Vagueness & Pragmatics

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Logical equivalent sentences need not be equiassertable

It may be the case that (1) is not assertable but that (2) is, although they seem to be logically equivalent:

(1) Louis is bald or Louis is not bald.

(2) It is not the case that Louis is bald and that he is not bald.

We want to find a pragmatic explanation why this is the case.
Semantics: Logical equivalent sentences are not equi-assertable. So we would have to leave classical logic. Keep classical logic and work on pragmatic side:

(3) Katie had several drinks and drove home.

is assertable if: Katie had several alcoholic drinks and drove home shortly afterwards.

The need for a pragmatic explanation of assertability

There may be situations in which a sentence is true without being assertable.
A notion of different contents of a sentence

(4) Katie had several drinks and drove home.

Assertable iff sentence and implicatures are true and speakers believes in truth.

The content of a sentence

For a sentence $S$ we define its

- semantic content $T(S)$ as the set of all situations in which $S$ is true
- objective pragmatic content $O(S)$ as the set of all situations in which $S$ is assertable
- subjective pragmatic content $A(S, x)$ as the set of all situations in which $x$ is convinced that everything needed for $S$ to be assertable is true
Grice suggested: the objective pragmatic content is the set of all situations where the sentence is true and all implicatures are satisfied. This implies that $O(S)$ is always a subset of $T(S)$ for any sentence $S$.

(5) If Katie had several drinks and drove home, then she broke the law.

- Sentence (5) is always assertable
- Sentence (5) is false if Katie drove home first, drank at home and did not break the law in any way

Hence $T(5)$ is a subset of $O(5)$, which is just the other way round as Grice wanted it to be.
The former observations suggest that the objective pragmatic content of a sentence is tied more closely to the objective pragmatic content of its components than to its semantic content:

**COP: Compositionality of Objective Pragmatic Content**

The objective pragmatic content of a compound sentence is a function of the objective pragmatic contents of its constituents, with the function given by the operator or connective used to form the compound.
The objective pragmatic content tells us when we can assert sentences. When we want to assert a sentence like ‘a is $F$’ where $F$ is a vague predicate, a has to be determinately $F$. The objective pragmatic content and □ coincide for the supervaluationistic theory.

(6) Louis is bald or he is not bald.
    □(Louis is bald) or □(Louis is not bald)

(7) It is not the case that Louis is bald and that he is not bald.
It is not the case that □(Louis is bald) and that □(Louis is not bald)
Does this also work for the subjective pragmatic content?

(8) Either X will be the next prime minister or Y will be the next prime minister.

If we use a similar hypothesis as COP for the subjective pragmatic content, a person can assert (8) only if she also would assert to one of its two disjuncts. But we clearly do not want this. So a similar ansatz cannot work in this case. Note however that this does not say anything negative about COP.
Application of COP to Quantifiers

(9) $Q$ Fs are $Gs$

$[Qx : Fx]Gx$

delivers:

(10) $[Qx : \Box Fx](\Box Gx)$
Let $P(n)$ mean ‘a man with exactly $n$ cent is poor’ and $N(n)$ that $n$ is a natural number. Suppose that $P(0)$ is true. Since the induction step $\forall n \; N(n)(P(n) \rightarrow P(n + 1))$ is false, its negation $\exists n \; N(n)(P(n) \land \neg P(n + 1))$ has to be true. But is it also assertable?

(11) \[ \exists n \; \square N(n) \; \square B(n) \]
is false, but its negation

(12) \[ \neg (\exists n \; \square N(n) (\square B(n))) \]
is true, hence we can assert ‘No number is the poor borderline’.
• We may assent to disjunctions although none of its disjuncts is determinately true:

(13) That is red or orange.

• We may assent to contradictions (if Louis is a penumbral case of baldness):

(14) It is not the case that Louis is bald, but nor is it the case that he is not bald.

Our current version of COP is not able to explain this.
A first change to COP

We need to do some alterations to COP to adjust it to the application to vague predicates:

**POP\textsubscript{V}: Pragmatic determination of Objective Pragmatic content**

Let $S$ be a sentence that has no differences between its semantic and objective pragmatic contents other than those caused by vagueness. Then there is a sentence $S'$ generated by adding $\Box$ operators to $S$ so that every term in it apart from sentential connectives is inside the scope of a $\Box$ operator and $O(S) = T(S')$. Which such sentence $S'$ satisfies this condition on an occasion where $S$ is used is determined by pragmatic features of utterance and occasion.
Suppose Louis is a borderline case of baldness.

- Louis is bald or Louis is not bald.
  - □(Louis is bald or Louis is not bald)
  - □(Louis is bald) or □(Louis is not bald)

- It is not the case that Louis is bald and that he is not bald.
  - □(It is not the case that Louis is bald and that he is not bald)
  - It is not the case that □(Louis is bald and he is not bald)
  - It is not the case that □(Louis is bald) and that □(he is not bald)
(11) It is not the case that Louis is bald, but nor is it the case that he is not bald.

may have (according to POP) one of the following as its objective pragmatic content:

- \( \neg \square Bl \land \neg \square \neg Bl \)
- \( \square \neg Bl \land \neg \square \neg Bl \)
- \( \neg \square Bl \land \square \neg \neg Bl \)
- \( \square (\neg Bl \land \neg \neg Bl) \)

If the context chooses the first interpretation, the sentence is assertable.
We need a theory as general as COP but keeping advantages of POP\textsubscript{V}:

**POP: Pragmatic Determination of Objective Pragmatic Content**

The objective pragmatic content of a compound sentence is a function of the objective pragmatic contents of its sub-sentences that are treated as simple, with the function given by the operator or connective used to form the compound. The choice of which sub-sentences are treated as simple is determined by the syntactic features of the sentence and the context. The objective pragmatic content of sentences treated as simple is determined by a direct application of broadly Gricean rules.

For a simple sentence to be assertable we want it –following Gricean maxims– to be determinately true.
The choice of which sub-sentences are treated as simple is determined by the syntactic features of the sentence [...].

(15) If Katie had several drinks and she drove home, then she broke the law.

(16) If, last night, Katie had several drinks and she drove home, then she broke the law.

(17) If Katie had several drinks last night and she drove home last night, then she broke the law.

In (16) the time reference is added to the conjunction as a whole, in (17) it is added to each of the conjuncts. They stop sharing an unuttered constituent, there is less temptation to treat the conjunction as a simple sentence. Now, its objective pragmatic content is just the conjunction of the objective pragmatic contents of its conjuncts, we lose the information about the temporal order of the events.
Intuitionistic Logic may explain why we

- accept the Law of Non-Contradiction
  "It is not the case that Louis is bald and that he is not bald."
- and disject the Law of Excluded Middle
  "Louis is bald or Louis is not bald."

but it cannot explain why we assent to contradictions as

It is not the case that Louis is bald, but nor is it the case that he is not bald.

Note however that intuitionistic logic is combinable with POP.
Utterances are assertable if they have a high truth-value.

- may explain why instance of the Law of Excluded Middle may not be assertable.
- cannot explain why instances of the Law of Non-Contradiction are assertable.

In fact:

- “He is bald and he is not bald.” may have a truth-value of 0.5.
- “It is not the case that he is bald and he is not bald.” then also only has a truth-value of 0.5 although being perfectly assertable.
Different possibilities to state the induction step (in decreasing persuasive force).

(18) It is not the case that $P(n)$ and not $P(n + 1)$.

(19) If $P(n)$ then $P(n + 1)$.

(20) Either it is not the case that $P(n)$ or $P(n + 1)$.

POP tells us that (18) may be even assertable when $n$ is a borderline case of poorness. But this does not hold for (20). It is hard to find any theory using classical logic accounting for these differences.
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What do we mean by “pragmatic slack”? 

Consider the truth conditions of this sentence:
John to Peter: “Mary arrived at three o’clock.”

People speak with varying degrees of precision. For most practical purposes, it suffices to be “close enough” to the truth.
If (21) is literally true only if Mary arrived precisely at 3:00, then it seems truth-conditionally equivalent to (22).

(21) Mary arrived at three o’clock.

(22) Mary arrived at exactly three o’clock.

But of course they do not mean the same thing.

**Suggestion**

(21) allows greater “slack” than (22) in determining just how close to the truth is close enough for practical purposes.

Thus, particular words, such as exactly, seem to be able to influence the amount of slack associated with the sentence.
(23) The townspeople are asleep.

It seems that (23) involves a near-universal quantification, so that this paraphrase seems plausible:

(24) More-or-less all townspeople are asleep.

But this assumption leads to a problem: (25) is contradictory while (26) is not.

(25) Although the townspeople are asleep, some of them are awake.

(26) Although more-or-less all townspeople are asleep, some of them are awake.
So maybe (23) is universally quantified after all? But then how can we account for the difference between (23) and (27)?

(27) All townspeople are asleep.

It seems that (23) allows exceptions (i.e. awake people) as is appropriate for the utterance context. Even though the sentence would then be literally false, it is still close enough to the truth to serve its purpose.
Examples - All the townspeople III

(23) The townspeople are asleep.
(27) All townspeople are asleep.

Suggestion

(23) and (27) are truth-conditionally equivalent, they only differ in the deviation from the truth they permit the pragmatic situation to license (i.e. \textit{all} allows less slack).

Note: Just because the sentence allows pragmatic slack does not mean that every pragmatic situation will exploit the slack that the sentence makes available.

Consider an experiment on sleeping behaviour where loose speaking is not appropriate: “The subjects are asleep.”
Scalar adjectives admit modification by degree adverbials such as very. But some adjectives do not allow such modification.

(28) This ball is very round.

(29) ? This ball is very spherical.

Very makes direct reference to the scale of the adjective, e.g. it may raise the “cutoff” point.

So is spherical non-scalar? But then, are any objects really spherical? And how can we explain the intensifying effect in (30)?

(30) This ball is perfectly spherical.
Suggestion

*Spherical* is non-scalar, but we may use it with pragmatic slack to refer to not-truly-spherical objects if it is close enough to truth for practical purposes. *Perfectly* reduces the acceptable level of deviance from the truth allowed by the pragmatics.

Slack regulators

The amount of acceptable slack is both determined by the pragmatics of the utterance context and the appearance of particular words within the utterance (these are called **SLACK REGULATORS**).
little hope for a generic metric for the notion of closeness to truth
therefore consider several “dimensions of closeness”
  • How close does the sentence come to getting the time right?
  • How close does it come to getting the shape of the ball right?
different slack regulators make reference to different dimensions of closeness
Pragmatically relevant details and distinctions

Just how close is close enough?
It is not the degree of closeness per se important, but whether
pragmatically relevant details and distinctions are represented.

Say we want to attack a town and wait for the townspeople to fall asleep. Three people
are still awake. They might be vigilant guards on the lookout, or harmless insomniacs
counting sheep.

Thus, the number of awake townspeople matters less than the effect they may have on
our attack.

“Close enough to the truth”

Let us suppose that “close enough to the truth” means close enough not
to obscure pragmatically relevant details or distinctions.

What is relevant? This part of the analysis is left vague.
Each expression is assigned a denotation (with respect to a model). The pragmatic context associates this denotation with a set of objects of the same logical type as the denotation itself. Each object in this set differs from the denotation only in some pragmatically ignorable respect (the denotation itself is also included in the set).

This set may be totally or partially ordered, such that the denotation forms a natural endpoint of the ordering. The relative position of the elements of a set according to such an ordering gives us a way of judging closeness to the truth.

This set together with its ordering relation is called the **Pragmatic Halo** of an expression.
• the “width” of the halo of a complex expression partly depends on the appearance or absence of a slack regulator

• this suggests some kind of compositional procedure in halo assignment for complex expressions

• apply the normal semantic rules to all possible combinations of elements drawn from the halos of the immediate parts of a complex expression

• ordering in the constituent halos is preserved in the halo of the complex expression
• slack regulators readjust the pragmatic halo of the expression they combine with

• in our examples: tightening
  • elimination of those elements ordered furtherest away from the core of the halo formed by the given expression

• preliminary assumptions about the semantics
  • verbs and predicates have a hidden argument place for eventualities (i.e. events, states and processes)
  • sentences denote set of eventualities rather than truth values
  • a sentence is true if its denotation is non-empty
Let *at three o’clock* denote the set of eventualities that occur at time $i$ (where $i$ is the time denoted by *three o’clock*).

Let intransitive verbs denote relations between individuals and eventualities, so that *arrive* matches each individual $x$ with events of $x$ arriving. *Mary arrived* then denotes the set of Mary’s arrivals (tense ignored).

*Mary arrived at three o’clock* then yields, by intersecting the denotation sets of its immediate parts, the set of Mary’s arrivals which occur at three o’clock.
For illustration’s purposes let’s assume that the pragmatic halo of *three o’clock* is the set \{i, j, k\}, ordered according to the ordering relation. Let us further assume that this is the only expression in the sentence with a non-trivial halo.

The pragmatic halo, according to the principles set so far, would then contain the set of Mary’s arrivals at *i*, the set of her arrivals at *j*, and the set of her arrivals at *k*, i.e.

\[
\{\{x | x \text{ is an arrival by Mary at } i\}\}, \\
\{x | x \text{ is an arrival of Mary at } j\}, \\
\{x | x \text{ is an arrival of Mary at } k\}\}
\]
Close enough to true

A sentence is “close enough to true for a context $C$” iff its halo relative to $C$ contains at least one non-empty element.

Suppose Mary actually arrived at $k$. With the denotation given above, the sentence is false (its denotation is the empty set). But its halo (given above) relative to $C$ is the following: $\{\emptyset, \emptyset, \{e\}\}$ where $e$ is the event of Mary’s arrival. Thus, this set contains at least one non-empty element and the sentence is close enough to true for its context $C$. 
The pragmatic halo of *exactly three o’clock* should include those elements of the halo of *three o’clock* which are closest to *i*, eliminating outlying elements. The “intensity” of the contraction of the halo depends on the given context.

The denotation of exactly is an identity function on times, therefore the halo is a set of functions on times. Each of these should differ from the identity function only in pragmatically ignorable ways, i.e. functions that match a given time *t* onto a time differing from *t* in ignorable ways.
Exactly three o’clock - Pragmatic Halo

To calculate the halo of exactly $T$ we apply the functions in the halo of exactly to the centerpoint of the halo of $T$, and then take the union of the resulting values.

Note: We have to make sure that the halo really contracts (rather than expands). Thus, we should stipulate that the functions in the halo of exactly should map a given time $t$ onto a subhalo of the halo of $t$.

So the halo of exactly $T$ should always be a subset of the halo of $T$. If a time $y$ is in the halo of exactly $T$, so should every time between $y$ and $T$, as well as $T$ itself.
Suppose that the halo of *exactly three o’clock* contains $i, j$, but not $k$. Let us further assume (as before) that Mary only arrived once and that this was at $k$.

The pragmatic halo of the whole sentence *Mary arrived at exactly three o’clock* is then $\{\emptyset, \emptyset\} = \{\emptyset\}$. Since this set does not have any non-empty members, the sentence is not close enough to true for our context - as opposed to *Mary arrived at three o’clock*, despite using the same denotations and halos.
Let us assume that both the noun phrases *the townspeople* and *all the townspeople* denote the set of townspeople collectively. It will serve as an argument to the predicate *are asleep*.

We will also assume that predicates can take sets of eventualities as arguments, and stipulate that a set of individuals $X$ will stand in the *sleep* relation to a set of eventualities $Y$ iff every member of $X$ stands in the sleep relation to a member of $Y$, and vice versa.
The halo of *the townspeople* should be a set of sets of individuals which differ from the set of the townspeople only in pragmatically ignorable ways, ordered according to closeness to the actual set of townspeople (we may use the subset relation for determining closeness).

We will treat *all* to denote the identity function (like *exactly*). Its halo therefore should be a set of functions that approximate the identity function.

We derive the halo of *all the N* by gathering the results of those functions applied to the denotation of *the N* into a set. As before, we will stipulate that every set in the halo of *all the N* is also in the halo of *the N*. 
(23) The townspeople are asleep.

(27) All townspeople are asleep.

There are contexts in which (23) is close enough to true while (27) is not, even though they are truth-conditionally equivalent.

Note that in this theory, we explicitly allow contradictory sentences to function pragmatically as though they were true.

(25) Although the townspeople are asleep, some of them are awake.

However, (25) is not only contradictory, it is also quite odd pragmatically. The first clause will never be close enough to true for its context if the context is one in which the second clause is assertable.
We need semantics for *perfectly* that manipulate scales for those predicates that provide them (e.g. scalar adjectives), in addition to manipulating pragmatic halos.

Let us suppose that scalar adjectives such as *round* denote different sets of individuals depending on the context. If the denotation of *round* relative to a context $C_1$ is a subset of its denotation in $C_2$, we say that $C_1$ is stricter than $C_2$.

The truth-conditional contribution of *perfectly* involves an implicit quantification over contexts: An object is perfectly round iff it falls into the denotation of *round* in all contexts (even in the strictest).
Perfectly spherical - Pragmatic Halo

*Spherical* denotes the set of perfect spheres. Its halo, thus, should be a set of sets that differ from the set of perfect spheres in pragmatically ignorable ways (e.g. by containing not-perfectly-spherical objects). A partial ordering is imposed on this halo.

Let the halo of *perfectly* be a set of functions approximating its denotation, i.e., each function maps a given set $X$ onto a set that differs from what the denotation of *perfectly* maps $X$ onto only in pragmatically ignorable ways.

The halo of *perfectly spherical* is derived by gathering the values given by these functions when applied to the endpoint of the halo of *spherical* into a set. Any set in the halo of *perfectly spherical* is also in the halo of *spherical*. 
We may try to relativise truth to standards of precision.

*The townspeople are asleep* is true relative to one standard of precision even if there are three people awake, but false relative to a stricter standard. The utterance situation determines which standard of precision is in force. Slack regulators then help determine the truth value relative to a given standard.

(23) The townspeople are asleep.

(27) All townspeople are asleep.

(27) is true relative to a given standard $s$ iff (23) is true relative to every standard $s'$. Therefore, (23) and (27) are no longer logically equivalent.

Thus, slack regulators now have a truth-conditional effect.
(31) Absolutely all the townspeople are asleep.

Absolutely appears to be a slack regulator here. Do we really want to claim that it is truth-conditionally distinct from (27)?

Furthermore, this approach does not solve one of our original problems: How do we explain that (25) is contradictory?

(25) Although the townspeople are asleep, some of them are awake.

We have to distinguish between authentic semantic vagueness and mere pragmatic looseness of speech. In the former, the extensions of predicates do not have well-defined borders, whereas in the latter they do.
If John is a borderline case of baldness, then a sentence like *John is bald* is analysed as not having a determinate truth value. A sentence is “simply true” if it is true relative to all ways of drawing the border (precisification).

Lewis: Even though a sentence may not evaluate to true in all precisifications we may still want to consider it “as if it is simply true”, provided it is true for enough precisifications.

Exactly how many ways of drawing the border count as enough varies according to the context and depends on the standard of precision in force. It may also be manipulated with slack regulators.
Lewis’s system allows for contextual variation in whether a sentence is true enough only when the sentence is truth-conditionally vague, i.e. when the sentence receives an indeterminate truth value. Sentences which are simply false will never be true enough.

We cannot capture the intuition that *Mary arrived at three o’clock* can be false while it can still be pragmatically treated as though it were true.

For Lewis, this kind of contextual variation only occurs because of undefined border area in the extension of a predicate, not because we ignore certain kinds of pragmatically irrelevant falsehood.