

The character of quotation

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Abstract This paper presents syntactic and semantic rules for a fragment of English with mixed quotation. The fragment shows that quotation has a recursive and compositional structure. Quoted expressions turn out to denote characters, so the semantics of quotation simulates the pragmatics of speech, including dependence on utterance contexts and reference to mental entities. The analysis also accommodates varieties of unquotation, pure quotation, and causal reference.

Keywords Mixed quotation · Compositional semantics · Utterance context · Monads · Type-lifting

1 Introduction

Davidson (1979) distinguished *mixed quotation*, as in (1) and (2), from *pure*, *direct*, and *indirect* quotation, as in (3)–(5).

- (1) (Mixed quotation) Quine says quotation ‘has a certain anomalous feature’.
- (2) (Mixed quotation) Bush is proud of his ‘eckullectic’ reading list.
- (3) (Pure quotation) ‘Bachelor’ has eight letters.
- (4) (Direct quotation) Quine says ‘quotation has a certain anomalous feature’.
- (5) (Indirect quotation) Quine says quotation has a certain anomalous feature.

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The quotes in (3) and (4) mention the quoted expression without using them. We can analyze these quotes as simply denoting the quoted expressions, which have properties such as having eight letters and being said by Quine. In contrast, the embedded clause in (5) is a quote only in that it uses—not mentions—the expression *quotation has a certain anomalous feature* to express a proposition attributed to Quine. Hence, it is easy to imagine a situation where (5) holds but (4) does not: perhaps Quine never uttered the word *anomalous*.

What is special about the quotes in (1) and (2) is that they *mix* mention and use. On one hand, these sentences hardly hold if Quine never uttered *anomalous* and Bush never uttered *eckullectic*.¹ On the other hand, in order to compose the meanings of *quotation ‘has a certain anomalous feature’* and *‘eckullectic’ reading list*, we need the quotes to denote verb-phrase and adjectival meanings, which can apply to quotation and reading lists, rather than expressions, which cannot.

One way to analyze the syntax and semantics of mixed quotation is to formulate some syntactic and semantic rules that generate a fragment of English with mixed quotation. This paper presents such a formal fragment, to show that quotation has a recursive and compositional structure, as we have come to expect in language and study in linguistics. It turns out in the fragment that quoting expressions denote *characters* (Kaplan 1989), so the semantics of quotation simulates the pragmatics of speech, including dependence on utterance contexts and reference to mental entities. The analysis also accommodates varieties of *unquotation*, pure quotation, and causal reference (Putnam 1975; Kripke 1980).

1.1 The truth conditions of mixed quotation

Before writing a fragment, we need to clarify the goal: what are the truth conditions and well-formedness conditions of mixed quotation? As the term *mixed* suggests (Geurts and Maier 2003; Potts 2007), the sentences (1) and (2) have two dimensions of meaning, one of mention and one of use. I gloss them separately below:

- (6) Quine says quotation ‘has a certain anomalous feature’. (= (1))
 a. (mention) *has a certain anomalous feature* is used to mean some *f*.
 b. (use) Quine says quotation *f*.
- (7) Bush is proud of his ‘eckullectic’ reading list. (= (2))
 a. (mention) *eckullectic* is used to mean some *f*.
 b. (use) Bush is proud of his *f* (reading list).

In each example, the use dimension depends anaphorically on the mention dimension for a semantic value *f*, which is a verb-phrase or adjectival meaning.

The phrase ‘is used to mean’ above skirts two difficult issues. First, although the most obvious readings by far of the sentences (1) and (2) require Quine and Bush to use the quoted expressions, the truth conditions in (6) and (7) only require someone

¹ More precisely, as I argue in Sect. 1.1 below, these sentences cannot be true or false until it is resolved who uttered the quoted expressions, if not Quine and Bush.

to. This weakness is actually a strength, because not every quoted expression has its speaker even mentioned in the quoting sentence.² For example, the most natural way to interpret the continuation (8) is that ‘*eckullectic*’ quotes Bush rather than Cheney.

(8) Yet Cheney’s reading list is far more ‘*eckullectic*’, not to mention longer.

In general, an embedding context such as *Quine says* or *Bush is proud of* is just a clue that helps the hearers of a mixed quote resolve who is being quoted, just as they disambiguate among multiple grammatical parses of a string. The quote may even be hypothetical or generic (Sams 2010). It is thus natural to analyze the mention dimension of a mixed-quote meaning as a presupposition, as Geurts and Maier (2003) do, or as a conventional implicature, as Potts (2007) does. In contrast, the use dimension of a mixed-quote meaning is the semantic value *f* it contributes to the sentence’s *at-issue* content (Potts 2003).

This analysis correctly predicts that using ordinary negation to object to an assertion with a mixed quote only targets the use dimension (Karttunen and Peters 1979): as a reviewer points out, just responding *no* to (7) cannot mean that, although Bush is proud of his eclectic reading list, he did not say *eckullectic*. However, just as for anaphora or presupposition, it remains to be detailed how it is resolved who is being mixed-quoted, or which resolutions are available. For example, as a reviewer points out, this analysis allows (7) to be true, even when spoken out of the blue, even if Bush uses *eckullectic* only to describe his foreign policy, never when discussing his reading list.

Following this analysis, I content myself with a fragment that ‘bakes in’ the result of the resolution and just generates sentences containing mixed quotes of Quine and Bush with truth conditions such as (6b) and (7b).

1.1.1 Using expressions

The second issue is, what does it take for someone to use some expression to mean something? I believe it is a common notion, but in lieu of a reductive definition, I can only offer some properties and examples to help fix the notion.

When you said ‘hello’ to someone on the street, the sound you made *indicated* that you used some expression *E* to mean a greeting. The expression *E* is a type, of which your sound is a token: Unlike any sound, inkblot, or action, *E* is abstract, not concrete. Unlike the sound you made, *E* is used at other times and places by other speakers, not specific to your utterance event. In fact, as discussed shortly, *E* may not even belong to any language. Moreover, among the many concrete ways to

² A reviewer points out that mixed-quoted first- and second-person pronouns seem not to have the shifted interpretation unless the quoted speaker is mentioned in the same breath. For example, it does not make sense to say

Bush is proud of ‘how *eckullectic* my reading list is’, but Cheney maintains that ‘how *eckullectic* my reading list is’ is less important than how many books on it Bush actually read

but replacing *my* by *the* (twice) improves the sentence. I have no explanation for this phenomenon.

indicate the use of E , none is distinguished as ‘verbatim’ somehow. In particular, E cannot indicate its own use concretely because it is abstract, just as the number 42 cannot be put on paper because strictly speaking only ink and coffee stains can. A natural-language fragment that generates E with a meaning M predicts that E can be used to mean M , but leaves unspecified (as a PF concern, so to speak) how to indicate the use of E concretely (that is, how to token E). Hearers regularly, if not completely reliably, infer the use of expressions from indications by speakers.

When I wrote

- (9) you said ‘hello’ to someone on the street

above, I used another expression E' to mean a proposition of saying. Again, E' is an abstract type, not specific to the utterance event of my tokening it. Furthermore, in a sense to be formalized below, just as E' contains the abstract word *street*, E' contains E as a *demonstration proper* (Clark and Gerrig 1990) (or *demonstratum* (de Brabanter 2005)) and a *quotable item* (Cappelen and Lepore 2007). In contrast, neither E' nor any concrete indication that I used E' contains the sound you made to indicate your use of E . A natural-language fragment that generates E' with a meaning M' predicts that E' can be used to mean M' , but leaves unspecified how to indicate the use of E' concretely. In particular, the quote of E in E' could be indicated by punctuation, prosody, or other means.

By the way, nothing precludes an abstract expression from containing nonlinguistic material, whether we treat such containment as the same phenomenon as quotation (Partee 1973; Clark and Gerrig 1990; Postal 2004; de Brabanter 2005; Cappelen and Lepore 2007). For example, to describe the way your body moved to make a basketball shot, I could say

- (10) your legs went ⟨bend and move fingers⟩ while your arms went ⟨bend and move arms⟩.

Although your concrete shot involved a basketball, the way I say your body moved does not. Although my concrete utterance involves my fingers, the abstract expression I use does not.

Returning to the notion of using some expression to mean something, the rest of this paper focuses on quotes of linguistic material. The distinction between abstract expressions and concrete indications of their use, while not restricted to quotation,³ lets us account for differences between the quote and the quoted, or more precisely, between the concrete indication of the quote and the concrete indication of the quoted. For example, if you stuttered when you used E (so the sound you made is more like ‘hel, ahem, hello’) or I made a typo when I used E' (so I put ‘hello’ instead of ‘hello’ in quotation marks), a charitable observer can chalk the difference

³ In other words, this distinction underlies how people indicate their use of *all* expressions, not just expressions with quotation. It is thus unlike Cappelen and Lepore’s (1997, 2007) *same-tokening* relation between a quoting token and the quoted token or Bonami and Godard’s (2008) *resemblance* relation between a quoting behavior and the quoted behavior. However, those relations can be regarded as the composition of our indication relation with its inverse.

up to how we indicated our uses of *E* and *E'* in less than the most helpful of ways, without including our disfluencies in *E* and *E'* or jeopardizing the claim that *E'* contains and quotes *E*. Analogously, if it was actually ‘bonjour’, in French, that you said to someone on the street, I can still truthfully write (9), to indicate my use of an abstract expression *E'* that contains and quotes an abstract expression *E* (of neither English nor French) that you used. Whether *E* qualifies as a word, that it exists is for ‘hello’ in English to, in a sense, translate ‘bonjour’ in French. Thus, a single sound you made indicated your use of multiple abstract expressions, some that belong to a specific language and some that do not.

Because a single sound, inkblot, or action often indicates the use of multiple abstract expressions, most quotes are ambiguous as to which abstract expression is quoted. That is why, as a reviewer points out, (12a) and (12b) are ‘equally possible and coherent’ responses to (11a) or (11b).

- (11) a. Bush said ‘I have an eclectic reading list’.
- b. Did Bush say ‘I have an eclectic reading list’?
- (12) a. Yes, but he did not say it that way.
- b. No, he said ‘I’ve got an eckullectic reading list’.

The response (12a) targets the reading of (11) that quotes an abstract expression whose use can be indicated fairly reliably by either *I have an eclectic reading list* or *I have an eckullectic reading list*. In the rest of this paper, I set aside this ambiguity by excluding that reading: I assume that no single abstract expression can have its use indicated by both *eclectic* and *eckullectic*, and I ignore that a practical journalist would revise (in a sense, translate) ‘*eckullectic*’ to ‘*eclectic*’ in writing. With nothing more to say about how the use of abstract expressions are indicated, I henceforth notate abstract expressions ‘literally’ by concrete inkblots.

It is not only in instances of disfluency and translation that a single concrete sound, inkblot, or action indicates the use of multiple abstract expressions. When Quine (1940) wrote

- (13) it has a certain anomalous feature which calls for special caution

he not only used that clause to mean a proposition, but also used various parts of that clause to mean various semantic values. It was by virtue of these values and their composition that the clause came to mean the proposition.⁴ In this way, an utterance context—that is, an utterance event or occasion, be it hypothetical or generic or not—comprises numerous utterance subevents in a network that mirrors the syntactic structure of the utterance. In each subevent, some expression was used to mean something. Hence, (7) may be true even if *eckullectic* is heretofore used only as part of complete clauses, and only to describe shoes.

⁴ That is not to say the parts form a hierarchy: the overlapping parts *has a certain*, *has a certain anomalous feature*, and *a certain anomalous feature which calls for special caution* were each used by Quine to mean something yet do not contain each other. Barker (2007) describes how to identify the semantic value contributed by each part without nailing down a single hierarchy of composition.

1.1.2 Reifying and evaluating expressions

One intuition behind the gloss of mixed quotation in (6) and (7) is that using an expression to mean a value is like decoding a Gödel number to yield a proposition or running a program to compute a result. Each of these operations is a systematic mapping from forms to meanings in an object language. In this sense, a natural language with mixed quotation is like a multilevel programming language (Nielson and Nielson 1988, 1992; Gomard and Jones 1991; Taha 1999) that supports running generated programs, and the fragment below follows this analogy.

In the case of mixed quotation, the object language is not mathematical logic or computer code but Quine English or Bush English. The quoted speaker's mind provides a mapping from public, spoken forms to private, intended meanings, so mixed quotation lets us curate meanings from other minds into our own utterances. As the fragment below shows, we can regard our uncertainty about what others mean as a special case of uncertainty about the world. For example, without knowing which 'anomalous feature' Quine had in mind or what it takes for Bush to consider something 'eckullectic', we can refer to these values by mixed-quoting Quine and Bush. Similarly, we can appeal to a botanist's notion of an elm and a historian's notion of Aristotle by mixed-quoting them (Putnam 1975; Kripke 1980), if without punctuating the written English by quotation marks.

Of course, mixed quotation often serves more purpose in discourse than referring to what an expression is used to mean. For example, a mixed quote often signals that the quoting speaker is distant from the quoted speaker and would not use the quoted expression in the same way. I focus here on the truth and well-formedness conditions of mixed quotation, leaving it to future work to explain the other accomplishments of a mixed quote as different ways to use it (Cappelen and Lepore 2003).

1.2 The well-formedness conditions of mixed quotation

The mixed quotes in (1) and (2) function grammatically as a verb phrase and an adjective respectively. Not all mixed quotes can, as the following attempts illustrate:

(14) *Bush said his reading list 'eckullectic'.

(15) *Quine's 'has a certain anomalous feature' is trivial.

The unacceptability of (14) demonstrates that a mixed quote of an adjective in Bush English cannot serve as a verb phrase.⁵ Perhaps this case is just a semantic type mismatch—after all, in the standard analysis, a verb phrase denotes a property whereas an adjective denotes a function from properties to properties. But it is also standard for a common noun to denote a property, so a semantic type mismatch does not account for the unacceptability of (15), in which a mixed quote of a verb phrase

⁵ Of course, if Bush used *eckullectic* as a third-person singular verb phrase, then (14) is perfectly acceptable, because the mixed quote is of a verb phrase in Bush English. Perhaps he said *my reading list eckullectic but my tax return does not*.

in Quine English fails to serve as a common noun. What does account for the unacceptability of (14) and (15) is that the syntactic category of a mixed quote must match (to a first approximation, equal) that of the quoted expression.

In fact, this requirement for the categories to match extends from the coarse distinction between verb phrases and common nouns to finer agreement in number and gender. For example, suppose Ken has said

(16) My only paper has appeared in print.

It would be unacceptable for someone to report

(17) *Ken has said that all of his papers ‘has appeared in print’.

Similarly for gender (where the plurality presupposition of *all* does not confound the evidence), suppose Ken has said in Italian

(18) Gli uomini italiani mi sembrano molto
 the.MASC.PL men Italian.MASC.PL to.me look.3PL very
 carini
 cute.MASC.PL
 ‘Italian men look very cute to me.’

It would be unacceptable for someone to report

(19) *Ken ha detto che le persone
 Ken has said that the.FEM.PL people
 italiane ‘mi sembrano molto carini’
 Italian.FEM.PL to.me look.3PL very cute.MASC.PL
 ‘Ken has said that Italian people ‘mi sembrano molto carini’.’

A reviewer suggests that mixed-quoted word order behaves similarly in Dutch: if Jan says, using main-clause word order,

(20) Ik zal die idioot een koekje van eigen deeg geven
 I shall that idiot a cookie of own dough give
 ‘I will give that idiot a taste of his own medicine.’

it would be unacceptable for a newspaper to report

(21) *Jan zegt dat hij ‘zal die idioot een koekje van
 Jan says that he shall that idiot a cookie of
 eigen deeg geven’
 own dough give
 ‘Jan says that he ‘zal die idioot een koekje van eigen deeg geven’.’

because the quote appears in an embedded clause.⁶

Perhaps the mixed quotes in (14) and (15) wrongly presuppose that *eckullectic* is used as a verb phrase and *has a certain anomalous feature* is used as a common noun. On such an account, (14) and (15) are bad due to presupposition failure, just as (22) is.

(22) *Bush met the king of France.

Seeing as the constraint at work is effectively a relation between the syntactic categories of the quoting and quoted languages, I explore in this paper how to retrieve it from the pragmatic wastebasket and express it by syntactic means, if only to avoid duplicating machinery. In other words, I treat (14) and (15) as syntactically ill-formed, on a par with the following counterparts without mixed quotation.

(23) *Bush said his reading list eclectic.

(24) *Quine's constitutes a knockdown argument is trivial.

Before launching into the fragment, one last proviso. Pure quotes, like proper names, can be very productively coerced into other grammatical categories including nouns (25), verbs (26), and adjectives (27).

(25) He said many 'no thank you's to the sales people in the aisles.

(26) She decided to 'no comment' the question.

(27) It is a very 'what the hell' movie.

In this paper, I set aside these coercion cases as a distinct phenomenon. One reason to do so is that the meanings of coerced pure quotes seem freer than those of ordinary mixed quotes: the relation between the expression *what the hell* and the property of being a 'what the hell' movie is fairly complicated. Another reason is that pure quotes, coerced or not, cannot take on certain grammatical categories that mixed quotes can. For example, whereas the mixed quote in (28) manages to play the role of a determiner, the pure quote in (29) and (30) can only act as an adjective.

(28) Bush expected his speech to win over 'few, if any' Democrats.

(29) Bush expected his speech to win over 'needles in a haystack' Democrats.

(30) It is a very 'needles in a haystack' movie.

⁶ These unacceptable examples become acceptable if we replace *has* in (17) by *have*, *carini* 'cute.-MASC.PL' in (19) by *carine* 'cute.FEM.PL', *zal die idioot een koekje van eigen deeg geven* in (21) by *die idioot een koekje van eigen deeg zal geven*. The resulting reports are true only by virtue of the kind of ambiguity in (11), which I set aside.

2 The basic fragment: embedding languages

We are ready for a fragment that formally expresses the truth and well-formedness conditions just set forth. The main idea is for our syntactic categories to embed those of the quoted languages and for our semantic values to include the characters of the quoted languages.

We start with a standard categorial grammar with an intensional (possible-worlds) semantics. In this language, *eclectic* is an adjective, but not *eckullectic*.

$$(31) \quad A ::= A/B \quad B \quad \llbracket A \rrbracket(w) = \llbracket A/B \rrbracket(w)(\llbracket B \rrbracket)$$

$$(32) \quad A ::= B \quad B \backslash A \quad \llbracket A \rrbracket(w) = \llbracket B \backslash A \rrbracket(w)(\llbracket B \rrbracket)$$

$$(33) \quad \text{DP} ::= \text{Bush} \quad \vdots$$

$$(34) \quad (\text{DP} \backslash \text{S})/\text{S} ::= \text{says}$$

$$(35) \quad (\text{DP} \backslash \text{S})/\text{DP} ::= \text{is proud of}$$

$$(36) \quad \text{N/N} ::= \text{eclectic}$$

$$(37) \quad \text{N} ::= \text{reading list}$$

For each syntactic category A , constituents of category A have semantic contents of type $\langle s, \tau(A) \rangle$, where s is the type of worlds and $\tau(A)$ is defined as usual by

$$(38) \quad \tau(A/B) = \tau(B \backslash A) = \langle \langle s, \tau(B) \rangle, \tau(A) \rangle, \quad \tau(\text{DP}) = e, \quad \tau(\text{S}) = t, \quad \dots$$

I write $\llbracket E \rrbracket$ for the content of an expression E in our language. Starting in the semantic rules to the right of (31) and (32), I abuse notation and write $\llbracket A \rrbracket$ to mean the content of the constituent of category A .

In preparation for mixed quotation, for each category A of Bush English (the quoted language), we add a category A' to our language (the quoting language).

$$(39) \quad (\text{N/N})' ::= \text{eckullectic} \quad \llbracket (\text{N/N})' \rrbracket = \langle \text{eckullectic} \rangle$$

$$(40) \quad \text{N}' ::= \text{reading list} \quad \llbracket \text{N}' \rrbracket = \langle \text{reading list} \rangle$$

In the syntax of our quoting language, these primed categories A' embed the syntax of a quoted language. For example, our categories $(\text{N/N})'$ and N' house adjectives and common nouns in Bush English. We keep these categories distinct from N/N and N , to exclude Bushisms such as

$$(41) \quad * \text{ Bush is proud of his eckullectic reading list}$$

from our category S . The category $(N/N)'$ is also distinct from N'/N' (although the rule (62) below effectively makes $(N/N)'$ entail N'/N').

This prime is reserved for Bush—to quote Quine as well, we would need another family of primed categories, perhaps A' . Similarly, to deal with nested quotes as in (42), where the quoted language includes quotes itself, we would need doubly primed categories, but the basic account is the same, just iterated.

(42) The politician said she is ‘sorry to have used an ‘epithet’.

This simplistic categorial syntax is enough for this paper. Of course, the reader who is dissatisfied that our primed categories are simplistic, or who is skeptic whether Bush English is a well-defined notion, is invited to conduct field work on how Bush speaks English, just as the reader who is dissatisfied that our unprimed categories are simplistic, or who is skeptic whether normal English is a well-defined notion, is invited to conduct field work on how English is normally spoken.

As for semantics, given an expression E , I write $\langle E \rangle$ for the (curried and presumably partial) function such that $\langle E \rangle(w)(i)$ is the content that E is used to mean in an utterance context i in a world w .⁷ For example, assuming that Bush uses *eckullectic* to mean ‘eclectic’ and *reading list* to mean simply ‘reading list’ in some context i in the real world w_0 , we have

$$(43) \quad \langle \text{eckullectic} \rangle(w_0)(i) = \llbracket \text{eclectic} \rrbracket,$$

$$(44) \quad \langle \text{reading list} \rangle(w_0)(i) = \llbracket \text{reading list} \rrbracket.$$

As the argument i indicates, a quoting expression denotes the *character* (Kaplan 1989)—a function from utterance contexts to semantic contents—of the quoted expression. Accordingly, we define $\tau(A') = \langle u, \langle s, \tau(A) \rangle \rangle$, where u is the type of utterance contexts. The general pattern is that, if E is an expression whose category is primed, then

$$(45) \quad \llbracket E \rrbracket = \langle E \rangle.$$

In short, quoting categories embed quoted categories, and quoting denotations are quoted characters. This is the case even for a quoted category A not found in the quoting language (in which case the quoting language so far has only the category A' , not A), and even for a quoted character that returns semantic contents not found in the quoting language (in which case we can still write that the quoting denotation is some $\langle E \rangle$, much as Montague writes **love'** without a reductive definition of love). We next put this correspondence to work.

⁷ Perhaps each context belongs to a unique world. In that case, $w_1 = w_2$ whenever $\langle E \rangle(w_1)(i)$ and $\langle E \rangle(w_2)(i)$ are both defined.

2.1 Diagonal interpretation

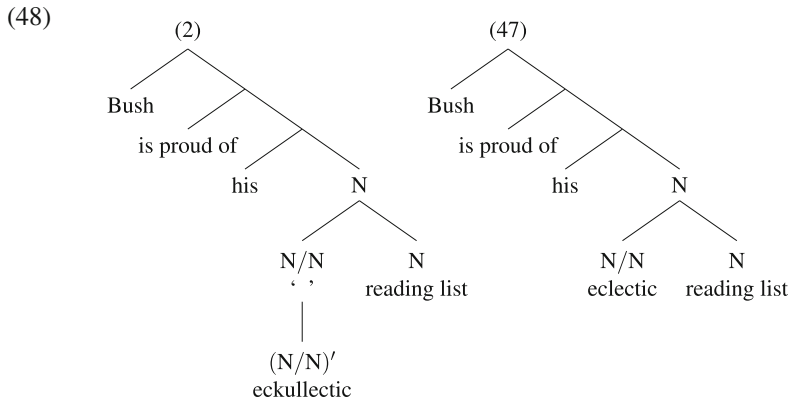
So far, our language is merely a disjoint union of normal and Bush English. To pass between the two, we add a rule for mixed quotation.

$$(46) \quad A ::= 'A' \quad \llbracket A \rrbracket(w) = \llbracket A' \rrbracket(w) \text{ (Bush English (in } w)) (w)$$

In syntax, for any category A , putting quotation marks around (or quotation into-
nation on) an A -expression in Bush English (which is to say, an A' -expression in our
language) makes it an A -expression in our language. For example, both *eclectic* and
'*eckullectic*' are in our category N/N but not $DP \backslash S$, so our fragment generates
sentences such as (2) alongside the ordinary

(47) Bush is proud of his eclectic reading list

but not (14) or (23). For comparison, the derivation trees are as follows.



The semantic rule in (46) specifies a form of *diagonalization*, which Stalnaker (1978) originally proposed as a pragmatic operation. Specifically, the first two arguments⁸ passed to $\llbracket A' \rrbracket$ compute what Bush uses the quoted expression to mean in the world w , then the last argument w extracts from this semantic content its denotation at w . The second argument 'Bush English (in w)' stands for some utterance context, perhaps a generic one, in which Bush uses the quoted expression.

Let us put these rules together to generate some simple examples. On one hand, if we know that Bush means 'eclectic' by *eckullectic*—in other words, if

$$(49) \quad \llbracket \text{eckullectic} \rrbracket(w)(\text{Bush English}) = \llbracket \text{eclectic} \rrbracket$$

⁸ I am not committed to this use of two arguments, a possible world and an utterance context, to distinguish among the different semantic contents that a given quoted expression such as *eckullectic* may be used to mean. If each context belongs to a unique world—in particular, if we 'represent contexts by the same indexed sets we use to represent circumstances' as Kaplan (1989) put it—then these two arguments can be merged into one, namely Bush English in w , as a matter of presentation. In other words, I am not committed as to whether it is really quoting denotations or quoting senses that are quoted characters.

for every belief world w of ours—then (2) is grammatical and true in exactly those worlds where Bush is proud of his eclectic reading list, as desired. On the other hand, if we do not know the semantics of the quoted language so well, then sentences containing mixed quotes can inform us about it: if $\langle\langle\text{eckullectic}\rangle\rangle(w)$ (Bush English) is not constant across our belief worlds w , then the two sentences below are not synonymous. A world satisfies (50) if and only if to be what Bush means by *eckullectic* in w , be it ‘eclectic’ or not, is to have never been seen by Bush.

(50) To be ‘eckullectic’ is to have never been seen by Bush.

(51) To be eclectic is to have never been seen by Bush.

This interpretation strategy is essentially how Stalnaker (1978) dealt with sentences like (52): by treating *Hesperus* and *Phosphorus* as mixed quotes of normal English.

(52) *Hesperus* is identical with *Phosphorus*.

Stalnaker addresses the problem of how come (52) does not sound trivial, under the assumption that the proper names *Hesperus* and *Phosphorus* are rigid designators (that is, their contents are constant functions from worlds). This assumption entails that the content of (52) is itself rigid—either the set of all worlds or the set of no world—so why would anyone assert it? Stalnaker suggests that the pragmatic oddity of asserting a rigid proposition leads the hearer to interpret (52) by computing its *diagonal proposition*

(53) $\lambda w. \langle\langle\text{Hesperus is identical with Phosphorus}\rangle\rangle(w)(\text{English})(w)$.

In words, this is the set of worlds w such that the content of (52) in w is true in w . Following (46), this proposition equals the denotation of ‘*Hesperus is identical with Phosphorus*’, which in turn equals the denotation of ‘*Hesperus*’ is identical with ‘*Phosphorus*’ if *is identical with* is interpreted identically in every world.

One reason to let quoting denotations be characters, and to locate the diagonalization operation of mixed quotation in semantics rather than pragmatics, is that mixed quotation allows quantifying over utterance contexts. For example, the most salient reading of the sentence

(54) Every day, I would promise to finish the paper ‘tomorrow’

refers to not a single context of uttering *tomorrow* but one per day. Given that the character of *tomorrow* maps different contexts to different times, we can account for this reading by resolving (in the sense of Sect. 1.1) the context of *tomorrow* so that it depends on and covaries with the day. To take another example, the sentence

(55) Danes and Norwegians eat ‘frokost’ at different times

has one reading that is true because *frokost* means ‘lunch’ in Danish and ‘breakfast’ in Norwegian. We can account for this reading by resolving the context of *frokost* so that it depends on and covaries with the subject. Whether these examples are cases

of wordplay, such quantification over contexts goes beyond the shifting from one language or context to another that Recanati (2001) considers in his account of mixed quotation.

2.2 Compositionality

The semantics of this fragment is compositional, in the usual sense that the meaning of any expression is determined by the meaning of its (immediate) parts and the combination mode that forms it from them. It is informative to see how this is so despite a usual argument that quotation breaks compositionality. That argument applies to pure and mixed quotes alike. It goes as follows. If English were compositional, then because

(56) Cicero

has the same meaning as *Tully* (a person), the meanings of the sentence with pure quotation

(57) ‘Cicero’ has six letters

and of the sentence with mixed quotation

(58) Bush appealed to the writings of ‘Cicero’

should not change when we replace *Cicero* by *Tully*. But English speakers judge that the truth conditions of these sentences do change when we replace *Cicero* by *Tully*—for example, Bush might use *Cicero* to mean Cheney and *Tully* to mean Rumsfeld. So, English must not be compositional after all.

The way our fragment sidesteps this argument is to deny that the expressions notated by the letters *Cicero* in (56), (57), and (58) are the same one. Specifically, *Cicero* in (58) is a DP', whereas *Cicero* in (56) is a DP. They are different expressions in the precise sense that the fragment does not generate them using the same rule or lexical entry. As far as the fragment is concerned, it is an orthographical accident that these expressions are notated by the same letters.

This situation is not new, not rare, and not due just to quotation. Even if the transitive verbs *man* and *staff* are synonymous, the common nouns *man* and *staff* certainly are not, as the sentence

(59) Bush is a man

shows. Similarly, even if the exclamations *damn* and *fuck* are synonymous, the transitive verbs *damn* and *fuck* certainly are not. Just as these facts do not tell us that English semantics is not compositional, the facts about (57) and (58) do not tell us that English semantics is rendered non-compositional by pure or mixed quotation. Our fragment maintains compositionality despite quotation because the DP's *Cicero* and *Tully* are not synonymous, even though the DPs *Cicero* and *Tully* are

synonymous. In the case of pure quotation (see Sect. 4.1), compositionality holds trivially because there are no synonyms among quoted expressions.

In sum, if the analysis of quotation embodied in our fragment is correct, then quotation does not threaten compositionality in the usual sense. Of course, this conclusion does not logically entail that a natural language with quotation, such as English, is compositional, because our analysis of quotation might be wrong. As a reviewer puts it, ‘only if it were uncontroversial what the right grammar and semantics for English are could one claim that English is compositional.’ This paper participates in that long-standing controversy in a typical way: by noting empirical facts and accounting for them in a formal theory.

Whereas it is natural to use separate grammar rules for the verb *man* and the noun *man*, this reviewer is probably not the only reader to find it counter-intuitive to use separate grammar rules for *reading list* unquoted and quoted ((37) and (40)), *Cicero* unquoted and quoted, ad nauseam. It hardly seems parsimonious to have two grammar rules for every expression. To the extent that our fragment is unappealing, perhaps English is not compositional after all.

I too am bothered by the profligacy of grammar rules for quoted expressions like (39) and (40). However, a general quotation rule that builds ‘*Cicero*’ from *Cicero* as well as ‘*reading list*’ from *reading list* is not the right approach to parsimony, because ungrammatical things can be quoted: ‘*eckullectic*’ is grammatical but *eckullectic* unquoted is not. The right fix is to combine (39), (40), and their infinitely many relatives into a single rule in a richer grammatical formalism. Such a fix (not detailed in this paper) would retain the distinction between quoted and unquoted expressions and hence compositionality.

Another way to phrase the same essential defense of compositionality is, the argument above only attacks compositionality of *reference*, not compositionality of *sense*. That is, the argument takes the ‘meaning’ of an expression to be its reference, not sense. We know that *Cicero* in (56) and *Tully* have the same reference (a person), but they may well have different senses—perhaps different ordered triples, each consisting of a Roman, an expression, and an American. Such senses would support an analysis of the reference and truth conditions of (56), (57), and (58) that is compositional of sense. In contrast, compositionality of reference has been a lost cause since Frege: even though the morning star is the evening star, the sentences

(60) Alice knows that Bob saw the morning star

(61) Alice knows that Bob saw the evening star

have different truth conditions.

3 The productivity of quotation and unquotation

Given that our fragment already contains individual expressions of Bush English, it is a small step to also add the combination modes of Bush English. Assuming that Bush English allows forward and backward application as usual, we add corresponding primed rules:

$$(62) \quad A' ::= (A/B)' B' \quad \llbracket A' \rrbracket(w)(i) = \langle A ::= A/B B \rangle(w)(i) \\ (\llbracket (A/B)' \rrbracket(w)(i), \llbracket B' \rrbracket(w)(i))$$

$$(63) \quad A' ::= B' (B \setminus A)' \quad \llbracket A' \rrbracket(w)(i) = \langle A ::= B B \setminus A \rangle(w)(i) \\ (\llbracket B' \rrbracket(w)(i), \llbracket (B \setminus A)' \rrbracket(w)(i))$$

You never know if the semantics of Bush English handles forward and backward application as normal English does (in (31) and (32)). Hence, we let the composition functions vary: In the semantic rules above, $\langle A ::= A/B B \rangle(w)(i)$ stands for what forward application is used to mean in a context i in a world w . It is a function that maps an ordered pair of semantic contents, of quoted (A/B) - and B -expressions, to the semantic content of the combined quoted A -expression. The upshot is that our semantic composition refers to and simulates Bush's.

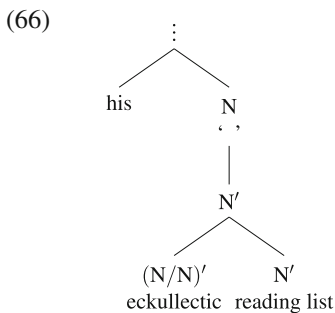
A first payoff of these primed rules is that they parsimoniously account for the productivity of quotes in generic contexts. A simple example of this productivity is that code switching can be regarded as mixed-quoting a generic context, such as that of French utterances, and is not restricted to a finite set of expressions, such as those that have been uttered before. To take a less mundane example, suppose that Bush is predisposed to use *eckullectic* to mean 'eclectic' and *reading list* to mean 'prepared speech', not just occasionally but regularly and habitually. Even if he never uses both phrases in the same actual utterance, then, Bush uses *eckullectic* to mean 'eclectic' and *reading list* to mean 'prepared speech' in a single generic context. The sentence

(64) Bush is proud of his 'eckullectic reading list'

may thus be acceptable and true in that Bush is proud of his eclectic prepared speech. Without any explicit production such as

$$(65) \quad N' ::= \text{eckullectic reading list} \quad \llbracket N' \rrbracket = \langle \text{eckullectic reading list} \rangle,$$

our fragment generates this sentence by combining (39) and (40) using (62), then applying (46):



A more significant payoff of the primed rules is that they let us account for *unquotation*: including non-quoted material inside a quote (Bawden 1999). In written English, unquotation is typically punctuated using square brackets. However, square brackets are ambiguous between *syntactic* and *semantic* unquotation (Shan 2007), as the following examples of mixed quotation illustrate.⁹

- (67) (Syntactic unquotation)
- Bush boasted of ‘my [expletive] reading list’.
 - Every boy_i liked ‘the gift [his_i uncle’s name] gave me’.
 - The politician admitted that she ‘lied my way into [redacted]’.
- (68) (Semantic unquotation)
- Bush boasted of ‘my [eclectic] reading list’.
 - Every boy_i liked ‘the gift [his_i uncle] gave me’.
 - The politician admitted that she ‘lied my way into [her job]’.

A syntactic unquote describes an expression, such as an expletive or a name, that can be plugged into the syntactic construction of a quoted expression. In contrast, a semantic unquote denotes a value, such as an uncle or a job, that can be plugged into the semantic composition of a quoted meaning. In (68), Bush could have used neither the word *eclectic* nor *ekcullectic*, each boy could have referred to his uncle using a different expression, and the politician could have said not *my job* but *this despicable position of deception*. The mixed quote in (69) exemplifies the ambiguity between syntactic and semantic unquotation: Bush could have said *deafening* inaudibly or *in-fucking-audible* audibly.

- (69) Bush complained about the ‘utterly [inaudible] loudspeakers’ in the room.

Starting with (67), our orthography is ambiguous in a new way: the sentence (67a) could be true because Bush put up a sign with

- (70) Come see my [expletive] reading list—you will be amazed!

written on it, including the square brackets. This ambiguity is a variant of that noted by Boolos (1995): the sentence

- (71) Bush is proud of his ‘ekcullectic’ reading list, whereas Cheney is proud of his ‘eclectic’ reading list

could in principle be true because Bush uses

⁹ Many examples in this section use mixed-quoted indexicals, with their shifted interpretations, to emphasize the difference that mixed quotation (and unquotation) makes. However, nothing in this discussion hinges on whether such shifted indexicals are available—as a reviewer points out, ‘there may well be a stylistic tendency to avoid mixed-quoting person indexicals (by shrinking the quote, or using unquotation)’, and any reader who dislikes shifted indexicals can easily adjust the examples to get rid of them. To account for unshifted indexicals such as in Maier’s example (2006)

And I even pissed off the youngest one so much that he told me to quote unquote
‘stick a lamp up my ass’ (<http://www.fansfromoz.com/lowie.html>)

I would have to appeal to unquotation or (following Recanati (2001)) *selective* context shifting.

(72) 'eclectic' reading list, whereas Cheney is proud of his 'eclectic

in writing, including the closing and opening quotation marks, to mean 'eclectic'. I exclude such readings from my notation for expressions throughout this paper.

The productivity of quotation gives rise to another ambiguity, one that I have not excluded: the sentence (64) can be generated either using the primed rule (62), as in (66), or using the atomic production (65), which treats the quoted expression as an atom. This syntactic ambiguity is like how *kick the bucket* has both literal and idiomatic uses, and we can expect language users to negotiate it similarly when it makes a significant semantic difference.

3.1 The prevalence of unquotation

Unquotation is a general strategy for quoting a construction without quoting any complete constituent containing it. Although the register of writing square brackets for unquotation is quite restricted, other instances of unquotation abound in speech as well as writing. I give three examples below, before implementing unquotation formally in the fragment.

First, non-constituents can be mixed-quoted, as Abbott (2003) showed with the following examples.

(73) David said that he had donated 'largish sums, to several benign institutions'.

(74) Mary allowed as how her dog ate 'odd things, when left to his own devices'.

We can analyze these examples by postulating semantic unquotes at the edge of constituent mixed-quotes, as in (68c) above:

(75) David said that he had '[donated] largish sums, to several benign institutions'.

(76) Mary allowed as how her dog '[ate] odd things, when left to his own devices'.

By unquoting *donated* and *ate*, we correctly predict that, for example, (74) could be true even if all Mary said was (77).

(77) Fido devoured odd things, when left to his own devices.

Furthermore, this analysis captures the fact that the mixed quotes in (73) and (74) include not just *largish sums, to several benign institutions*, *odd things*, and *when left to his own devices*, but also David's and Mary's juxtaposing these phrases after a transitive verb. That is why (74) could not be true if all Mary said was (78).

(78) Whereas under human supervision Fido already ate odd things, when left to his own devices he would even eat soap.

This subtlety is overlooked by Maier's (2008) analysis of breaking the quoted non-constituent into two phrases.

Second, a register of informal banter is perfectly compatible with both syntactic and semantic unquotation, as long as it is practical to punctuate or intone the quotes to convey the speaker's intention. It is easier when the quoted language is distinct from the quoting language:

- (79) John tried to show off his French at the restaurant the other day—he ordered 'à la mode [(the name of) some dessert] pour moi'.

To make fun of John, the quote includes his uttering *à la mode* before the dessert name.

Finally, just as a metavariable can occur inside Quine corners, a syntactic unquote can occur inside a pure quote:

- (80) Ralph scribbled the sentence 'I suspect that [Ortcutt's beach alias] is a spy' on a notepad.

- (81) 'I suspect that [Ortcutt's beach alias] is a spy' has ten words.

As one might expect, semantic unquotation cannot occur inside a pure quote unless it is clear from context how to reify the unquoted value into a unique expression in the quoted language that means it.

- (82) ?? Ralph scribbled the sentence 'I suspect that [Ortcutt] is a spy' on a notepad.

- (83) * 'I suspect that [Ortcutt] is a spy' has ten words.

The hearer of (82) may be able to guess what expression Ralph chose to use to mean Ortcutt, but it is impossible to do so for (83).

3.2 Rules for unquotation

We add the two rules below to our fragment, for syntactic and semantic unquotation respectively.

- (84) $A' ::= [\text{DP}] \quad \llbracket A' \rrbracket(w)(i) = (\llbracket [\text{DP}] \rrbracket(w))(\llbracket w \rrbracket(i))$

- (85) $A' ::= [A] \quad \llbracket A' \rrbracket(w)(i) = \llbracket A \rrbracket$

Both kinds of unquotation turn an unprimed category into a primed category, so they can only occur inside quotation. (Primed categories and unquotation rules are thus analogous to slash categories and gap rules.)

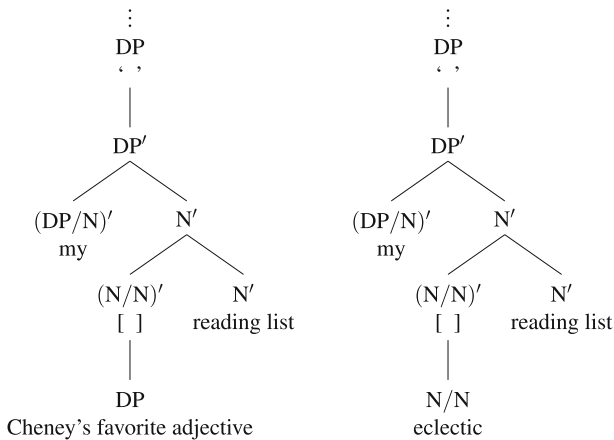
The rule (84) for syntactic unquotation applies only to a DP that denotes an expression, such as *his uncle's name* in (67b). We let such a syntactic unquote

simply denote the character of that expression $\llbracket \text{DP} \rrbracket(w)$. Strictly speaking, this rule does not handle *expletive* in (67a) and *redacted* in (67c), because they are not DPs. We regard these commonplace syntactic unquotes as abbreviations for the indefinites *an expletive* and *a redacted expression* that are special to this context. Before we tackle those indefinites, our fragment already generates semantically simpler instances of syntactic unquotation such as

(86) Bush boasted of ‘my [Cheney’s favorite adjective] reading list’.

All it takes is to apply the rule (84) to the DP *Cheney’s favorite adjective* in normal English. The analysis of the quote is shown below to the left.

(87)



As usual, the semantic content of the DP *Cheney’s favorite adjective* is the function that maps each world to Cheney’s favorite adjective in that world. We thus correctly generate the meaning of (86), which is that Bush boasted of $f_1(m, f_2(a, r))$, where f_1 is what forward application to N yielding DP means in Bush English, m is what *my* means in Bush English, f_2 is what forward application to N yielding N means in Bush English, a is what Cheney’s favorite adjective means in Bush English, and r is what *reading list* means in Bush English.

The rule (85) turns any expression in our language into a semantic unquote. For example, all it takes to generate the sentence (68a) is to apply this rule to the adjective *eclectic* in normal English. The analysis is shown in (87) to the right. A semantic unquote denotes a character that ignores its context argument i . (In this sense, the unquote is non-indexical from the perspective inside the quote.) For example, we correctly generate the meaning of (68a), which is that Bush boasted of $f_1(m, f_2(\llbracket \text{eclectic} \rrbracket, r))$.

The rule (85) lets the unquoted content $\llbracket A \rrbracket$ be evaluated not at the world w where the unquote is evaluated, but at the world where the containing quote is eventually evaluated. In other words, this semantic rule gives rise to de-dicto readings. For example, the reading of (88) that (85) gives rise to is roughly equivalent to interpreting *the spy* de dicto in (89). That is, in each of Ralph’s desired worlds, he finds the spy in that world, not necessarily the spy in the actual world.

(88) Grippled by paranoia, Ralph ‘wanted to find [the spy] and shoot him myself’.

(89) Grippled by paranoia, Ralph wanted to find the spy and shoot him himself.

It is trivial to add another version of (85) that gives rise to de-re readings: just set $\llbracket A' \rrbracket(w)(i)(w')$ to $\llbracket A \rrbracket(w)$ instead of $\llbracket A \rrbracket(w')$, so that the character denoted by the semantic unquote is not only context-insensitive but also rigid. However, in a larger and more realistic grammar, such an additional rule may well be obviated by another means of generating de-re readings, such as quantifying in.

3.3 Using monads to generalize type-lifting

Whether in unquotes or not, quantifiers (such as *an expletive*, *a redacted expression*, and *every boy* in (67b) and (68b)) and bound pronouns (as in *his uncle*) are entirely absent from our fragment. We can accommodate quantification and binding by generalizing the type lifting that we have already woven throughout the fragment to handle intensionality. One way to do so is to parameterize our semantics by a *monad*. This section spells out how, though we leave most intuition and additional examples for elsewhere (Moggi 1991; Wadler 1992; Shan 2001).

- (90) A *monad* is a triple $(\mathbb{M}, \eta, \star)$, where
- \mathbb{M} is a map from types to types. Roughly, it specifies how to lift types. For example, \mathbb{M} could map each type α to the type $\mathbb{M}\alpha = \langle s, \alpha \rangle$.
 - η (pronounced ‘unit’) is a unary polymorphic function that maps values of type α to values of type $\mathbb{M}\alpha$, for every type α . Roughly, it specifies how to lift ordinary values trivially. To continue the example, $\eta(a)(w)$ could be just a , where a is of type α and w is of type s .
 - \star (pronounced ‘bind’) is a binary polymorphic function that maps values of type $\mathbb{M}\alpha$ and values of type $\langle \alpha, \mathbb{M}\beta \rangle$ to values of type $\mathbb{M}\beta$, for every type α and every type β . We usually notate \star as an infix operator. Roughly, it specifies how lifted values compose with each other. To finish the example, $(m \star q)(w)$ could be just $q(m(w))(w)$, where m is of type $\langle s, \alpha \rangle$, q is of type $\langle \alpha, \langle s, \beta \rangle \rangle$, and w is of type s .
- The functions η and \star are *polymorphic*—that is, they must be defined for all types α and β . Moreover, they must satisfy three laws:
- Left identity: $\eta(a) \star q = q(a)$
 - Right identity: $m \star \eta = m$
 - Associativity: $(m \star q) \star r = m \star \lambda a. q(a) \star r$

Notated as an infix operator, \star binds more tightly (in other words, takes higher precedence) than λ , so $m \star \lambda a. q(a) \star r$ above means $m \star \lambda a. (q(a) \star r)$ rather than $(m \star \lambda a. q(a)) \star r$.

Given an arbitrary monad $(\mathbb{M}, \eta, \star)$, we can replace the semantic rule in (31) above by (31 \mathbb{M}) below, (32) above by (32 \mathbb{M}) below, and so on.

- (31M) $A ::= A/B B \quad \llbracket A \rrbracket = \llbracket A/B \rrbracket \star \lambda f. \eta(f(\llbracket B \rrbracket))$
- (32M) $A ::= B B \backslash A \quad \llbracket A \rrbracket = \llbracket B \backslash A \rrbracket \star \lambda f. \eta(f(\llbracket B \rrbracket))$
- (46M) $A ::= 'A' \quad \llbracket A \rrbracket = \llbracket A' \rrbracket \star \lambda h. h \text{ (Bush English)}$
- (62M) $A' ::= (A/B)' B' \quad \llbracket A' \rrbracket = \langle A ::= A/B B \rangle \star \lambda h. \llbracket (A/B)' \rrbracket \star \lambda l. \llbracket B' \rrbracket \star \lambda r. \eta(\lambda i. h(i)(l(i), r(i)))$
- (63M) $A' ::= B' (B \backslash A)' \quad \llbracket A' \rrbracket = \langle A ::= B B \backslash A \rangle \star \lambda h. \llbracket B' \rrbracket \star \lambda l. \llbracket (B \backslash A)' \rrbracket \star \lambda r. \eta(\lambda i. h(i)(l(i), r(i)))$
- (84M) $A' ::= [\text{DP}] \quad \llbracket A' \rrbracket = \llbracket \text{DP} \rrbracket \star \lambda E. \langle E \rangle$
- (85M) $A' ::= [A] \quad \llbracket A' \rrbracket = \eta(\lambda i. \llbracket A \rrbracket)$

For each syntactic category A , constituents of category A now have semantic contents of type $\mathbb{M}(\tau(A))$, where $\tau(A)$ is now defined by

$$(91) \quad \tau(A/B) = \tau(B \backslash A) = \langle \mathbb{M}(\tau(B)), \tau(A) \rangle, \quad \tau(\text{DP}) = e, \quad \tau(\text{S}) = t, \dots,$$

$$(92) \quad \tau(A') = \langle u, \mathbb{M}(\tau(A)) \rangle.$$

The content of a quoted expression now has a type of the form $\mathbb{M}\langle u, \mathbb{M} \dots \rangle$, which generalizes $\langle s, \langle u, \langle s, \dots \rangle \rangle \rangle$. For example, the content of a DP' constituent has the type $\mathbb{M}\langle u, \mathbb{M}e \rangle$, which generalizes $\langle s, \langle u, \langle s, e \rangle \rangle \rangle$. In words, the content of a quoted expression is a lifted character, which generalizes a function from worlds to characters. This generalization is reflected in how (62M), (63M), and (84M) above use the notation $\langle \rangle$: if E is an expression, then $\langle E \rangle$ is a lifted character.

If we take $(\mathbb{M}, \eta, \star)$ to be the example monad given in (90) (called the *reader monad*), then the new semantics reduces to the old one. If we take a different monad, then we get another grammar that similarly juggles the multiple levels of type lifting (Barker and Shan 2008) that arise in the quoting and quoted languages. In particular, to make room for quantificational expressions such as *an expletive*, *a redacted expression*, and *every boy*, we can use the following monad (which is the result of applying the *reader monad transformer* to the *continuation monad*).

$$(93) \quad \mathbb{M}\alpha = \langle s, \langle \langle \alpha, t \rangle, t \rangle \rangle$$

$$(94) \quad \eta(a)(w)(c) = c(a)$$

$$(95) \quad (m \star q)(w)(c) = m(w)(\lambda a. q(a)(w)(c))$$

Here, $\mathbb{M}\alpha$ is the type of a function from worlds to generalized quantifiers over α . For example, the content of *John* as a DP would be the lifted individual $\lambda w. \lambda c. c(j)$, of

type $\langle s, \langle \langle e, t \rangle, t \rangle \rangle$, whereas the content of *John* as a DP' (assuming that Bush uses the name normally) would be the lifted DP-character $\lambda w. \lambda c. c(\lambda i. \lambda w. \lambda c. c(j))$, of type $\langle s, \langle \langle \langle u, \langle s, \langle \langle e, t \rangle, t \rangle \rangle \rangle, t \rangle, t \rangle \rangle$.

To put these quantifier types to work, let us analyze 'my [expletive] reading list' in (67a). Assume that the lifted characters $\langle \text{my} \rangle$, $\langle E \rangle$ where E is any expletive, $\langle \text{reading list} \rangle$, $\langle \text{DP} ::= \text{DP}/\text{N N} \rangle$, and $\langle \text{N} ::= \text{N}/\text{N N} \rangle$ are all *non-quantificational*, in the sense that, for example, $\langle \text{my} \rangle(w)(c) = c(\text{the character of } my \text{ in the world } w)$.¹⁰ Starting with the unsurprising lexical entry

$$(96) \quad \text{DP} ::= \text{expletive} \quad \llbracket \text{DP} \rrbracket(w)(c) = \exists E. (\text{expletive}_w(E) \wedge c(E)),$$

applying (84M) gives

$$(97) \quad \llbracket [\text{expletive}] \rrbracket(w)(c) = \exists E. (\text{expletive}_w(E) \wedge c(\text{the character of } E \text{ in } w))$$

then applying (62M) twice gives

$$(98) \quad \llbracket \text{my} [\text{expletive}] \text{ reading list} \rrbracket(w)(c) \\ = \exists E. (\text{expletive}_w(E) \wedge c(\text{the character of } my \text{ } E \text{ reading list in } w)).$$

Finally, applying (46M) gives an ordinary generalized-quantifier denotation:

$$(99) \quad \llbracket \text{'my} [\text{expletive}] \text{ reading list'} \rrbracket(w)(c) \\ = \exists E. (\text{expletive}_w(E) \wedge \\ (\text{what Bush used } my \text{ } E \text{ reading list to mean in } w)(w)(c))$$

The nucleus (what Bush used *my E reading list* to mean in w)(w)(c) is more or less $c(\text{Bush's reading list in } w)$ with the presupposition that Bush said *my E reading list*.

The sentence (67c) can be analyzed similarly to (67a). As for *his uncle* in (67b) and (68b), one way to treat bound pronouns that is expedient for exposition here is to incorporate assignments, of type g , into the semantics. To do so, we can replace the type t in (93) by $\langle g, t \rangle$, without changing the rest of the monad's definition.

4 Beyond mixed quotation

So far, I have given a formal account of mixed quotation. The fragment enforces well-formedness conditions and supports both kinds of unquotation, by incorporating syntactic distinctions and combination modes from quoted languages. The semantics generalizes causal reference to individuals and kinds, by modeling what quoted speakers mean and hence their mental entities.

As promised in Sect. 1.1.2, these features of the fragment draw from the design of *multilevel* programming languages (Nielson and Nielson 1988, 1992; Gomard and Jones 1991; Taha 1999), which are programming languages whose semantic

¹⁰ In general, a lifted value m is non-quantificational if and only if $m(w)(c) = c(f(w))$ for some f .

values include expressions of an object language. (For example, the C *preprocessor* is a primitive two-level language; quotation in Lisp (Muller 1992) is another oft-cited example.) Typically, the well-formedness conditions of the multilevel language enforce those of the object language by recapitulating them. Analogous to syntactic unquotation is an *escape* construct that combines object expressions. In place of semantic unquotation is a *lifting* operation that turns a value into an object expression that evaluates to that value. Conversely, some multilevel languages allow evaluating an object expression to yield its value. It is often convenient to represent an object expression as a function from interpretations of the object language (Carette et al. 2009).

In the rest of this paper, I take a closer look at the representation of utterance contexts, so as to show that this account of mixed quotation applies more broadly to pure quotation and the rest of language.

What is in an utterance context? In the fragment above, the semantic rules provide only one way to *introduce* contexts, namely by quotation (in (46)). There are also only a few ways to *use* contexts, namely by quoted expressions and combination modes (in (39), (40), (62), and (63)) and by syntactic unquotation (in (84)). Given that these are the only ways to introduce and use contexts, we can regard a context as simply a function from (a possible world and) a quoted expression or combination mode. Formally, this shift in perspective is merely a matter of replacing the quoted context ‘Bush English’ in (46) by the function

$$(100) \quad \lambda w. \lambda E. \langle E \rangle(w)(\text{Bush English})$$

and replacing $\langle E \rangle(w)(i)$ everywhere else by $i(w)(E)$. For example, the lexical entry

$$(39) \quad (\text{N/N})' ::= \text{eckullectic} \quad \llbracket (\text{N/N})' \rrbracket = \langle \text{eckullectic} \rangle$$

is equivalent to

$$(101) \quad (\text{N/N})' ::= \text{eckullectic} \quad \llbracket (\text{N/N})' \rrbracket(w)(i) = \langle \text{eckullectic} \rangle(w)(i)$$

and changes to

$$(102) \quad (\text{N/N})' ::= \text{eckullectic} \quad \llbracket (\text{N/N})' \rrbracket(w)(i) = i(w)(\text{eckullectic}).$$

Then, using the new version of the quotation rule (46), we can calculate

$$(103) \quad \llbracket \langle \text{eckullectic} \rangle \rrbracket(w) = \llbracket \text{eckullectic} \rrbracket(w)(\lambda w. \lambda E. \langle E \rangle(w)(\text{Bush English}))(w) \\ = \langle \text{eckullectic} \rangle(w)(\text{Bush English})(w)$$

as before.

If we only care about a few quoted expressions and combination modes, we can even regard the function $i(w)$ concretely as a small lookup table. For example, we can replace the quoted context ‘Bush English’ in (46) by the function from worlds to quadruples

$$(104) \quad \lambda w. (\llbracket \text{eckullectic} \rrbracket(w)(\text{Bush English}), \llbracket \text{reading list} \rrbracket(w)(\text{Bush English}), \\ \llbracket A ::= A/B \ B \rrbracket(w)(\text{Bush English}), \llbracket A ::= B \ B \setminus A \rrbracket(w)(\text{Bush English})).$$

We then have to change the lexical entry (39) to

$$(105) \quad (\text{N/N})' ::= \text{eckullectic} \quad \llbracket (\text{N/N})' \rrbracket(w)(i) = \pi_1(i(w)),$$

where π_1 is the projection function returning the first element of a quadruple.

4.1 Pure quotation

Although this shift in perspective does not change any of the fragment's predictions, it generalizes our notion of quotable contexts beyond any metaphysical notion of utterance contexts. Our *interpretation function* $i(w)$ only has to be some function in the mathematical sense, whose domain includes quoted expressions and combination modes. In particular, we can recover pure quotation by letting $i(w)$ be the identity function,¹¹ essentially a *Herbrand interpretation*—each expression is interpreted as itself, and each combination mode is interpreted as the function that combines expressions thus. We just add the following rule:

$$(106) \quad A ::= 'A' \quad \llbracket A \rrbracket(w) = \llbracket A' \rrbracket(w)(\lambda w. \lambda E. E)$$

This new rule straightforwardly generates the pure and direct quotes in (3) and (4). It also works with the rule for syntactic unquotation in (84)¹² to generate sentences such as (80) and (81). It is incompatible with the rule for semantic unquotation in (85), so the bad examples (82) and (83) are ruled out. To quote expressions outside Bush English, we can generalize lexical entries like (102) using the semantic pattern (45), or rather, its new version

$$(107) \quad \llbracket E \rrbracket(w)(i) = i(w)(E).$$

Pure quotation is one extreme on a spectrum of hyperintensionality. At the other end is indirect quotation, which some would say is no quotation at all. We can recover indirect quotation using another interpretation function, $\lambda w. \lambda E. \llbracket E \rrbracket$, which appeals to the semantics of our own language. Mixed quotation sits somewhere in the middle of the spectrum.

4.2 The rest of language

I have suggested previously that mixed quotation subsumes all of language except coinage (Shan 2007): Each word or construction we use was acquired from, and can

¹¹ That is, the identity function on quoted expressions and combination modes. A combination mode, such as $A ::= B \ B \setminus A$, is here a function that maps an ordered pair of subexpressions to their combined expression.

¹² Following the shift above, the semantic rule in (84) changes to $\llbracket A' \rrbracket(w)(i) = i(w)(\llbracket \text{DP} \rrbracket(w))$.

be analyzed as a mixed quote of, some utterance (perhaps a generic one). For example, the ordinary sentence *Alice saw Bob* can be cobbled together from mixed quotes of the name *Alice* on one utterance occasion, the name *Bob* on another, and the construction ...*saw*... on a third, combined using semantic unquotation as shown below.

(108) ‘[‘*Alice*’] saw [‘*Bob*’]’

In fact, the quoted utterances of *Alice*, *Bob*, and ...*saw*... are probably not coinages but mixed quotes themselves. If so, the following notation would be more accurate.

(109) ‘[[‘*Alice*’]] saw [[‘*Bob*’]]’

This subsumption underscores the expressivity of mixed quotation for curating meanings from other minds, including their curation from yet other minds. However, these nested mixed quotes are so complex in syntax and semantics as to appear psychologically implausible. Surely, when we say merely *Alice saw Bob* in the usual way, we do not reason about what others use ...*saw*... to mean that they think yet others use ...*saw*... to mean.

It turns out that we can competently speak nested mixed quotes as in (109) without performing nested mental reasoning all the time. As soon as we learn what ...*saw*... is used to mean—in other words, as soon as we shrink our set of belief worlds w enough that $\langle S ::= DP \text{ saw } DP \rangle(w)(i)$ is constant across them—the mixed-quoted ...*saw*... becomes equivalent to an ordinary construction whose semantic content, involving no diagonalization, is that constant, which we might as well call the denotation of *saw*. More precisely,

(110) $\lambda w. \lambda o. \lambda s. \langle S ::= DP \text{ saw } DP \rangle(w_0)(\text{English})(s, o)(w) = \llbracket \text{saw} \rrbracket$

where w_0 is the real world. This equivalence is same as the one between ‘*eckul-lectic*’ and *eclectic* described in (49).

In general, each mixed-quoted word or construction whose syntax and semantics we know can be merged into our own unquoted language, the extra level of quotation ignored thereafter. To learn a language, be it French or Bush English, is thus to move its words and constructions along the spectrum of hyperintensionality from mixed quotation to indirect quotation, or no quotation at all.

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