

Reasoning about the Objects of Attitudes and Operators Towards a Disquotation Theory for Representation of Propositional Content*

by

Steven O. Kimbrough

University of Pennsylvania

3620 Locust Walk, Suite 1300

Philadelphia, PA 19104-6366

kimbrough@wharton.upenn.edu

<http://grace.wharton.upenn.edu/~sok/>

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A word on motivation

Applications in mind. Origin of work in problems of EDI: no compositional semantics \leadsto expensive kludges.

Big issues: (a) intensionality, (b) getting the inferences right (inclusion, exclusion)

Key elements of my approach: speech acts, $F(P)$; event (subatomic) semantics

Reporting here: a new theory/approach, which I like better than my modal approach and which is much more generally applicable.

Explication, rational reconstruction of practice.

Sentences with propositional content

Examples (with content P): S believes that P, S promises that P, S says that P, etc.

- Saying that (indirect discourse):
 - Galileo said that the earth moves
 - Bush said that the U.S. economy was in deep trouble and only massive tax reductions, especially for the wealthy, could save the day.

- Propositional attitude descriptions (aka: clausal complements) such as:
 - Jane believes that Tom loves Mary
 - Jane desires that Tom does not love Mary
 - Jane intends that Tom will marry Susan

and their stylistic equivalents. For example, Tom intends to marry Mary is arguably a variant of the more stilted Tom intends that he (Tom) will marry Mary.

- Speech act descriptions, such as:
 - Tom promised that he will marry Mary.

- Sam promised Sue a diamond.*
- Bush asserted that his administration would operate on a bipartisan basis.
- The Supreme Court declared that the ballots will not be counted.

- Modal descriptions, such as:
 - It is impossible that Gore can appeal a Supreme Court decision.
 - Necessarily, it is raining or not

- Deontic descriptions, such as:

*I take this kind of construction as shorthand for, here, something akin to Sam promised Sue that she (Sue) will get a diamond.

- Jake is obliged to Tom that Jake read(s) the letter.
- Parking is not permitted here.

- Perceiving-that descriptions, such as:
 - Jane saw that Tom kissed Mary
(as distinguished from Jane saw Tom kiss Mary.)

- Others, e.g.,
 - Gore needs it to be the case that a miracle occurs.

Comments

1. Most of these examples and other cases involve some degree of inten[st]ionality.

Here: focus on intensionality (“s-ality”). Roughly: linguistic description of intentionality. Diagnostic: failure of substitution of equivalents (identicals) can fail to preserve truth. “S believes that P, P if and only if Q, therefore S believes that Q” is surely invalid, as is “S knows that a robbed the bank, $a = b$, therefore S knows that b robbed the bank.” Aside: degrees or levels of inten[st]ionality.

2. Here: a sketch of a theory (or approach)

3. Definition versus description. Here: description. (Baseball)

More on inten[st]ionality

Puzzling. Thought to challenge naturalism, materialism. The “mark of the mental”? Intentionality: directed, aspectual.

$$f(x) = z, x = y \models f(y) = z$$

$$P, P \leftrightarrow Q \models Q$$

$$P \rightarrow R, P \leftrightarrow Q \models Q \rightarrow R$$

Examples of intentionality: Oedipus, Juliet, police knowing the bank robber, BDI, etc.

Levels of inten[st]ionality, include: equivalences: extensional (Batman and Bruce Wayne), nomic (laws of nature), alethic (ordinary necessity), analytic (triangles, bachelors), synonymy (?)

Modal approaches (to intensionality)

Standardly:

Modal logic, e.g., $\Box P, P \leftrightarrow Q \not\models \Box Q$ but $\Box P, \Box(P \leftrightarrow Q) \models \Box Q$

Logics of belief, of knowledge, etc.

Speech act analysis pushed by sok:

$$\text{promise}(P) \approx \exists e(\text{promise}(e) \wedge \Box(K(e) \leftrightarrow P))$$

What's wrong with this? (a) Does there have to be something wrong to consider an alternative? (b) In my own case, I've been bothered by the lack of principled motivation for a modal approach. It's there for intensionality (only?).

Disquotation theory/approach: core idea

Propositional content has (at least) two important aspects. First, it is about something, that is to say it is true-or-false or rather it is a description, accurate or not, of something. Second, it is itself something about which we attribute certain properties, e.g., that Mary believes it or hopes it or asserts it or promises it. Summarizing (perhaps sloganizing), we might put the point by saying that the sentences of interest here large have the structure: content + comment (on the content). The core idea I wish to develop involves directly recognizing and representing these two aspects (content, comment) of sentences with propositional content.

Disquotatation theory: alternative to the modal theory (\square)

Consider the simple propositional content (and speech act) sentence:

Expression 1 Mary asserts that Sam arrived yesterday.

My idea is to represent this (and similar) sentence(s) with two kinds of expression: (a) a fundamental expression and (b) one or more axiom schemas, used to articulate meaning for the fundamental expressions. First, we can represent Sam arrived yesterday in what is more or less standard event semantics:

Expression 2 $\exists e'(\text{arrive}(e') \wedge \text{Subject}(e', \text{Sam}) \wedge \text{Cul}(e', \text{yesterday}))$

Let ϕ represent Expression 2.

The fundamental expression for the sentence (in Expression 1) becomes, in shorthand:

Expression 3 $\exists e(\text{assert}(e) \wedge \text{Subject}(e, \text{Mary}) \wedge \text{Obj}(e, [\phi]))$

or fully written out:

Expression 4 $\exists e(\text{assert}(e) \wedge \text{Subject}(e, \text{Mary}) \wedge \text{Obj}(e, [\exists e'(\text{arrive}(e') \wedge \text{Subject}(e', \text{Sam}) \wedge \text{Cul}(e', \text{yesterday}))]))$

Thus, the main idea in the fundamental expressions is to treat a quoted sentence (the propositional content) as an object or individual about which a comment is made. In particular, the quoted sentence is the direct object of an event (or eventuality). Moreover, a special form of quotation is used: $[\cdot]$. By quoting an expression in this way—as in 3 and 4—we treat it as an individual and so capture (I argue) the second aspect noted about it.

Disquotation theory: alternative to the modal theory (\Box)

Formally we have the following rule:

Axiom Schema 1 (Assert Rule) $\forall e((\text{assert}(e) \wedge \text{Obj}(e, [\phi]))) \rightarrow (\text{Veridical}(e) \leftrightarrow \phi))$

Axiom Schema 1 should be thought of as a rule into which we may substitute uniformly for ϕ any well-formed formula in the current language.

Note: This generalizes to all the speech acts.

Disquotation theory: Extension to deontic reasoning

Obligations and permissions. Problems with the standard logic. Now an alternative.

The Anderson reduction: Instead of $\mathcal{O}\phi$ for “It ought to be the case that ϕ ” we have $\Box(\neg\phi \rightarrow V)$ where V is the bad (violation) condition. That is, “ ϕ ought to be true” is unpacked as “Necessarily, if ϕ isn’t true, then the bad happens” (and that’s not good!).

Then... Suppose that a delivery is obligated:

Expression 5 $\mathcal{O}\exists e_1(\text{deliver}(e_1) \wedge \text{Sub}(e_1, a) \wedge \text{Obj}(e_1, g) \wedge \text{IndObj}(e_1, s) \wedge \text{Sake}(e_1, e))$

Disquotation theory: Deontic reasoning

Our fundamental schema for ought follows the usual form

Fundamental Schema 1 (Ought) $\exists e(\text{ought}(e) \wedge \text{Obj}(e, [\phi])) \wedge$

and our example (Expression 5) instantiates in the predictable fashion:

Expression 6 $\exists e(\text{ought}(e) \wedge \text{Obj}(e, [\exists e_1(\text{deliver}(e_1) \wedge \text{Sub}(e_1, a) \wedge \text{Obj}(e_1, g) \wedge \text{IndObj}(e_1, s) \wedge \text{Sake}(e_1, [e])]))))$

Corresponding closely to the spirit of the Anderson reduction gives us the weak ought rule:

Axiom Schema 2 (Weak Ought Rule)

$\forall e((\text{ought}(e) \wedge \text{Obj}(e, [\phi])) \rightarrow (\neg\phi \rightarrow V(e)))$

Disquotation theory: Deontic reasoning

My theory allows us to employ the strong ought rule:

Axiom Schema 3 (Strong Ought Rule)

$$\forall e((\text{ought}(e) \wedge \text{Obj}(e, [\phi])) \rightarrow (\neg\phi \leftrightarrow V(e)))$$

Permission works similarly.

$$\text{Expression 7 (Permission)} \quad \exists e(\text{permit}(e) \wedge \text{Obj}(e, [\exists e_1(\text{deliver}(e_1) \wedge \text{Sub}(e_1, a) \wedge \text{Obj}(e_1, g) \wedge \text{IndObj}(e_1, s) \wedge \text{Sake}(e_1, \boxed{e})]))$$

Disquotation theory: Deontic reasoning, directed obligation

The move here is the same as in systems of obligation and permission: add predicates to qualify the underlying event. If a has an obligation to b under system of norms n that ϕ , we then have:

Fundamental Schema 2 (Directed Obligation) $\exists e(\text{ought}(e) \wedge \text{Subject}(e, a) \wedge \text{IndObj}(e, b) \wedge \text{IsUnderNSystem}(e, n) \wedge \text{Obj}(e, [\phi])) \wedge)$

Note: Error in paper. Instead of $V(e)$ we need $V(e, n)$.

Summary & Discussion

For each type of expression (focused on intensional verbs) we have:

- a fundamental schema (with quotation)
- one or more axiom schemas (quantified, with disquotation)

with indexing on eventualities.

Summary & Discussion

With quotation, the fundamental schema expressions are maximally intensional. Even to synonymy.

With disquotation, the axiom schemas allow degrees of relaxation (among other things) of the intensionality.

Claim: a nice property. Pretty obvious: a means to handle degrees of intensionality.

Summary & Discussion

Another example: blocking deductive closure. Hard(er) to do in a modal system. S knows that $P \wedge Q \not\models S$ knows that P . OK with the disquotation theory.

Also OK with the disquotation theory:

S knows directly and immediately that $P \wedge Q \models S$ knows indirectly and mediately that P .

Note: can be generalized quantitatively.

Conclusion: Add the fact that this representation is friendly for logic programming and for RDBMS, and we have something well worth further investigation.