

# *Scope-Ambiguity, Modal Verbs and Quantification*

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## ABSTRACT

This article addresses the question of the ambiguities which arise in the interpretation of modals, due to scope differences involving quantifiers within these verbs. Two main views have been proposed: (1) the lexical ambiguity view (Lakoff, 1972), according to which modal verbs have different senses which are distinguished by the choices of quantifier over the subject and over times, and (2) the scalar quantity implicature analysis (Horn, 1972), which avoids ambiguity by claiming, broadly, that it is the sense of an item which is asserted, and any other additional meaning is implied. Both solutions are shown to be unsatisfactory. In the last sections of this study, a pragmatic approach, along the lines of Sperber and Wilson's Relevance Theory (1986), is used to provide a unitary explanation.

*You can fool all the people some of the time,  
and some of the people all the time, but you can  
not fool all the people all of the time<sup>1</sup>.*

(Abraham Lincoln)

## 1. INTRODUCTION

When the class of modals is described as anomalous, unpredictable and complex, it is usually, among other reasons, because of the scope-ambiguities

ascribed to some of these verbs. As Lakoff (1972:230) points out, «there is also evidence to the effect that the structure of modals is more complex than had been hoped; perhaps we must provide for quantification within modals, and must allow for ambiguities of interpretation of modals due to scope differences involving quantifiers within modals». In this respect, Palmer (1979:152-3) talks about ‘existential modality’ and considers «that this is yet another kind of modality, distinct from dynamic modality, but dealing with quantification, rather than with modality in any of the senses we have been discussing.» This paper sets out to show that this problem is pragmatic in origin and that a pragmatic approach can be used to provide a unitary explanation.

## 2. THE LEXICAL AMBIGUITY VIEW

We can begin with examples from Lakoff (1972:230), who analyses

- (1) Football players may be sex maniacs
- (2) Football players can be sex maniacs
- (3) Football players can be tall

She notes that (1) is paraphrased by «It is possible for football players to be sex maniacs» but that (2) is triply ambiguous and may have at least any of the following readings: any given football player sometimes is, and sometimes isn’t, a sex maniac; some football players are always sex maniacs, and some football players aren’t; and some football players are sometimes sex maniacs (sometimes not) and some football players are not. But (3) has only one reading: some football players are always tall, and others aren’t.

Lakoff concludes that different kinds of quantification are the cause of these ambiguities: first, quantification over different elements in the sentence (only some superficially present) distinguishes MAY from CAN. The first difference is whether or not there is quantification over possible worlds, as there is with MAY: the possibility of the truth of (1) in other possible worlds is left open. But the use of CAN implies truth in the speaker’s own world. So the second difference is represented by «the different senses of CAN» (Lakoff, 1972:232), which are distinguished by the choices of quantifier over the subject and over times. Lakoff suggests, then, a polysemantic approach to this problem. In this respect, Palmer (1979:153) regards *some* and *sometimes* as meanings of CAN. So (4):

- (4) Lions can be dangerous

can be paraphrased by «Some lions are dangerous» but, according to Palmer, «often CAN does not have the meaning of ‘some’, but of ‘sometimes’, and

our (...) example might well mean 'Lions are sometimes dangerous' or even 'Some lions are sometimes dangerous'» (*ibid.*).

Let us first remove the lexical ambiguity view from our discussion by quickly running through some evidence against it. On the one hand, in uttering (5):

(5) This lion can be dangerous

we are saying that a given lion has the property of being dangerous and that this property can be instantiated at a particular time (probably having in mind some set of circumstances which includes a previous occasion on which the lion demonstrated its property of being dangerous). In the same way, when the subject is plural («Lions can be dangerous»), we might well mean that (1) «some lions have the property of [being dangerous]», that (2) «lions have the property of [being dangerous sometimes]», or even that (3) «some lions have the property of [being dangerous sometimes]». It seems, then, that the contribution of CAN to the meaning of the sentence is to express that the predicate «be dangerous» is a property of the subject («lions»), that if the subject is plural it can be ambiguous between «lions in general» and «some lions», and that this property can be/is instantiated sometimes. It is significant, however, that if we add SOMETIMES to «Lions can be dangerous»:

(6) Lions can be dangerous sometimes

the use of CAN would appear to be redundant, and the 'sometimes interpretation' would be due, if not to the expression SOMETIMES itself, then at most to the co-occurrence of CAN and SOMETIMES. Another question for the polysemy view is why 'sometimes' may have the 'some' interpretation but not viceversa.

On the other hand, when we utter (7):

(7) Lions can't be dangerous

we interpret (7) as «No lions are dangerous» or «Lions are never dangerous». Should we say, then, that CAN, when used in the negative, also means 'no' and 'never'? It seems that, according to the polysemy view, too much of the meaning of these sentences is expressed by CAN. But those who support the polysemy view seem to be giving account of some of the possible environments of CAN, rather than of CAN itself, and this bypasses the question of what CAN itself actually contributes to the meaning of the sentence.

Besides, the question remains of how CAN is disambiguated in sentences like:

(8) Roses can be mauve

which, according to Palmer (1979:153), can be interpreted as «Some roses are mauve» or as «Roses are mauve sometimes»<sup>2</sup>. If we believe that CAN is

ambiguous between different meanings («some» and «sometimes» in these cases) we would expect that it can be disambiguated in **all** cases, yet there are many cases in which a straightforward disambiguation is not possible. This raises the question of what the justification is for the claim that CAN is ambiguous<sup>3</sup>.

### 3. GRICEAN PRAGMATICS

Gricean pragmatics provides a pragmatic explanation as a counter to the generalized tendency to postulate a large number of distinct but related senses for modals. One solution to the unpalatable multiplication of senses suggested by Lakoff is proposed by Horn (1972), using the notion of conversational implicature in general, and that of **scalar Quantity implicatures** in particular<sup>4</sup>. On the basis of Grice's first maxim of Quantity («Make your contribution as informative as is required») a statement with a weaker expression  $e_2$  may be taken as implicating that the relevant statement with a stronger expression  $e_1$  cannot be made. Thus a set of linguistic expressions  $\langle e_1, e_2, e_3, \dots, e_n \rangle$  is a scale if the following conditions are met:

- (a) If  $e_1$  is substituted for  $e_2$  in sentential frame  $S(\ )$  we obtain a well-formed sentence.
- (b)  $S(e_1)$  entails  $S(e_2)$ ,  $S(e_2)$  entails  $S(e_3)$ , etc., but not vice versa.

Given such a scale, a sentential frame and a particular context, the assertion of one value in this frame implicates that a speaker cannot assert, or does not believe, the corresponding sentence with a stronger value.

In order to give a precise definition of such scalar implicatures, Horn (1972) and Gazdar (1979) define a linguistic scale as a set of contrastive expressions of the same grammatical category (such as the modals MUST, SHOULD and MAY/CAN, or the quantifiers ALL and SOME) which can be arranged in order by degree of informativeness or semantic strength. These form an implicational scale ( $\langle \text{ALL, SOME} \rangle$ ;  $\langle \text{MUST, SHOULD, MAY/CAN} \rangle$ ) from which there is a predictive rule for deriving a set of Quantity implicatures: if a speaker asserts that a weaker point on the scale obtains, he implicates that a stronger point on the scale does not obtain. So asserting «It is possible that  $p$ » implicates «It is not necessary that  $p$ », while the use of SOME conversationally implicates the negation of ALL.

Horn (1972:196) observes that «SOME, the weakest positive quantifier whose use implicates the negation of every stronger quantifier, stands in the

same relationship to its quantificational scale as that in which CAN stands to the stronger elements of the logical, epistemic, and deontic scales». Applied to Lakoff's examples, if one asserts that (2) «Football players can be sex maniacs» one conversationally implicates that «Not all football players are sex maniacs» or, using an adverbial phrase of time corresponding to SOME, «Football players are not always sex maniacs». It would appear that, given the utterance of (2) in context, all that is then needed is some theory of utterance interpretation which would enable the hearer to choose one implicature or the other. The acceptability of

(9) Welshmen can be tall

which parallels (3) above, Horn (1972:195) ascribes to the plurality of the noun phrase and hence the availability of the paraphrase «Some Welshmen are tall».

It is important to note that in these examples implicatures are derived by reference to what has not been said: the absence of a strong statement, in the presence of a weaker one, legitimates the inference that the stronger statement does not apply. The focus in interpretation is on what is implicated rather than on what is directly conveyed. Criticism has been made elsewhere of the practice of treating all meaning which cannot be dealt with in truth-theoretic terms as implicature, and of the consequent breakdown of the semantics-pragmatics distinction (cf. Wilson & Sperber (1981), Carston (1988)). Carston (1988) has shown how a variety of Gricean 'implicatures' can be reanalysed as pragmatically determined aspects of what is said. In her analysis, pragmatic principles make a much greater contribution to truth-conditional content than has generally been assumed, and consequently for pragmatics it should not automatically be assumed that every pragmatically determined aspect of utterance meaning (apart from reference assignment and disambiguation) is an implicature. Carston shows that many pragmatically determined aspects of utterance meaning that have been classified as conversational implicatures in the Gricean tradition are better viewed as pragmatic aspects of the proposition expressed.

Carston (1988) proposes a **criterion of functional independence** according to which conversational implicatures are functionally independent of what is said, i.e. they do not entail, and are not entailed by, what is said. When an alleged implicature does not meet this criterion, it must be considered as part of what is said.

Let us first compare the categorical assertion in (10) with the modalized version in (2) (repeated here):

- (10) Football players are sex maniacs
- (2) Football players can be sex maniacs

We could well say that when the speaker utters (2) «Football players can be sex maniacs», the use of a modal verb expressing *possibility* indicates that the speaker is not prepared to make a categorical assertion, that is to say, he has no reasons to assert (10) «Football players are sex maniacs», where «football players» would be interpreted as «all football players», and the temporal reference would be «always». If we (correctly) assume that the first (strongest) member of the epistemic scale is factual assertion, the utterance of (2) «Football players can be sex maniacs» indicates that the speaker is implicating that the categorical assertion in (10) cannot be made, i.e. he is implicating:

(11) NOT [all football players are always sex maniacs]

But (11) entails what is said, which, depending on how reference assignment and disambiguation are carried out, can be any of the propositions in (12):

(12) IT IS POSSIBLE THAT [some football players are sex maniacs sometimes]  
 IT IS POSSIBLE THAT [all football players are sex maniacs sometimes]  
 IT IS POSSIBLE THAT [some football players are always sex maniacs]

Here the speaker can assert the possibility that the state of affairs described in (10) is true if, in the process of reference assignment and disambiguation, we choose for the variables ALL and/or ALWAYS an item lower in the scale (SOME/SOMETIMES; ALL/SOMETIMES; SOME/ALWAYS). It is important to note, then, that neither of the scope ambiguities is ascribable to CAN (which keeps the same contribution to what is said outside the brackets) but to the quantifiers ALL, SOME and to the temporal particles ALWAYS, SOMETIMES, given that the higher members of each scale (i.e., ALL and ALWAYS) do not co-occur. But the essential point to note here is that all the explicitly communicated propositions in (12) are entailed by the alleged implicature (11). This implicature, then, does not meet the criterion of functional independence, because it overlaps in content with/duplicates what is said. And, as Carston says, both explicatures and implicatures are assumptions which occupy independent roles in the mental life of the hearer: they function as autonomous premises in inferential interactions with other assumptions and must be stored in memory as separate assumptions. As Carston (1988:174) notes:

Again this approach is based on the assumption that anything pragmatically derived (apart from reference assignment and disambiguation) is an implicature, an assumption that simply cannot be maintained (...) We have here another case where an alleged implicature entails the explicature of the utterance (...), which should immediately alert us to the possibility that the supposedly implicated material is actually part of the explicature.

An alternative account is then needed of what our examples communicate explicitly, and this will be developed below.

#### 4. RELEVANCE THEORY

Generally, scalar implicatures are an important topic understudied in the Relevance Theory literature. However, there are reasons to believe that the problems in a polysemy approach to modals or in Horn's proposals may be resolved by using this theory (Sperber and Wilson, 1986).

Sperber and Wilson take the notion of **relevance** as the central concept of pragmatics and provide an account of utterance interpretation based on a general cognitive theory of information processing. Underlying Relevance Theory is the idea that in processing information people generally aim at the greatest improvement in their overall representation of the world with the least cost in processing. Hearers search for the relevance of an utterance by processing it in a context which yields the maximum effect at minimum processing cost. Clearly, then, it is in the interests of a hearer searching to establish the relevance of what he hears that the speaker should supply an utterance whose interpretation calls for less processing effort than any other utterance he could have produced. And, equally, given that the speaker wishes to communicate with the hearer, it is in his interests to make his utterance as easily understood as possible. So the hearer can interpret any utterance on the assumption that the speaker has tried to supply him with what the speaker believes to be maximally relevant information for the minimum necessary processing.

More specifically, it is this principle which controls the process of **proposition selection** and **context construction** by the hearer. The hearer's task is to gain more, and better, information about the world, and his aim is therefore to integrate new information with old, or to recover information that is relevant to him. His search for relevance leads him to process new information in a context of existing assumptions, and an utterance is relevant to him if, and only if, it combines with some context to yield new information not derivable from the utterance or context alone. Relevance is maximised when this information is obtained at minimum processing cost. Central to Relevance Theory is the claim that the human cognitive mechanism is geared to maximising relevance, extracting the largest amount of information with the least cognitive effort, and it is this assumption which underlies what Sperber and Wilson call the principle of relevance: the speaker believes that what he has said is, in the circumstances, **optimally relevant** to the hearer, immediately providing the

hearer with a set of premises (proposition expressed plus context) at minimum processing cost.

An utterance triggers in the hearer a process of decoding. The linguistic form of the utterance is determined by the grammar and in this respect is unvarying, but this linguistic form yields a range of semantic representations, one for each sense of the sentence uttered. The hearer must **select** and **complete** one of these semantic representations in deciding which **proposition** the utterance can be taken to express, and the aim of a theory of pragmatics must be to describe how the hearer does this.

For Sperber and Wilson, interpreting an utterance is an inferential process which involves establishing both what is said, or explicit content, as well as what is implicated in the Gricean sense. Two processes are involved here: first, the hearer must establish what proposition the utterance has expressed; and second, if necessary, the hearer must access an extra proposition or set of propositions, the context, which combines with the proposition expressed in the utterance to yield indirect information. In Sperber and Wilson's view the linguistic content of natural language utterances underdetermines the proposition expressed. The grammar is only a partial basis for determining the proposition to be associated with a sentence, assigning what these authors term the logical form of the sentence. This logical form must be developed in a process of enrichment which uses information from context in order to produce a propositional form from which propositions can be constructed:

(...) The sense of a sentence is often an incomplete logical form. (...) when a natural language sentence is uttered, the linguistic input system automatically decodes it into its logical form (or in the case of an ambiguous sentence a set of logical forms), which the hearer is normally expected to complete into the fully propositional form that the speaker intended to convey<sup>5</sup>.

Selection of the proposition expressed is also governed by the principle of relevance and is the key to resolving scope-ambiguities, including those ascribed to modals. We can remember that different senses of CAN were proposed by Lakoff (1972:232) to account for the possible interpretations involving different subjects and times of (2) «Football players can be sex maniacs». In contrast, Horn's solution for similar examples avoids ambiguity by claiming, broadly, that it is the sense of an item which is asserted, and any other additional meaning is implied. Neither of these solutions is satisfactory, in part for reasons already stated and further because they fail to separate scope-ambiguities from the underdetermining by the linguistic content of modal verbs of the way a sentence is to be understood. The semantics of a sentence may not determine the domain



of either individuals or times to be selected, both of which are part of the proposition expressed; but the principle of relevance predicts that these domains will be narrowed until optimal relevance is reached, that is, until the broadest domains remain which are compatible with the requirement of optimal relevance.

Consider (13):

(13) I have had breakfast

According to Sperber and Wilson, once the identity of the speaker and the time of utterance have been fixed, (13) expresses a proposition, viz. the proposition that the speaker has had breakfast at least once before the time of utterance. This proposition, which would be true if the speaker had had breakfast a few decades before the time of utterance, does not correspond to what the speaker means to say when he utters «I have had breakfast». What the speaker says goes beyond the minimal proposition expressible. We need to go beyond the latter and enrich it by pragmatically specifying the relevant lapse of time as rather short (a few minutes, perhaps). This contextual specification is constitutive of what is said. The same processes go on when cases of the so-called scalar implicatures are involved:

The claim by Sperber and Wilson is that selection of interpretation of the scalar implicature phenomena is like that of selection of domain of individuals, and that of selection of interval of time for tense interpretation. In all cases the principle is as follows. Given that the semantics of the sentence itself does not determine the domain to be selected, the domain is narrowed until it reaches an optimal level of relevance<sup>6</sup>.

This phenomenon, however, must be separated from the need for pragmatic enrichment of the semantic content of modals in order to resolve ambiguities deriving from their semantic indeterminacy.

In Berbeira Gardón (1993a) an account has been given of the modals which is based on the interaction of linguistic semantics and pragmatics as advocated by relevance theory. According to this approach, modal verbs have a basic meaning. The output of linguistic decoding is a logical form containing the basic meaning of the modal, which then can be enriched according to the principle of relevance to yield a full interpretation. The basic meaning proposed for CAN, which is a reformulation of Groefsema's proposal, can be formulated as follows:

CAN:p is compatible with the set of all propositions which have a bearing on p, and the world type is potential<sup>7</sup>.

In informal terms, what the basic meaning of CAN does is to focus the hearer's attention on all the evidence for the proposition expressed and expresses that all the evidence supports the proposition expressed. In the interpretation process, this abstract basic meaning can then be contextually enriched and be

interpreted at the level of higher-level explicatures, as ‘ability’, ‘possibility’, ‘permission’, etcetera.

## 5. A RELEVANCE-THEORETIC SOLUTION

Once selection of interpretation of individuals or times and the contribution of CAN to sentence meaning have been separated as two different processes, we may reconsider our initial examples somewhat more fully.

In the case of generic descriptions, such as (2) above, (repeated here):

(2) Football players can be sex maniacs

something characteristic of a group/kind is described. The notion which underlies a characteristic is that of a general truth attributable to all members of the group all of the time, to all members some of the time, to some members all of the time, or to some members some of the time. In the first case, however, when the general truth is attributable to all members of the group all of the time, we have a factual assertion, which cannot be expressed by an utterance containing a modal:

(14) All football players are always sex maniacs.  
ALL X are ALWAYS Y

All the other cases can be expressed by an utterance containing CAN:

(2) Football players can be sex maniacs  
 (2a) Some football players are always sex maniacs  
 SOME X are ALWAYS Y  
 (2b) Some football players are sometimes sex maniacs  
 SOME X are SOMETIMES Y  
 (2c) All football players are sometimes sex maniacs  
 ALL X are SOMETIMES Y

The function of CAN, then, is to constrain the broadest possible interpretation of the proposition expressed (that is, the non-modal) and to point to narrower interpretations of what is potentially true of all members of the group some of the time, or of some members of the group all or some of the time. All these interpretations would share the same logical form:

(2') [p Football players be sex maniacs] is compatible with the set of all propositions which have a bearing on p, and the world type is potential,

and the principle of relevance would guide the hearer in the selection of the domains of individuals and times in order to reach a semantically complete

propositional form («some football players»/»always»; «some football players»/»sometimes»; «all football players»/»sometimes»), i.e.:

- (2a') [p Some football players be always sex maniacs] is compatible with the set of all propositions which have a bearing on p, and the world type is potential.
- (2b') [p Some football players be sometimes sex maniacs] is compatible with the set of all propositions which have a bearing on p, and the world type is potential.
- (2c') [p All football players be sometimes sex maniacs] is compatible with the set of all propositions which have a bearing on p, and the world type is potential.

A slightly different problem occurs with (9) above (repeated here):

(9) Welshmen can be tall

Because of the nature of the predicate «be tall», the proposition expressed by this sentence has the broadest possible temporal scope. In fact, it is not interpretable as other than timeless. Suppose (9) is uttered on seeing the Welsh basketball team surrounded by a crowd of their considerably shorter fellow-countrymen. From the linguistic content of the utterance (9'),

- (9') [p Welshmen be tall] is compatible with the set of all propositions which have a bearing on it, and the world type is potential,

assumptions can be constructed directly by drawing on immediately available contextual information in the development of this linguistic content. The assumption «some Welshmen are tall» can be identified as explicitly communicated. However, «any given Welshman is sometimes tall and sometimes not tall» is not a candidate for an assumption of the sentence uttered, since no one can be tall one minute and short the next. The propositional form would then be:

- (9'') [p Some Welshmen be tall] is compatible with the set of all propositions which have a bearing on p, and the world type is potential.

In contrast to (9), consider the utterance of (15):

(15) Hooliganism can cause serious incidents in British stadiums

expressing the linguistic content:

- (15') [p Hooliganism cause serious incidents in British stadiums] is compatible with the set of all propositions which have a bearing on it, and the world type is potential.

Given that the temporal domain to be selected is not determined by the utterance, it would have to be narrowed down via the principle of relevance until

an appropriate time interval is found. Here the relevant explicature communicated by the utterance of this sentence would most likely be «Hooliganism sometimes causes serious incidents in British stadiums». The undetermined mass noun «Hooliganism» is less likely to guide the hearer in this case to construction of the assumption «a certain amount of hooliganism...» and is not interpretable as «certain kinds of hooliganism ...». And this follows from the fact that the proposition expressed in (15) is less «generic» in nature, being used to refer only to a characteristic of certain areas of a specific location, than the propositions in (2) and (9) which extend to the characteristics of the entire set of players of a certain sport or even to a whole nation.

## 6. CONCLUSIONS

To summarize this study, we might note the following points which have emerged from our discussion. There is a general problem with the modals: the range of logical expressions within the scope of these operators is not fixed by the linguistic expression with which a propositional form is associated. Ambiguities connected with modals are not therefore reducible to other indeterminacies in the linguistic content of an utterance. There are indeterminacies connected with indefinite plurals (cf.9) and with indefinite mass nouns (cf.15) among other features of utterances. The type of predicate expressed can also give rise to indeterminacies so that, for example, in (9) («Welshmen can be tall») the temporal domain is a universal generalisation over time, whereas in (15) («Hooliganism can cause serious incidents in British stadiums») the temporal domain to be selected is restricted to «sometimes».

Domain selection in respect of individuals and time are discrete aspects of the enrichment process of the linguistic content of utterances, governed as usual by the principle of relevance. Also governed by this principle is the separate process of fixing the scope of propositional operators such as modals. But the scope-ambiguities of (2), (9), and (15) are not ascribable to CAN, or to various senses of this modal as suggested by Lakoff. Nor is an account in terms of implicatures, as proposed by Horn, appropriate or revealing. The assumptions relevant to the interpretation of the examples discussed above have been shown to be, in each case, explicitly communicated developments of a propositional form.

## NOTES

<sup>1</sup> Taken from D. C. Dennet (1981), *Consciousness Explained*, Harmondsworth: Penguin Books.

<sup>2</sup> It is not clear to me that these two different 'interpretations' describe two different states of affairs at all.

<sup>3</sup> For further and more general criticisms against the polysemy view, see J. L. Berbeira Gardón (1993a).

<sup>4</sup> Cf. the summary given in S. C. Levinson (1983:133 ff.). The scalar implicature analysis is explicitly defended by the majority of Gricean pragmatists: «The recognition of such scalar implicatures not only aids the understanding of the general vocabulary in a language, but it also plays a crucial role in understanding the 'logical' expressions in natural language, especially the connectives, the quantifiers and the modals.» (S. C. Levinson (1983:101). Certainly, scalar implicatures are a central focus for neo-Gricean pragmatists like Horn and Levinson, who play about with various reformulations of the two quantity maxims, considering them and the tension and interaction between them as probably the central driving principles in pragmatics.

<sup>5</sup> D. Sperber and D. Wilson (1986:73).

<sup>6</sup> R. Kempson (1988: 96).

<sup>7</sup> 'Potential worlds' are defined in D. Wilson and D. Sperber (1988:85) as «worlds compatible with the individual's assumptions about the actual world which can be, or become, actual themselves». See Berbeira Gardón (1993a, chapter 3) for a characterization of modal sentences as those semantically specialized for the representation of potential worlds. A somewhat similar approach has recently been taken by A. Klinge (1993), who adopts the terms 'potential' and 'potentiality' to stand for the semantic field shared by the modals CAN, MAY, MUST, WILL, and SHALL. The two accounts differ in that Klinge proposes that the modals contribute to the interpretation of an utterance by providing a relation between the proposition expressed and an actual state of affairs. The account in Berbeira Gardón (1993a), like Groefsema (1992, 1995), suggests that the modals contribute a relation between the proposition expressed and a set of assumptions. Groefsema's account, however, does not make any reference to the notion of 'potentiality'.

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