Is 'kein' Really Not Subject to Analysis?

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1. Introduction

In this research I like to bring forward how to treat the German negator 'kein' correctly for prenominal negation such as 'keine Frau' and 'kein Kind' within the framework of Montague Grammar.

Until now, 'kein' has been treated in two different ways, that is, the one is that 'kein' is not subject to analysis and the other is that 'kein' is subject to analysis. But unfortunately the subject of the correct form is not much discussed. Now I will show that 'kein' should be decomposed into the negator 'nicht' and the existential quantifier 'ein' in order to find out all of the possible readings of a sentence with the negator 'kein'. But the purpose of decomposing it is different from Jacobs(1980). He controverted the so-called lexical decomposition, while the decomposition of such an expression as 'kein' is called 'Grammatical decomposition' by Hwang, J.I. (1982:389-390)'. From this point, I will examine the controversy closely.

2. Review

In the first one of the two arguments above, 'kein' has been regarded as an unanalysable expression like 'jeder', 'der', and 'ein'. And it is introduced into the sentences syncategorematically by syntactic rules and their corresponding translations are given beforehand like (1) by translation rules (Stechow (1978: 117-119), S. S. Shin (1980: 65), Löbner (1976:242-244)).

(1) kein $\Rightarrow \lambda P \lambda Q \neg \forall x\, [P(x) \wedge Q(x)]$

Then let's translate the sentence (2).

(2) Keine Frau träumt.

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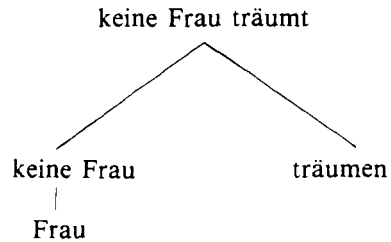
The sentence (2) is to be analysed as follows:

(2′)



With the help of (1) and (2′), (2) translates into the formular (2″) correctly.

(2″) $\neg \forall x$ [Frau′(x) ∧ träumen′(x)]

Neglecting the differences in types, this is the same way as K. Lee (1974, 1976) has used for prenominal negation such as *no man*. He has added an extra operation to the syntactic rule 2 in PTQ and its corresponding translation rule (1974: 119)

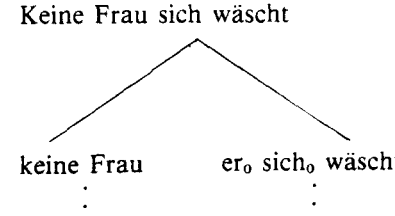
(3) a. $S_2 : F_{2'}(\alpha_{CN}) = no\ \alpha_T$

b. $T_2 : F_{2'}(\alpha_{CN}) = \lambda P \neg \forall x[\alpha'(x) \wedge P\ \{x\}]$
where P is $V_{o,<s,<<s,e>,t>>}$ and x is $V_{o,<s,e>}$.

As mentioned above, I will neglect individual concept here as in Bennett (1976). However, this rule could raise a crucial problem. We can find it by closely examining the sentence (4). The first argument can be discarded without hesitation.

(4) a. Keine Frau wäscht sich.

b. Keine Frau sich wäscht



(4a) translates into the formula (4′) correctly with the help of (1) and the analysis tree (4b).

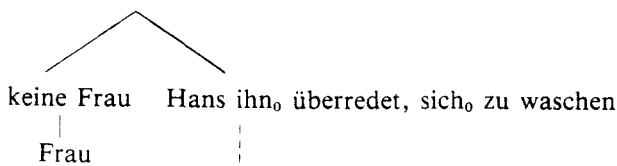
(4′) $\neg \forall x$[Frau′(x) ∧ waschen′(x)]

As (4') corresponds with our linguistic intuition, the translation of 'kein' and the respective analysis tree (2') and (4b) of (2) and (4a) may be regarded as proper. But as 'keine Frau' is binding both er_0 and $sich_0$ in the analysis tree (4b), the coreferential relation seems to stand between 'keine Frau' and $sich_0$ shown in the analysis tree. However, it does not correspond with our intuition. In this sentence '$sich_0$' does not denote the whole NP 'keine Frau', but it is in the coreferential relation with the NP 'eine Frau' without the negative meaning. This phenomenon arises also frequently in the complex sentences. For instance, the sentences in (5) show the fact.

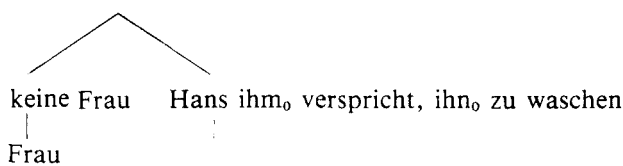
(5) a. Hans überredet keine Frau, sich zu waschen.
b. Hans verspricht keiner Frau, sie zu waschen.

If we analyse the sentences in (5) in order to obtain the proper translation, the analysis trees are illustrated roughly as follows:

(5') a. Hans keine Frau überredet, sich zu waschen



b. Hans keiner Frau verspricht, sie zu waschen



From the analysis trees, we will see that 'keine Frau' binds not only 'ihn_0' but also '$sich_0$' in (5'a) and that 'keine Frau' binds not only 'ihm_0' but also 'ihn_0'in (5'b). And it seems that '$sich_0$' in (5'a) and 'ihn_0' in (5'b) denote the whole NP of 'keine Frau' and 'keiner Frau', respectively. But it is not true as shown in (4'b) above, and it contradicts our intuition. Therefore, the first method is not good, which introduces the prenominal negator 'kein' into the sentence syncategorematically like 'jeder', 'der', and 'ein'.

On the other hand, from such a point of view, the other argument that 'kein' should be lexically decomposed into the negator 'nicht' and the existential quantifier 'ein' is apparently true. To say the conclution in advance, however, I agree with Jacobs(1980) in the point that 'kein' should be decom-

posed into the negator 'nicht' and the existential quantifier 'ein'. But it is important to know that the reason why it should be decomposed is different from my argument.

3. Possible Readings

It is said that the sentence is ambiguous, when it has more possible readings than two. To find out all of the possible readings which an ambiguous sentence has in relation with quantifiers and/or negators — it occupies an important position in linguistics. How must we treat an ambiguous sentence in order to obtain every and only possible reading?

3.1 The Negated Sentences with the Quantifiers

Now we will see by examining his own sentences why his argument is not adequate. The following sentences are his own.

(6) a. Alle Ärzte haben kein Auto.
b. Jedem ihrer Ärzte vermachte Luise keine Spieldose.

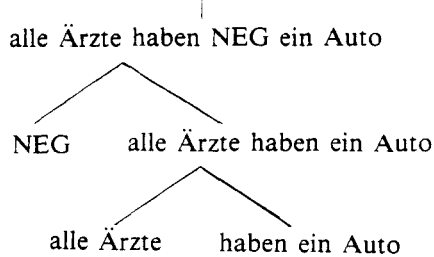
Against the first argument, Jacobs(1980) insists that 'kein' should be subject to analysis into the negator 'nicht' and the existential quantifier 'ein'. According to Jacobs(1980), the sentences have the meaning $\Lambda x \neg \forall y[Arzt'(x) \rightarrow [Auto'(y) \wedge haben'(x,y)]]$, $\Lambda x \neg \forall y[Arzt'(x) \rightarrow [Spieldose'(y) \wedge vermachen'(l,x,y)]]$ respectively. But as mentioned for English in K. Lee(1974), they do not have the reading $\neg \forall y \Lambda x[Auto'(y) \wedge [Arzt'(x) \rightarrow haben'(x,y)]]$, $\neg \forall y \Lambda x[Spieldose'(y) \wedge [Arzt'(x) \rightarrow vermachen'(l,x,y)]]$ respectively. Every German agrees in this opinion. In order to obtain the correct readings and to block the incorrect readings, Lee suggested Crossover-Constraint on quantification.[3] By the Crossover-Constraint on Quantification, the reading in which 'kein' has the wider scope is blocked. Unfortunately, however, Jacobs argues that they possibly mean the reading $\neg \Lambda x \forall y[Arzt'(x) \rightarrow [Auto'(y) \wedge haben'(x,y)]]$, $\neg \Lambda x \forall y [Arzt'(x) \rightarrow [Spieldose'(y) \wedge vermachen'(l,x,y)]]$ respectively in the southern Bavarian dialect. In other words, the readings are not in High German. For the most part, Germans do not agree in his opinion. In fact, no well-educated Germans use such expressions for the meanings. Anyway, in his opinion, for such a case, 'kein' should be decomposed. But even though the lexical decomposition is acceptable in German, Jacobs(1980) cannot explain the following problems:

First, even though the reading in which 'kein' has the wider scope ($\neg \forall y \Lambda x[\ldots\ldots]$) is blocked by the Crossover-Constraint by Lee(1974), how does a man block the other readings, which, in fact, are actually im-

possible but possibly arise through the lexical decomposition? That is, ΛxVy[...¬ ...], Vy ¬ Λx[.....], VyΛx[... ¬ ...].

Secondly, his analysis tree for the reading '¬ ΛxVy[.....]' is as follows:

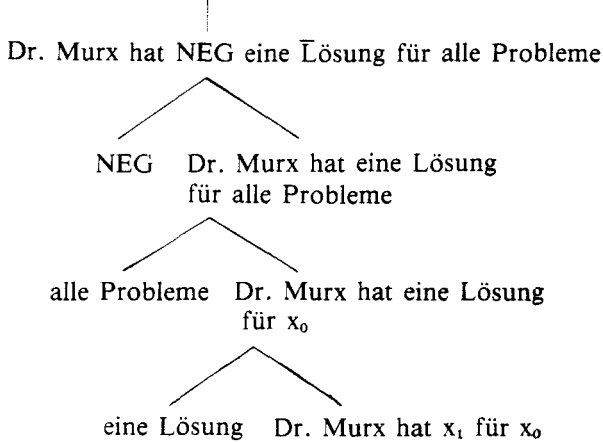
(7) alle Ärzte haben kein Auto



In his analysis tree there are no syntactic devices to fix the position of NEG. That is, when NEG is realized as 'nicht' before 'alle', another natural sentence with the same meaning is also possible — Nicht alle Ärzte haben ein Auto. — And on the other hand, when NEG is realized as 'nicht' after 'ein Auto', another natural sentence appears with the different meaning. — Alle Ärzte haben ein Auto nicht. —

Lastly, moreover, complex problems are brought about by his analysis of the sentence (8)a in the form of the analysis tree (8)b:

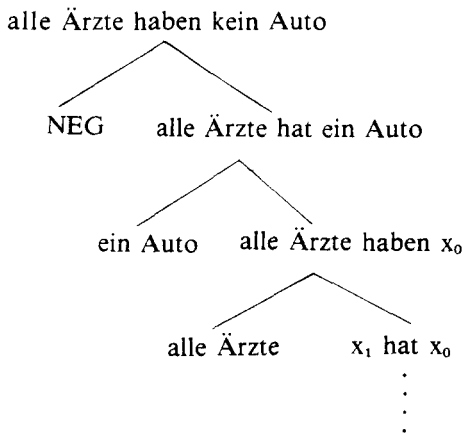
(8) a. Dr. Murx hat keine Lösung für alle Probleme.
b. Dr. Murx hat keine Lösung für alle Probleme.



The sentence gives up 3 of the mathematically possible readings as its adequate readings because of the Crossover-Constraint (e.g. *Vx¬ Λy [.....],

*∀x∧y[.. ¬···], *∧y∀x[.. ¬···]). The suggested analysis tree is for the reading ¬∧y∀x[·····]. This analysis tree shows that the linear order of the surface can be reversed in the analysing process, that is, the term-phrase 'alle Probleme' with the universal quantifier at the back has the wider scope than the term-phrase 'eine Lösung' with the existential quantifier in the front linearly. If it is really possible to reverse the linear order, the following analysis tree for (6a) is also possible, which is different from (7). That is, it is analysed by reversing the linear order.

(7')



In this analysis tree, 'ein Auto' with the existential quantifier is introduced into the sentence later than 'alle Ärzte' with the universal quantifier, and results in having the wider scope. This analysis tree does not violate the Crossover-Constraint. Nevertheless, this process brings us the impossible reading (*¬∀y∧x [·····] In fact it must be blocked by the Crossover-Constraint in K. Lee(1974).

Hereby we have seen that the argument of Jacobs(1980) cause many complex problems, because with his method we obtain implausible readings from a normal point of view. Therefore, his lexical decomposition cannot be accepted in our grammar for High German.

From now on I will describe German, especially the German negative sentences within the framework of Montague Grammar.

All the attempts to describe German within the framework of Montague Grammar with the use of syntactic rules and translation rules have failed in explaining the differences in readings as the position of the negator 'nicht' changes (Löbner(1976), Stechow(1978), Link(1976), Heringer etc.(1980), Jacobs(1980).

Stechow argues that each of the 3 sentences in (9) should have the syntactically different derivational histories respectively, because each of them is not ambiguous at all and so has the different meaning semantically.

(9) a. Nicht jeder Mann himmelt einen Filmstar an.
b. Jeder Mann himmelt nicht einen Filmstar an.
c. Jeder Mann himmelt einen Filmstar nicht an.
(Stechow 1978: 111-115)

Such an argument of Stechow's is supported by the sentences of Heringer et al. (1980) and Link(1979).

(10) a. Alle Säugetiere sind Landbewohner.
b. Nicht alle Säugetiere sind Landbewohner.
c. Alle Säugetiere sind nicht Landbewohner.
(Heringer et al. 1980: 284)

Heringer's opinion is that the negation of the sentence of (10a) is only (10b) and (10c) has the different meaning from (10b). He also presents the sentences in (11) in order to stick to his opinion. That is, the sentences (11a) and (11b) are different in meanings from each other.

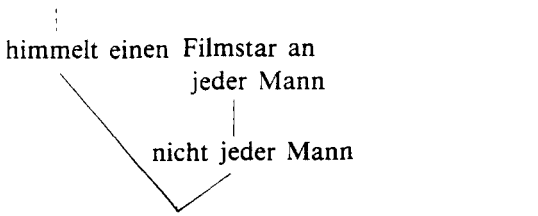
(11) a. Nicht alle Amerikaner sind blauäugig.
b. Alle Amerikaner sind nicht blauäugig.
(Heringer et al. 1980: 332)

Link(1979) treats (12a) and (12b) as different in meanings.

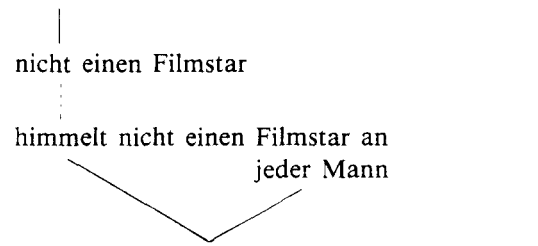
(12) a. Die Kinder sind alle nicht aufrichtig.
b. Die Kinder sind nicht alle aufrichtig.
c. Nicht jeder Raucher ist rücksichtsvoll.
(Link 1979:83)

That is, Stechow, Link, and Heringer et al. insist that the linear order of the sentence is crucial for the meaning of the sentence, especially in German. For each of the sentences in (9), Stechow illustrates the syntactic derivational histories as in (9'):

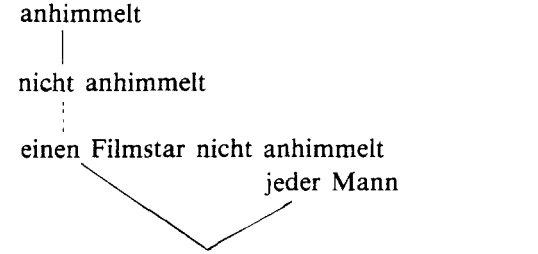
(9′) a. anhimmelt



b. einen Filmstar



c. anhimmelt



Even though this method of Stechow's explains the differences in meanings of the 3 sentences systematically and explicitly, in (9′a) and (9′b) the negator 'nicht' works as function from a term-phrase to a term-phrase, and in (9′c) it works as function from an expression of IV/T type to the same type (IV/T). Therefore we must know one of other functions of the negator in order to explain the sentences in (13). That is, in (13) it works as function from the expression of IAV(= IV/IV) type to the expression of the same type(IAV = IV/IV).

(13) a. Hans geht nicht oft in die Schule.
b. Hans geht oft nicht in die Schule.

This method is not suitable because the negator 'nicht', which is the logical constant, works semantically as a sentence-operator but syntactically it does not work as a sentence-operator. We must find a device to fix the position of the negator 'nicht' in a sentence. The logical operator 'nicht' must work only as a sentence-operator not only semantically but also syntactically.

3.2 The Tensed Negated Sentences

Now we will consider the tensed sentences. Tense-operators have relative scopes and as a result of it, we must recognize the ambiguities caused by quantifiers and/or negators in relation with tense-operators. However, it is easily understood what to do for an explanation of such ambiguities. Then let's consider the negative past sentence of Löbner:

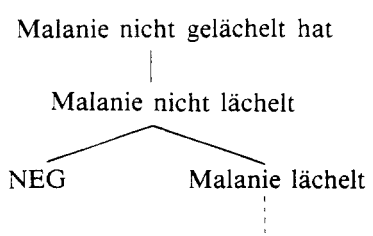
(14) Malanie hat nicht gelächelt.
(Löbner 1976: 233)

According to Löbner, (14) can be interpreted in two different ways because of the differences in the scope of the tense-operator and the negator. The two different interpretations are given in (14′) respectively.

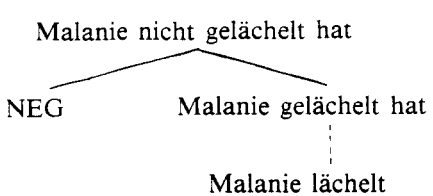
(14′) a. P[¬ lächeln′(m)]
b. ¬P[lächeln′(m)]

For (14′a) and (14′b) he suggests the following analysis trees respectively.

(14″) a.



b.



In his opinion, (14″a) means that 'Malanie hat (einmal) nicht gelächelt.' and (14″b) means that 'Malanie hat nie gelächelt.' Link(1979) also treats the same phenomenon. Let's consider the sentence (15) of Link (1979: 216).

(15) (Früher) verlor der Trainer nicht.

(15′) a. $\forall y[\lambda x[\text{Trainer}'(x) \leftrightarrow x = y] \wedge \neg P \text{ verlieren}'(y)]$
b. $\neg P \forall y[[\lambda x \text{ Trainer}'(x) \leftrightarrow x = y] \wedge \text{verlieren}'(y)]$

The sentence (15) has two possible readings: (15′a) and (15′b). He says that (15′a) means that 'Der Trainer ist jemand, der (früher) nicht verlor.' and (15′b) means that 'Es war (früher) nicht der Fall, dass der Trainer verlor.' Link(1979) cannot yet find out the other readings of (15) because he exactly follows the method of Montague's PTQ. That is, with syntactic rules setting the tense in the IV-phrase as in PTQ and Dowty(1982), we could not show explicitly the ambiguities caused by 'nicht' and tense-operators. The negator 'nicht' must function semantically and syntactically only as a sentence-operator in my research.

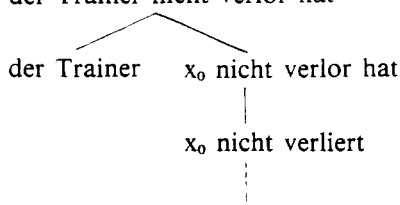
4. Syntactic Rules and Translation Rules for Tense and Negation

How can we treat possibly ambiguious sentences? I will lay importance on the fact that the negator must be a sentence-operator because it is a logical operator which works only as a sentence-operator in logic. From such a point of view, no syntactic rules and translation rules in PTQ, Lee (1974, 1976), Löbner(1976), Link(1979), or Dowty(1982) explain the ambiguities of (14) and (15). If we have no consideration for the sentences with time adverbs, the method of Dowty(1979) is much better than Dowty(1982), in which he treats the sentences with time adverbs. Dowty(1979) has two new rules to introduce the tensed sentences. For such an explanation of the ambiguities, we must have a new syntactic tensing rule and its corresponding translation rule (16). The rule resembles the tensing rules of Dowty(1979)[4]. It is applied only to the expression of <t> type.

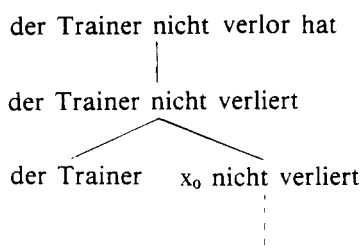
(16) Sm (tense rule): If $\phi \in P_t$, then Fm $(\phi) \in P_t$.
Fm $(\phi) = \phi'$, where ϕ' has its third person present perfect form instead of the finite verb in ϕ
Tm: If $\phi \in P_t$ and ϕ translates into ϕ', then Fm (ϕ) translates into $P\phi'$.

For each of (15′a) and (15′b), we have the analysis trees in (15″) respectively.

(15″) a. der Trainer nicht verlor hat



b. der Trainer nicht verlor hat



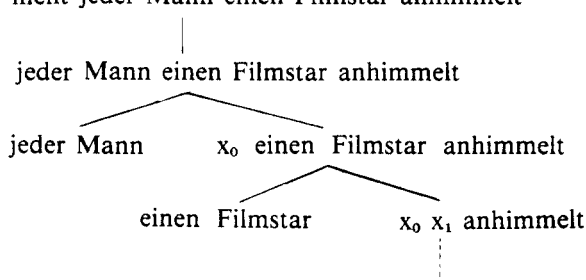
If we solve the above mentioned problems with the new negation rule in which the negator 'nicht' works only as a sentence-operator not only semantically but also syntactically, instead of the new device to fix the position of the negator 'nicht'. The new negation rule looks like as (17).

(17) Sn (negation rule): If $\phi \in P_t$, then Fn $(\phi) \in P_t$. Fn $(\phi) = \phi'$, where ϕ' is exactly like ϕ except for the negator 'nicht' before the first word, which is not a variable.

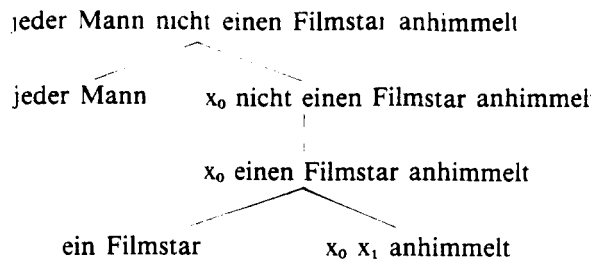
Tn: If $\phi \in P_t$, ϕ translates into ϕ', then Fn (ϕ) translates into $\neg\phi'$.

With this rule we can explain the differences in meanings of the sentences given by Stechow(1978), Heringer etc.(1980), and Link(1979). I will illustrate the analysis trees of the sentences in (9) as in (9″).

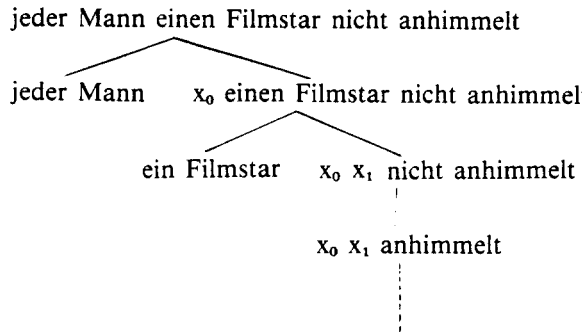
(9″) a. nicht jeder Mann einen Filmstar anhimmelt



b



c.



In the analysis tree (9″a), 'jeder Mann' is the first word which is not a variable. Therefore 'nicht' must lie before 'jeder Mann'. But in the analysis tree (9″b) 'einen Filmstar' is the first word which is not a variable. Therefore, 'nicht' lies before 'einen Filmstar'. Similarily, in the analysis tree (9″c) 'anhimmelt' is the first word which is not a variable. Thus, 'nicht' lies before 'anhimmelt'. Furthermore, with these rules we can explain the sentences with the particular structure. The sentences in (18) are all grammatical, but the sentences in (18′) are all ungrammatical. Let's compare the German sentences with English ones.

(18) a. Hans liebt nicht viele Studentinnen.
a′. Hans liebt viele Studentinnen nicht.
b. Hans hat nicht viel Geld.
b′. Hans hat viel Geld nicht.

(18′) a. *John loves not many girl-students.
a′. *John loves many girl-students not.
b. *John has not much money.
b′. *John has much money not.

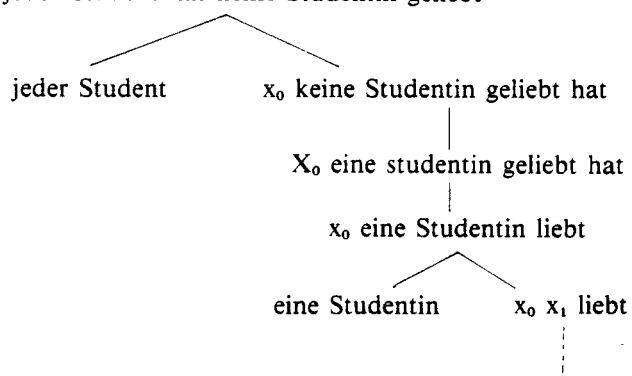
However, with this negation rule and the quantification of proper nouns according to the super-star convention by K. Lee(1981), it is shown in the same way as in (9″) how the pairs of the sentences in (18) are different in meanings from each other. Lastly, let's consider the sentences in (19). With the new rules the possible readings of (19) can be suggested as follows:

(19) Jeder Student hat keine Studentin geliebt.

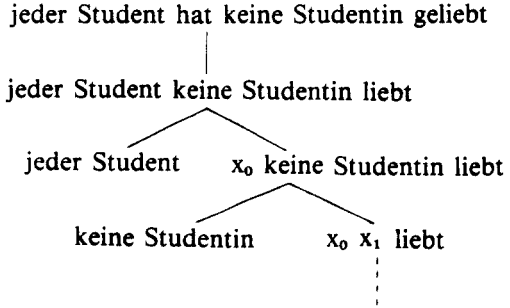
(19′) a. $\Lambda x[\text{Student}'(x) \rightarrow [\neg \forall y[\text{Studentin}'(y) \wedge P \text{ lieben}'(x,y)]]]$
b. $P\Lambda x[\text{Student}'(x) \rightarrow [\neg \forall y [\text{Studentin}'(y) \wedge \text{lieben}'(x,y)]]]$
c. $\Lambda x[\text{Student}'(x) \rightarrow [P \neg \forall y[\text{Studentin}'(y) \wedge \text{lieben}'(x,y)]]]$

The analysis tree for the reading of (19′a) is (19″a), and the analysis tree for the reading of (19′b) is (19″b), and (19″c) is for (19′c).

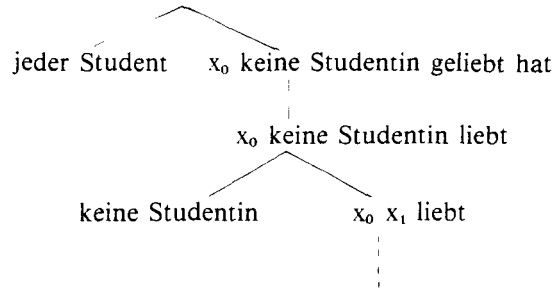
(19″) a. jeder Student hat keine Studentin geliebt



b. jeder Student hat keine Studentin geliebt



c. jeder Student hat keine Studentin geliebt

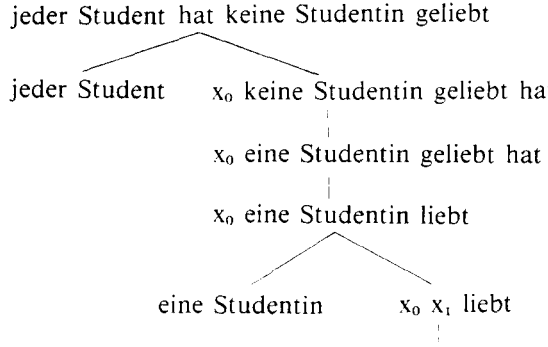


But we cannot yet obtain one possible reading of (19) — (19'd) — without decomposing 'kein' into the negator 'night' and the existential quantifier 'ein'. The one possible reading of (19) is (19'd).

(19') d. $\Lambda x[\text{Student}'(x) \rightarrow [\neg P\forall y[\text{Studentin}'(y) \wedge \text{lieben}'(x,y)]]]$

For such a reading 'kein' should be decomposed into two parts. The analysis tree is (19"d)

(19") d. jeder Student hat keine Studentin geliebt



As we have seen above, it is shown that the negator 'kein' for the prenominal negation should be decomposed into the negator 'nicht' and the existential quantifier 'ein' without reversing the linear order of them.

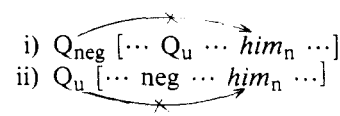
5. Conclusion

To conclude, this paper provided substantial reasons for the decomposition of 'kein'. It is different from Jacobs(1980). In my research, the purpose of the decomposition is to reveal GRAMMATICAL words latent

in 'kein'. Therefore, this operation is called GRAMMATICAL DECOMPOSITION by J. I. Hwang(1982: 390). It is very important not to reverse the linear order of the two parts from 'kein'. If we can grammatically decompose 'kein' into the negator 'nicht' and the existential quantifier 'ein', as we have seen above, all the readings are systematically and clearly interpreted.

Footnotes

1. In his opinion, through the grammatical decomposition we may obtain 'ein Mensch' for 'jemand', 'nicht ein Mensch' for 'niemand', and 'nicht etwas' for 'nichts' etc. He says that this operation is called Grammatical decomposition because it applies to dig out grammatical words latent in the pronouns in question.
2. That is, P is properties of individual concept and x is individual concept.
3. It says that Negation (negative quantifiers, *not*) and universal quantifier (every, all) may not cross over each other in the process of quantification. (K. Lee(1974: 134)



4. Dowty(1979: 330)
$S_{39}<F_{39}, <t>, t>$ (Past Tense Rule); $F_{39}(\phi)$ is the result of replacing the main verb of with its past tense form. K $(F_{39}(\phi))$ = Vt[PAST(t) ∧ AT(t,ϕ)].
$S_{40}<F_{40}, <t>, t>$ (Future Tense Rule); $F_{40}(\phi)$ is the result of inserting *will* before the main verb in ϕ. K $(F_{40}(\phi))$ = Vt [FUT(t) ∧ AT(t, ϕ).

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