Analysis* 49, pp.143-148.

Grim, Patrick (1995). 'Review of Keith Simmons, *Universality and the Liar*', *Philosophical Review* 104, pp.467-469.

Groenendijk, J., Janssen, T. and Stokhof M. (eds.) (1984). *Truth, Interpretation, and Information*, Foris, Dordrecht, 1984.

Grosz, B.J. (1977). 'The representation and use of focus in a system for understanding dialogs', *Proceedings of the Fifth International Joint Conference on Artificial Intelligence*, Los Altos, Morgan Kaufmann 1977, pp.67–76. Reprinted in B. J. Grosz, K. Sparck Jones, and B. L.Webber (eds.), *Readings in Natural Language Processing*, Los Altos, Morgan Kaufmann 1986.

Grosz, B. and Sidner C. (1986). 'Attention, intention, and the structure of discourse', *Computational Linguistics* 12, pp.175-204.

Gupta, Anil (1982). 'Truth and Paradox', *Journal of Philosophical Logic* 11, pp.1-60; reprinted in R. L. Martin (ed.) 1984, pp.175-235.

Halliday, M.A.K. (1967). 'Notes on transitivity and theme in English: Part 2', *Journal of Linguistics* 3, pp.199-244.

Halliday, M.A.K and Hasan, R. (1976). *Cohesion in English*, London: Longman.

Hardy, James (1997). 'Three Problems for the Singularity Theory of Truth', *Journal of Philosophical Logic,* vol. 26, no. 5, pp.501-520.

Heim, Irene (1988). *The Semantics of Definite and Indefinite Noun Phrases*, Garland Publishing, New York and London 1988.

Isard, S. (1975). 'Changing the context', in Keenan (1975), pp.287-296.

.

Juhl, C. F. (1997) 'A context-sensitive liar', Analysis 57.3, pp.202-204.

Kamp, Hans (1984). 'A theory of truth and semantic representation', in J. Groenendijk, T. Janssen, and M. Stokhof (eds.) 1984, pp.1–41.

Kamp, H. and Reyle, U. (1993). *From Discourse to Logic*, Kluwer, Dordrecht.

Kamp, H. and van Eijck (1996). 'Representing discourse in context', Chapter 3 of *Handbook of Logic and Language*, Johan van Benthem and Alice ter Meulen (eds.), MIT Press/North-Holland, pp.179-237.

Kaplan, David (1989). *Themes from Kaplan*, Joseph Almog, John Perry, Howard Wettstein (eds.), New York, Oxford University Press.

Karttunen, L. (1976) "Discourse referents" in J. McCawley (ed.) *Syntax and Semantics 7*, New York: Academic Press, pp.363-385.

Keenan, E. (ed.) (1975). *Formal Semantics of Natural Language*, Cambridge University Press.

Kleene, S. C. (1952) *Introduction to Metamathematics*, New York, van Nostrand.

Koons, R.C. (1992). *Paradoxes of Belief and Strategic Rationality*, Cambridge University Press.

Kripke, Saul (1975). 'Outline of a Theory of Truth', *Journal of Philosophy* 72, pp.690-716; reprinted in R. L. Martin (ed.) 1984, pp.53-81.

Lewis, David (1970). 'General Semantics', *Synthese* 22, pp.18-67.

Lewis, David (1979). 'Scorekeeping in a language game', *Journal of Philosophical Logic* 8, pp.339-359; reprinted in Lewis 1983, pp.233-249.

Lewis, David (1980). 'Index, context, and content', in *Philosophy and Grammar*, S. Kanger and S. Ohman (eds.), Dordrecht, Reidel; reprinted in Lewis 1998, pp.21-44.

Lewis, David (1983). *Philosophical Papers*, vol.1, Oxford University Press.

David Lewis (1998). *Papers in Philosophical Logic*, Cambridge University Press.

Martin, Robert L. (ed.) (1984). *Recent Essays on Truth and the Liar Paradox*, Oxford University Press.

McGee, Vann (1991). 'Review of Jon Barwise and John Etchemendy, *The Liar: An essay on truth and circularity*', *Philosophical Review* 100, 472-474.

Muskens, R., van Benthem, J., and Visser, A. (1997). 'Dynamics' in *Handbook of Logic and Language*, J. van Benthem and A. ter Meulen, The MIT Press/North-Holland, pp.587-648.

Parsons, Charles (1974). 'The Liar Paradox', *Journal of Philosophical Logic* 3, pp. 381-412; reprinted with a postscript in Martin 1984, pp. 9-45.

Portner, P., and Yabushita K. (1998). 'The semantics and pragmatics of topic phrases", *Linguistics and Philosophy*, 21, pp.117–157.

Priest, Graham (2005). 'Spiking the Field Artillery' in Beall and Armour-Garb (eds) 2005, pp.41-52.

Prince, E. (1981). 'Toward a Taxonomy of Given-New Information', in *Radical Pragmatics*, Peter Cole (ed.), Academic Press, pp.223-255.

Reinhart, T. (1981). 'Pragmatics and Linguistics: An analysis of sentence topics', *Philosophica* 27, 1981 (1), pp.53-94.

Roberts, C. (1996). 'Information structure in discourse: Towards an integrated formal theory of pragmatics', *Ohio State University Working Papers in Linguistics* 49, pp.91–136.

Russell, Bertrand (1908). 'Mathematical Logic as Based on the Theory of Types', reprinted in *Logic and Knowledge*: *Essays 1901-1950*, edited by R. C. *Marsh*, New York, Putnam, 1971.

Scharp, Kevin (2007). *Replacing Truth*, Inquiry 50 (6), pp.606–621.

Scharp, Kevin (2008). 'Aletheic vengeance', in Beall 2008, pp.272-319.

Schilpp, P.A. (ed.) (1944). *The Philosophy of Bertrand Russell*, La Salle, Open Court, pp.123-153.

Simmons, Keith (1993). *Universality and the Liar: An essay on truth and the diagonal argument*, Cambridge University Press.

Stalnaker, Robert (1975). 'Indicative Conditionals', *Philosophia* 5, 1975, pp.269-286; reprinted in Stalnaker (1999), 63-77.

Stalnaker, Robert (1978). 'Assertion', in P. Cole (ed.), *Syntax and Semantics, vol.9: Pragmatics*, New York, New York University Press, pp.197-213; reprinted in Stalnaker 1999, pp.78-95.

Stalnaker, Robert (1988). 'On the representation of context', *Journal of Logic, Language, and Information* 7, pp.3-19.

Stalnaker, Robert (1999). *Context and Content: Essays on Intentionality in Speech and in Thought*, Oxford University Press.

Stanley, Jason (2000). 'Context and logical form', *Linguistics and Philosophy* 23, pp.391–434.

Vallduvi, E. (1992). *The Informational Component*, Ph.D. dissertation, University of Pennsylvania, 1990. Published by Garland, New York, 1992.

van Kuppevelt, J. (1995). 'Discourse structure, topicality and questioning", *Journal of Linguistics* 31, pp.109–147.

von Fintel, K. (1994). *Restrictions on Quantifier Domains*. Ph.D. dissertation, University of Massachusetts at Amherst.

Williamson, Timothy (2003). 'Everything', *Philosophical Perspectives*, 17 (1), pp.415–465.

Yablo, Stephen (2003). 'New Grounds for Naïve Truth Theory', in Beall 2003, pp.312-30.

Endnotes

[1] For example, Kripke's gap theory of truth (Kripke 1975) must address the challenge generated by 'This sentence is false or gappy'; 'This sentence is not stably true' poses a revenge liar for Gupta's revision theory of truth (Gupta 1982); and Field's paracomplete theory (Field 2008) must deal with sentences such as 'This sentence is not determinately true'. The threat here is that notions such as *gappy*, or *stably true* or *determinately true* are inexpressible in the given theory on pain of paradox-produced contradiction. For critical discussion of Kripke and Gupta, see, for example, Simmons 1993, chapters 3 and 4; and for critical discussion of Field, see, for example, Priest 2005, 44-46, Beall 2005, pp.23-24, Yablo 2003 pp.328-9, and Scharp 2008. Field discusses these issues in Field 2008, pp.309-357.

[2] For example, Scharp replaces the concept of truth (which he regards as inconsistent) by the concepts of *ascending truth* and *descending truth*, and as a result cannot allow the intuitive revenge reasoning to go through (see, for example, Scharp 2007).

[3] Stalnaker 1975, in Stalnaker 1999, p.66. Isard puts it this way: "communications do not merely depend on the context for their interpretation, they change that context" (Isard 1975).

[4] Stalnaker 1988, in Stalnaker 1999, p.98. This is a repeated theme in Stalnaker's writings; for example, on p.6 of his introduction to Stalnaker 1999, he writes: "... a context should be represented by a body of information that is presumed to be available to the participants in the speech situation."

[5] Grice, H.P. (1989). *Studies in the Way of Words*, Harvard University Press.

[6] Appendix to Stalnaker 1975, in Stalnaker 1999, p.77. In a similar vein, Stalnaker writes: "... the essential effect of an assertion is to change the presuppositions of the participants in the conversation by adding the content of what is asserted to what is presupposed." (Stalnaker 1978, in Stalnaker 1999, p.86.)

[7] See Lewis 1979. The analogy is with a baseball score. A baseball score for Lewis is composed of a set of 7 numbers that indicate, for a given stage of the game, how many runs each team has, which half of which innings we're in, and the number of strikes, balls and outs. Notice that correct play depends on the score - what is correct play after two strikes differs from what is correct play after three strikes. Similarly for conversations: the correctness of utterances - their truth, or their acceptability in some other respect - depends on the *conversational* score. Lewis continues: "Not only aspects of acceptability of an uttered sentence may depend on score. So may other semantic properties that play a role in determining aspects of acceptability. For instance, the constituents of an uttered sentence - subsentences, names, predicates, etc - may depend on the score for their intension or extension" (Lewis 1979, p.345).

[8] Lewis 1979, p.339.

[9] *Op. cit.*, p.246.

[10] See Heim 1988. A 'file' contains all the information that has been conveyed up to that point - and the file is continually updated as the discourse moves on. Heim's notion of common ground is more fine-grained than Stalnaker's, since Heim's account is more sensitive to the subsentential structure of sentences.

[11] Grosz and Sidner 1986.

[12] See, for example, Halliday 1967, Halliday and Hasan 1976, Chafe 1976, Clark and Havilland 1977, Clark and Clark 1977, Allerton 1978, Prince 1981, Brown and Yule 1983.

[13] Burge identifies a Gricean pragmatic implicature here. Suppose E is an *evaluating* sentence, a sentence that applies 'true' to some sentence or class of sentences (as in 'Socrates's last utterance was true' or 'Nothing Smith says is true'). And let the *associated truth-schema* for E be the schema in which 'true' is coextensive with the occurrence of 'true' in E. Then Burge claims that there the following pragmatic implicature: the sentence or class of sentences to which E refers or quantifies over is to be evaluated by the associated truth-schema for E. In the particular case of R, R is to be evaluated by the $truth_{cR}$-schema. For a critical discussion of the role of implicature in Burge's theory, see Gaifman 1992, pp.259-60.

[14] Burge puts this in Gricean terms, as the cancellation of an implicature. The implicature or background assumption that R is to be assessed by the $truth_{cR}$-schema is cancelled.

[15] Stanley takes the claim that 'true' is an indexical to be the claim that 'true' is a *narrow* indexical (see Stanley 2000), where the extension of a narrow indexical is supplied entirely by the context of utterance (as with 'I', 'here' and 'now'). This is in contrast with, say, the comparative adjective 'small' – the sentence 'Most species have members that are small' has a reading ('Most species S have members that are small for S') where the extension of 'small' is not determined by the standard made salient by the context of utterance. Stanley goes on to argue that the claim that 'true' is a narrow indexical is put into doubt by the observation that the vast number of cases of unobvious context dependence do not involve narrow indexicality (pp.430-1). One might wonder, given that 'true' presents such a special case, why the unobvious context dependence of 'true' should go the way of other cases of unobvious context dependence. But anyway, the present contextual account of 'true' does not claim that 'true' is a narrow indexical. Not every use of 'true' produced in a context reflective with respect to R is to be represented by '$true_{rR}$' – consider, for example, the use of 'true' in the repetition S. As with 'small', there are uses of 'true' whose extensions are not determined by the standard made salient by the context of utterance.

[16] Cresswell 1972, quoted in Lewis 1980, p.30. One target of Cresswell's remark is Lewis 1970, and Lewis takes Cresswell's criticism to heart in Lewis 1980. In a somewhat similar vein, Kaplan writes: "context *provides* whatever parameters are needed" (Kaplan 1989, p.591), though Kaplan's remark is restricted to expressions that are "directly referential".

[17] In Chapter 6 of Koons 1992, Koons argues that the hierarchical theories of Burge, Barwise and Etchemendy, and Gaifman are special cases of a more general theory, and then, in Chapter 7, applies this theory to doxic paradoxes. For further discussion of Koons, see, for example, Juhl 1997.

[18] In his presentation of the formal theory, Burge explicitly accommodates only finite levels. As he acknowledges in the postscript to Burge 1979, provisions would need to be made for extending the constructions into the transfinite (see Martin 1984, p.115).

[19] This is the ordering that Burge suggests in the postscript to Burge 1979, in Martin 1984, p.115.

[20] Burge, in Martin 1984, p110.

[21] See Burge 1979. In this way, Burge escapes Kripke's criticism of theories (perhaps like that of Parsons 1974) where level is explicitly or implicity assigned in advance by speakers (see Kripke 1975, pp.58-60).

[22] The first construction departs from the Tarskian hierarchy in allowing natural-language sentences that lead to paradox to be well-formed. And sentences that Tarski would count ungrammatical can be given truth conditions at appropriate higher levels.

[23] The intuition here also motivates Kleene's strong tables (see Kleene 1952, sec. 64, pp.332-40).

[24] The intuition behind the third construction is that semantical evaluation should be grounded, in a sense like that of Kripke (Kripke 1975). Intuitively, the evaluation
(E) 'Snow is white' is true
is grounded, because it evaluates a nonsemantical sentence, and the evaluation 'E is true' is also grounded, because it evaluates an evaluation which is grounded, and so on. On Burge's third construction, the $true_i$ sentences will include those sentences that say of $true_i$ sentences that they are $true_i$. Consider for example the $true_1$ sentences. The $true_1$ sentences are obtained as follows: "… take all nonsemantical $true_1$ sentences, add sentences logically derivable from them; add all sentences that say that these sentences are $true_1$ (and that their negations are not $true_1$); then add sentences logically derivable from them; add all sentences that say that these sentences are $true_1$ (and that their negations are not $true_1$); and so on." (Burge 1979, p.104). Then we do the same for '$true_2$', starting with all $true_2$ sentences that are either nonsemantical or contain only '$true_1$'. And so on, through the levels. The third construction departs from Kripke's notion of groundedness in the following respect: evaluations can be grounded (or 'rooted', to use Burge's preferred term) in lower-level semantical evaluations, and need not be traceable back to a nonsemantical sentence. For example, the evaluation that (R) is $true_k$ is grounded (rooted) in the evaluation that (R) is not $true_i$ (where $i \leq k$).

[25] Kripke 1975, pp.59-60.

[26] Burge 1979, pp.110-11, and Burge 1982, pp.360-61.

[27] See Simmons 1993.

[28] Kurt Gödel 1944, in Schilpp 1944, p. 228.

[29] *Op. cit.*, p. 229.

[30] In different empirical circumstances, as we saw, (1) and (2) may receive determinate truth values. In Simmons 1993, these cases are treated in accordance with Kleene's strong tables via a formal account of grounding, and the notion of a pruned tree. Intuitively, the idea is that in cases where definite truth values can be assigned, appropriate pruning removes any infinite branches – so pathology is not indicated.

[31] A full account of this case along singularity lines can be found in Simmons 1993, pp.142-5.

[32] For another example of Minimality at work, suppose Max and Claire say the following:
(M) What Claire is saying is true.
(C): What Claire is saying is not true.
The primary tree for Claire's utterance indicates that C is a singularity of 'true' in C: the triple $\langle type(C), c_C, c_C \rangle$ repeats on an infinite branch. So C is not $true_{c_C}$, which is what C says. So C is true in any context reflective with respect to C. The primary tree for M looks like this:

<type(M), c_M,c_M>
|
<type(C),c_C,c_M>
|
<type(C),c_C,c_C>
.
.
.

Notice that the second member of the triple at the first tier becomes the third member of the triple at the second tier – C is assessed via the schema associated with the occurrence of 'true' in M, since M is evaluating C. Similarly, the second member of the triple at the second tier becomes the third member of the triple at the third tier (since C is evaluating C). The primary representation of M does not repeat on this infinite branch, so M is not pathological – intuitively, M stands above the loop in which C is caught. *In accordance with Minimality, the context c_M is treated as reflective with respect to C.* Since C is true in any context reflective with respect to C, Minimality requires that C is $true_{cM}$ – and so given what M says, M is $true_{cM}$.

[33] Every occurrence of 'true' has singularities. We can produce an 'anaphoric liar' sentence by extending your innocent utterance: "'Snow is white' is true but this very sentence isn't". An anaphoric liar can help us see the anti-hierarchical nature of the singularity account. Suppose we reflect on (R) and declare: "(R) is true". The occurrence of 'true' here occurs in a context reflective with respect to (R) – (R) is not a singularity of this occurrence. But this occurrence of 'true' also has its own singularities – suppose we append "but this very sentence isn't". But by Minimality, this anaphoric liar is not a singularity of the occurrence of 'true' in (R). The two occurrences of 'true' have different singularities. We do not move from a less comprehensive truth predicate to a more comprehensive one. Neither extension includes the other.

[34] For further discussion of the singularity theory, see, for example, Grim (1995), Antonelli (1996), Hardy (1997), Beall (2003), Gauker(2006).

[35] See Glanzberg 2001 p226-7.

[36] See Glanzberg 2004, 33-34; also Glanzberg 2001, 229.

[37] For the sake of simplicity, the applications of the first two assumptions are not made explicit here. See Glanzberg 2004, pp.33-34 for details.

[38] Perhaps the sentential analogue of (T-Exp) can be challenged – but (T-Exp) is in terms of propositions, and it seems much harder to deny.

[39] For the general idea that context is a running record of information, Glanzberg cites Stalnaker 1978 and Lewis 1979. For work on context and salience, Glanzberg cites Karttunen 1976, Heim 1988 and Kamp 1984; for work on the role of topic in context, Büring 1999, Portner and Yabushita 1998, Reinhart 1981, Roberts 1996, Vallduvi 1992, van Kuppevelt 1995, and von Fintel 1994; and for similar ideas applied to natural language processing, the focus spaces of Grosz 1977 and the focusing structures of Grosz and Sidner 1986.

[40] Further linguistic support for this claim is provided in Glanzberg (2002).

[41] This 'extraordinary' context dependence gives rise to some fascinating issues, which are taken up by Glanzberg in 2001, section IV. Here are two (connected) issues. (1) If the domain of truth conditions is constrained by the resources speakers have for expressing propositions, then anti-realism about truth conditions might seem to follow. Glanzberg argues that it doesn't. Just because certain truth conditions may be inaccessible from a given speaker's context, they are in principle accessible to that speaker by a shift up the hierarchy – contexts are fully commensurable. And once a proposition is expressed, there is no reason to think that it does not satisfy bivalence, or cannot be evidence-transcendent, and so on. There is a sense in which truth conditions are constructed by speakers – but that need not force us to be anti-realist about truth conditions any more than we are forced to be anti-realist about buildings, or any other artifacts. (2) It is often thought that content is separable from context – once we settle on the content expressed, we can detach it from the context in which it was expressed. This is not so with extraordinary context dependence, since there are propositions that just cannot be expressed in some contexts.

[42] Glanzberg draws on the theory of admissible sets (in Barwise 1975), and on Moschovakis's work on acceptable structures (Moschovakis 1974).

[43] For further discussion of Glanzberg's theory, see, for example, Gauker 2006.

[44] Barwise and Etchemendy's central notion of a partial situation is drawn from the situation semantics of Barwise and Perry (1983).

[45] For situation semantics, see Barwise and Perry 1983.

[46] See Aczel 1987.

[47] On what Barwise and Etchemendy call a *Russellian* account of propositions, the proposition I express would be true. A Russellian proposition is uniquely determined by the sentence used, so if I say that Claire has the ace of hearts, and she does (albeit across town), then the Russellian proposition I have expressed is true. On the Russellian view, the situation I am talking about is not a feature of my utterance.

[48] Barwise and Etchemendy assume some standard technique for representing distinct objects by distinct sets. Exactly how, for example, [σ] and {s; [H,c,a;1]} are represented as sets will not matter, as long as they are represented differently in a systematic way.

[49] This is Theorem 6, p.132 of Barwise and Etchemendy (1987).

[50] This is Proposition 10, *op. cit.*, p.135.

[51] For further discussion of Barwise and Etchemendy's theory, see, for example, Grim and Mar 1989, McGee 1991, Koons 1992, Glanzberg 2004, Gauker 2006.

[52] Gaifman also starts out from the revenge liar, in the form:
line 1: The sentence on line 1 is not true.
line 2: The sentence on line 1 is not true.
In the familiar way, we find the sentence at line 1 pathological, and so not true – and so we evaluate the sentence at line 2 as true. Gaifman draws this moral: we should assign truth values to tokens, not types, and the two tokens at lines 1 and 2 do not express the same thing. And that's because what these tokens express depends not only on their type, but also on the network of tokens with which each is associated.

The associated networks for the two tokens are different, since the sentence at line 1 is self-referential and the sentence at line 2 is not: these tokens are *pointers* that point in different ways to the sentence at line 1. Pointers are the truth bearers, and Gaifman develops a formal pointer semantics. Intuitively, the sentence at line 2 stands above the self-referential loop in which the sentence at line 1 is caught – so the evaluation of the pointer at line 2 involves a jump to a higher level. In general, pointers can be stratified in a way that reflects a Tarski-like hierarchy. Though Gaifman's theory is a theory about tokens, it isn't really a contextual theory of truth. The difference between the sentences at lines 1 and 2 is explained not in terms of a contextual shift, but rather in terms of the referential networks associated with each of the sentences.

[53] See Koons 1992, Chapter 6.

[54] One might argue: either the sentence is true at some level, say i, or it is not true at any level. If the former, then, given what the sentence says, the sentence is not true at any level, including i – and we reach a contradiction. If the latter, then the sentence is true – and since truth is always tied to a level, it is true at some level. And we have a contradiction again.

[55] See Burge 1979, p.108.

[56] Burge discusses schematic uses of 'true' in Burge (1979), in Martin (1984), pp.115-7, and pp.107-8, and in Burge (1982), p.353.

[57] The singularity theory draws on relatively meager resources. It requires only: (1) the notion of the type of an expression of £, (2) the notion of an utterance's context of utterance, (3) the pragmatic information that a context is reflective with respect to a given expression, and (4) the determination set of a given expression.

[58] A 'Tarskian' account of truth stratifies 'true', providing extensions of 'true' at distinct levels; in Kripke's theory, the minimal fixed point is a model of the object language, providing the extension and anti-extension of 'true'. There is nothing analogous in the language $\mathfrak{I}$ of the singularity theory.

[59] In a sense, this predicate constant of $\mathfrak{I}$ – call it '$\text{true}_{£}$' - can be understood as the truth predicate for £. (But again $\mathfrak{I}$ is not a metalanguage for £: any ordinary use of 'true' is far more comprehensive in many ways than '$\text{true}_{£}$'.) Now we can form a version of the liar: 'This sentence is not $\text{true}_{£}$'. This sentence says of itself that it's not a true sentence of £ in any context. And since this isn't a sentence of £ but a sentence of $\mathfrak{I}$, this is a true sentence of $\mathfrak{I}$, given what it says. This true sentence of $\mathfrak{I}$ won't be identified as a singularity of any given occurrence of the context-sensitive predicate 'true' of £ - so it will be in the extension of that occurrence. So ordinary uses of 'true' will have in their extension sentences of $\mathfrak{I}$ in which '$\text{true}_{£}$' occurs. There is no Tarskian hierarchy here.

[60] See Williamson 2003.

[61] Cf. Russell 1908, reprinted in Marsh 1971, pp.64-9. Relatedly, Parsons considers the following objection to his account in Parsons (1974): if we interpret the quantifiers of Parsons' paper as ranging over some sufficiently large set, we can then produce a discourse to which his analysis of the liar will not apply. In response, Parsons suggests that the generality that his paper has, transcending any particular set as the range of the quantifiers, "must lie in a sort of systematic ambiguity, in that indefinitely many such sets will so" (Parsons 1974, fn.13, p.28). The notion of typical ambiguity is also related to Burge's claim that there are schematic uses of 'true'.

[62] See Barwise and Etchemendy 1987, Chapter 13.