

Questioning and time

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Past tense anomalies This talk provides an account for a set of observations concerning past tense in questions, most of which, to the best of our knowledge, are novel. For our empirical investigation, we will use a certain kind of stative sentences, viz. statives that express analytic truths (henceforth “analytic statives”). We observe that, other than ordinary statives (Klein 1984), analytic statives cannot be interpreted relative to a reference time (i.e. they cannot be claims about just that time): the question in (1-Q) fixes a past reference time, viz. the time after the first stop of the bus; still, the past tense version of the last conjunct of the answer (1-A) gives rise to the “cessation implicature” that the present tense counterpart of the sentence is false (cf. Altshuler & Schwarzschild 2013; henceforth “A&S”). This leads to deviance, presumably because the cessation implicature contradicts the common knowledge that the difference between any two numbers is eternally the same (cf. Magri 2009).

- (1) Q: Why are you so sure that exactly thirty-three seats were empty after the first stop?
A: Well, the bus has forty seats, seven passengers entered the bus at the first stop, and forty minus seven {is | #was} thirty-three.

We will also control for the “sequence of tense” (SOT) effects by looking at sentences in German, a language without SOT, as evidenced by (2).

- (2) a. The students knew that two was a prime number
b. Die Studenten wussten, dass zwei eine Primzahl {ist | #war}
the students knew that two a prime number is was

Assuming that implicatures of **know**-complements are inherited by the matrix sentence (Chierchia 2004), the deviance of the past tense variant of (2b) is due to the inference that 2 was, but has ceased to be, a prime number, which contradicts common knowledge. Curiously, if the embedded clause is changed to a question, German appears to allow SOT.

- (3) a. Most of the students knew which number was a prime number
b. Die meisten Studenten wussten, welche Zahl eine Primzahl {ist | war}
the most students knew which number a prime number is was

The past tense variant of (3b) has a consistent reading in which it does not imply any number to have been prime in the past and non-prime at the present. Imagine, for example, a math test context, where students have to tell which number of the pair $\langle 1, 2 \rangle$ is prime. After evaluating the results, the teacher can surely utter the past tense variant of (3b) felicitously. Moreover, we find the question induced non-cessation reading even under present tense attitude verbs: in the math test context, the question in (4), asked by one of the students to her classmate, does not imply cessation of the prime number property.

- (4) Weißt du, welche Zahl eine Primzahl war? ‘Do you know which number know you which number a prime number was was a prime number?’

The above observation is complicated by two others. The first shows that it is not simply the case that embedded questions in German tolerate past tense: the past tense variant of (5b) is deviant, as it implies that two is no longer prime or no longer not prime.

- (5) a. Most of the students knew whether two was a prime number
b. Die meisten Studenten wussten, ob zwei eine Primzahl {ist | #war}
the most students knew whether two a prime number is was

The second is that both questions, ‘which number is prime’ and ‘whether 2 is prime,’ can bear past tense in unembedded contexts: both (6a) and (6b) can be felicitously uttered in appropriate contexts (cf. Sauerland 2001, Sauerland & Yatsushiro 2014).

- (6) a. Welche Zahl war (nochmal) eine Primzahl? b. War zwei (nochmal) eine Primzahl?
which no. was (again) a prime no. was two (again) a prime no.

Tense semantics This talk provides an account for the set of facts just presented. The account starts from a number of assumptions about tense. Following A&S, we assume the “Temporal Profile of Statives” (TPS): For any tenseless stative clause ϕ and world w , if ϕ is true in w at moment m , then there is a moment m' preceding m at which ϕ is true in w and there is a moment m'' following m at which ϕ is true in w (i.e. each convex interval $\{m : \phi \text{ is true in } w \text{ at moment } m\}$ is open on both sides). The tense operators PAST and PRESENT denote functions $[\lambda C \lambda p \lambda t \lambda w. \exists t'(t' R t \wedge t' \in C \wedge p(t')(w) = 1)]$, where R is the precedence relation ($<$) in the case of PAST and the identity relation ($=$) in the case of PRESENT, and C a domain restriction representing the “reference time.” (In syntax, tense is thus adjoined to a syntactic variable that is assigned the value C by the context.) It follows from these assumptions that for any C that includes the speech time s^* , $\llbracket \text{PRESENT} \rrbracket(C)(\llbracket \phi \rrbracket)(s^*)$ will non-trivially entail $\llbracket \text{PAST} \rrbracket(C)(\llbracket \phi \rrbracket)(s^*)$, and a past tense stative will license the cessation implicature that the present tense counterpart is false. We take the cessation implicature of past analytic statives to show that hyperintensional meanings allow for temporal specification and a notion of truth at a moment of time (i.e. they have the TPS). To account for the fact that the cessation implicature of past analytic statives cannot be cancelled by excluding the speech time s^* from C , making $\llbracket \text{PRESENT} \rrbracket(C)(\llbracket \phi \rrbracket)(s^*)$ contradictory and thus a non-viable alternative to $\llbracket \text{PAST} \rrbracket(C)(\llbracket \phi \rrbracket)(s^*)$, we add the condition that a domain restriction must be trivial if it is vacuous. Since tenseless analytic statives are eternally true or eternally false, the domain restriction of a past analytic stative is vacuous (i.e. it cannot alter its meaning), and must hence be trivial (i.e. include all moments, among them s^*).

Questions semantics We adopt the following rather standard assumptions about questions: (i) the semantic value of a question is the set of its possible answers (Hamblin 1958); (ii) to ask a question is to state a request, and to know a question is to know the true answers to it; (iii) a question q is parsed as QUEST(q) as a matrix clause, and as ANS(q) as the complement of **know**. The function of QUEST is to map a set of possible answers Q to the proposition that the speaker requests that the hearer identify the true elements of Q . (We are only concerned with the truth-conditional underpinning of question acts and not with the speech acts themselves.) The function of ANS is to map Q to the conjunction of all true members of Q (cf. Stenius 1967, Ross 1970, Karttunen 1977, Heim 1991, Krifka 2001).

Explanation of the data Let q be a question and Q the set of its possible answers. If all possible answers have the TPS, then $\llbracket \text{ANS} \rrbracket(Q)$ will have the TPS, too, since the TPS is preserved under conjunction; $\llbracket \text{QUEST} \rrbracket(Q)$, in contrast, will not have the TPS if we assume that the semantic ‘request’ predicate, just like its lexical counterpart, is not stative. This explains the contrast between (6b) and the past variant of (5b): the embedded question q of the latter is parsed as ANS(q), which has the TPS and hence leads to a cessation implicature; the matrix question q in (6b) is parsed as QUEST(q), which does not have the TPS; since q , by virtue of denoting a set of semantic objects, doesn’t have the TPS either, (6b) doesn’t trigger a cessation implicature. To explain the contrast between the past variant of (5b) and (3b), we note that the latter examples contain identification questions in which the **which**-phrase can quantify over members of a conceptual cover, which is a “method of identification” (Aloni 2001). Importantly, on one such method, viz. identification by ostension, the answer set of the identification question **which number was prime?** is a set of non-analytical statives: {the first number (of the number pair on the math test sheet) was prime, the second number was prime}; the result of applying $\llbracket \text{ANS} \rrbracket$ to this set (viz. one of the two propositions) has the TPS. This means that the **which**-questions in (3b), and also (4), do trigger a cessation implicature. However, this implicature doesn’t lead to deviance given the identification-by-ostension reading of these questions, since it is non-analytical. (There is evidence for the cessation implicature: if the math test sheet is salient in the utterance situation, (3b) and (4) are infelicitous.)