The semantic status of 'INDEX+MALE'
in Nihon Shuwa (Japanese Sign Language)*

Yutaka Osugi
University of Rochester

1 Question

The universality of a set of articulations including vocal and manual articulators seems to be harnessed into different linguistic and communicative functions in human languages. Perceptual constraints in individuals cause the re-assignment of different articulators to serve linguistic, intonational and gestural functions in signed and spoken languages. Consider the pointing gesture which is made by manual articulators as an example. Hearing people sometimes use this pointing gesture in conversation and it cooccurs with the utterance of sentences using vocal articulators, but the pointing gesture is generally considered as serving a communicative function but not a linguistic function (cf. McNeil 1992). The pointing gesture is used very frequently in signed languages of deaf people who cannot depend on vocal articulators for conversation with one another, and therefore, the pointing gesture should be considered as functioning as a linguistic element for deaf people. In fact, Pettito (1983) showed that deaf children make the transition from nonlinguistic to linguistic use of the pointing gesture. Then, my ongoing question is: what is the linguistic nature of the pointing gesture in signed languages? To answer this question, this paper will examine the semantic structure of some signs which contain a pointing gesture in Nihon Shuwa (Japanese Sign Language). A separate paper (Osugi and Fischer, in preparation) will examine the syntactic structure of these signs.

2 General background

In American Sign Language (ASL) linguistic literature, the pointing sign with the index finger, which I will refer to as 'INDEX', has provoked a great deal of controversy in terms of anaphoric reference. Here, the term "anaphoric reference" is used in a broad sense, to refer to a phenomenon in

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1. This hypothesis was developed in my work with Rebecca Webb.

2. Although an alternate term, NihonSyuwa, can be used, the information needed to pronounce Nihon Shuwa can be recovered from generally accepted transcription rules.
which an item in a sentence depends for its denotation on another item in the linguistic or nonlinguistic context. When 'INDEX' points to a locus in space as in the following conversation, it tends to be interpreted as 'she' in English.

(1) **MARY LIKE BALLET, INDEX\textsubscript{a} WANT GO FRANCE.**

'Mary likes ballet and she wants to go to France.'

In 'INDEX\textsubscript{a}', a lower case subscript from the beginning of the alphabet represents spatial locus 'a'. This referential expression has in this case, 'mary' as its antecedent, and can be replaced by the noun phrase 'MARY'. Furthermore, when there are more than two nominal referents, two different spatial loci will be pointed to by INDEX to distinguish them as follows;

(2) **MARY LOVE JOHN, INDEX\textsubscript{a} BUY GIFT FOR INDEX\textsubscript{b}.**

'Mary loves John, she bought a gift for him.'

Based on these facts, 'INDEX' has been regarded as a pronoun (Lacy, 1973; O'Malley, 1975; Coulter, 1977; Liddell, 1980; Pettito, 1983; Padden, 1983), or as an indicator of locus which functions as a pronoun (Mandel, 1977; Wilbur, 1979). Recently, several researchers proposed a new analysis which regards some kinds of 'INDEX' as determiner (Fischer and Johnson, 1982; Zimmer & Patschke, 1990; Bahan, et al, 1995). Despite these differing views, the general consensus among them is that anaphoric reference with the use of 'INDEX' requires the use of spatial contrast. This has been assumed to be the only linguistic device for anaphoric reference, available in signed languages throughout the world. However, this expectation turns out to be incorrect when signed languages in Far East Asia are taken into consideration.

Nihon Shuwa, as well as its neighboring signed languages, has been seen as unique in comparison to other signed languages for its use of handshape to mark gender. Gender is represented with the closed hand held in midair, and with either the thumb extended upward for male (glossed 'MALE') or the pinkie extended upward for female (glossed 'FEMALE').

**Figure 1: 'MALE'**

These contrastive handshapes in gender contribute to word formation processes in Nihon Shuwa. According to Osugi and Supalla (1998), the gender handshape 'MALE' behaves in several different
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ways: as a nominal lexeme, as an agreement marker for verbs, as a derivational morpheme which generates a nominal class of kinship lexemes, and as a classifier morpheme in the classifier predicate construction. The most striking fact is that the gender handshapes can be used for anaphoric reference. That is, Nihon Shuwa can accomplish anaphoric reference not only by the use of spatial contrast, but also by positioning the gender handshapes which agree with their referents in gender and other features, without the use of spatial contrast. In the following sentence, 'MALE' has the referential interpretation although this sign is positioned in the neutral space.

(3) INDEX, JOHN LIKE, BUT MALE YOUNGER-SISTER LIKE.
I like John, but he likes my younger sister.

Furthermore, interestingly, these gender handshapes can appear simultaneously with the pointing sign 'INDEX' in neutral space as illustrated below.

Figure 2: 'INDEX+MALE'

This linguistic expression, glossed 'INDEX+MALE', can be used for anaphoric reference as in (4) which replaces 'MALE' in (3) by 'INDEX+MALE'.

(4) INDEX, JOHN LIKE, BUT INDEX+MALE YOUNGER-SISTER LIKE.
I like John, but he likes my younger sister.

In (3) and (4), both 'MALE' and 'INDEX+MALE' carry the referential interpretation, however, there are subtle semantic differences between them, which are what I will spend the reminder of this paper discussing. Since the only one difference between their phonological forms is the 'INDEX' part of 'INDEX+MALE', the discussion of the semantic differences between 'MALE' and 'INDEX+MALE' would lead to identifying the semantic status of the 'INDEX' part of 'INDEX+MALE' in Nihon Shuwa.

3. As a classifier morpheme, this handshape denotes any animate entity regardless of its gender or humanness.
3 Possible interpretations

This section will discuss the first distinction between the two expressions that 'INDEX+MALE' generates only the referential interpretation while two other interpretations are also possible for 'MALE'. Consider the semantic behavior of 'MALE' first, this sign can appear in the NP position as a 'bare form' as in the following:

(5)    MALE FOOL.

(6)    MALE ANGRY.

The term 'bare form' is borrowed from Carlson's (1977) term 'bare plural', but its use is a bit different here as it is extended to refer to the most basic structure of the form itself. Compare the interpretations of the NPs in (5) and (6). Assuming that both of the sentences are uttered as the first sentence in the discourse, each sentence can be translated into English as the following:

(7)    (Generally speaking,) men are fools.

(8)    A man is angry.

In (5), 'MALE' is interpreted in the generic sense referring to the group consisting of men and the statement that they all are fools. On the other hand, as seen in (8), 'MALE' in (6) does not carry the generic sense, but rather the existential interpretation. That is to say, the same expression 'MALE' is interpreted as generic in some sentences and existential in other sentences. Is it enough to state that this phenomenon comes from different usages of the nominal expression? Obviously, this is not the desired approach. To give it an explicit explanation, there are two possible approaches. The first one is to assume two different covert determiners for these NPs; the universal determiner in (5) and the existential determiner in (6). However, it must still be explained how each covert determiner is introduced into the corresponding environment. To solve this problem, consider the second approach Carlson's (1978) analysis of 'bare plural' in English.

The 'bare plural' of English can be interpreted as generic or existential in different syntactic and semantic environments as in the following extract from Carlson 1978:

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4. In ASL, Petronio (1995) uses a different term 'bare noun phrase' in her analysis of the interaction between bare NPs and three different types of verbs, plain verbs, agreement verbs, and spatial verbs. The same classification of verbs may hold in Nihon Shuwa. Only plain verbs are considered throughout this paper.

5. This term 'bare form' is essentially identical to Carlson's term 'bare plural' in the sense of 'determinerless NPs'.

(9) Dogs run.

(10) Dogs are available.

The NP 'dogs' is interpreted as generic in (9) and existential in (10). This phenomenon is parallel to (5) and (6). Carlson suggests that a unified formula be assigned to the same bare plural (i.e., 'dogs' in above) and that the difference in interpretation of the NP comes from its syntactic and semantic environment. In his theory, entities are divided into two classes: 'individual' and 'stage'. 'Individual' is further divided into 'kind' and 'object'. The term 'kind' refers to an individual which stands for the group as a whole, 'object' corresponds to 'entity' or 'individual' in the PTQ (Montague, 1973) sense, and 'stage' is the realization of an individual ('kind' or 'object'). Based on this classification of entities, he claims that a predicate of English can be categorized into one of three classes depending on the type of entities to which it applies.

For example, the predicate 'run' in (9) is applied directly to the 'kind' type of entity while 'be available' in (10) is applied to the 'stage' type. Thus, these sentences are translated into logical forms as in (11) and (12). Here, by using the λ-operator which defines complex properties systematically, a unified λ-expression \( \lambda PP(d^k)(\lambda \text{run}(x)) \) is assigned to a bare plural 'dogs' in both (9) and (10). Note that 'd^k' stands for an individual constant of the 'kind' level, and also that the first formula in both (9) and (10) can be reduced to the second by λ-conversion, which governs the logical-semantic structure of the λ-expression. (cf. Church 1940)

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(11) \quad \lambda PP(d^k)(\lambda \text{run}(x)) \\
=> \quad \text{run}(d^k)
\]

\[
(12) \quad \lambda PP(d^k)(\lambda \lambda x \exists z'[R(z', x) & \text{be-available}(z')]) \\
=> \quad \exists z'[R(z', d^k) & \text{be-available}(z')]
\]

(11) indicates that the group comprised of dogs, runs, and (12) indicates that for the kind, dog, there is a stage where they are available. Then, a meaning postulate (MP7) suggested by Carlson introduces from (12) that there are dogs ('object') who are available. This reduction is permissible with respect to the cognitively real aspect of humanness.

Carlson's contribution to semantics is in providing an explanation of the diverse usages of a certain nominal expression X ('dogs' in the above case) based on the syntactic and semantic environment where X is generated, by giving X a unified formalization. Once we adopt a unified formalization for bare nouns along the lines proposed by Carlson (1978), the reason 'MALE' is interpreted as generic in

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6. Note that there is a difference between (6) and (10), the former is a singular form while the latter is a plural form.
some sentences and as existential in other sentences can be explained. That is, we can give the NP 'MALE' a unified formula and state that the predicate 'FOOL' applies directly to the 'kind' type while the predicate 'ANGRY' applies to the 'stage' type. Then, different types of formulae can be assigned to each sentences so that they receive different interpretations.

Recall that I assumed that (5) and (6) are uttered as the first sentence in the discourse to obtain the (7) and (8) readings respectively. We must now look into the effect of discourse context on the readings in (13) and (14).

(13) TANAKA MONEY BE-STOLEN. MALE FOOL.
    Tanaka's money was stolen. Men are fools.
    He was a fool.

(14) TANAKA MONEY BE-STOLEN. MALE ANGRY.
    Tanaka's money was stolen. He was angry.

The first sentence in both (13) and (14) says that Tanaka had his money stolen. In (13), the second sentence is identical to (5), and thus, its semantic content should generate the generic interpretation which is the case. However, (13) is ambiguous in that it has another reading, 'Tanaka is a fool'. This indicates that 'MALE' can now carry the referential interpretation. It seems that the discourse allows either interpretation. On the other hand, in (14), the semantic content of 'MALE' generates only the referential interpretation; the existential interpretation is no longer available. It is unclear in both examples whether 'MALE' refers to the man named Tanaka through its antecedent 'TANAKA' in the first sentence or whether 'MALE co-refers to the man named Tanaka and 'TANAKA'. I will not address this issue in this paper, but only indicate that 'MALE' will take the referential interpretation when the appropriate discourse context is provided.

Based on the analysis of 'MALE' in the above, the sign glossed 'INDEX+MALE' will be examined for its possible interpretations. As illustrated in Figure 2, this sign is expressed as a complex of 'INDEX' and 'MALE'. Consider the following sets of examples, (15) and (16). (15a) and (16a) are identical to (5) and (6) respectively, but (15b) and (16b) replace 'MALE' by 'INDEX+MALE' in the subject position.

(15) a. MALE FOOL.
    b. INDEX+MALE FOOL. (* as the first sentence)

(16) a. MALE ANGRY.
    b. INDEX+MALE ANGRY. (* as the first sentence)

Interestingly, both (15b) and (16b) cannot appear as the first sentence in the discourse. They require a specified discourse context. If the appropriate discourse context is provided, 'INDEX+MALE' will generate the referential interpretation. Neither the generic nor existential interpretation is possible for
this linguistic expression. That is, while 'MALE' can generate three different interpretations depending on predicate type or discourse context, the other expression 'INDEX+MALE' generates only the referential interpretation regardless of predicate type and discourse context, furthermore, 'INDEX+MALE' must always refer to a specific man in the discourse. This is the primary distinction between the two linguistic expressions in respect to possible interpretation.

4 Definiteness

In the previous section, it was shown that both 'MALE' and 'INDEX+MALE' can carry the referential interpretation. This section will show that these two expressions do not share the exact same semantic content in the referential interpretation. Only 'INDEX+MALE' bears the definite feature. I use Comrie's (1981) definition of 'definiteness' as follows:

(17) The speaker presupposes that the hearer can uniquely identify the entity being spoken of.

Returning to the examples, (15b) says that the man is a fool and (16b) says that the man is angry. Both sentences which contain 'INDEX+MALE' require the speaker to presuppose that the hearer can identify the entity being referred to by 'INDEX+MALE'. The difference in the interpretation of NPs is observable at the object position, too, as in the following examples.

(18) a. TEACHER MALE LIKE.
    b. TEACHER INDEX+MALE LIKE.

While 'MALE' in (18a) can generate the generic reading in an appropriate discourse, (18b) never receives the generic interpretation. Furthermore, (18b) requires the speaker to presuppose that the hearer can identify the entity being referred to by 'INDEX+MALE' and thus is interpreted as 'the teacher likes the man'. Clearly, 'INDEX+MALE' bears the definite feature. There is further data to support this. Let us consider (19):

(19) a. PEOPLE GATHER PAST, BUT MALE BE-THERE NOT.
    b. PEOPLE GATHER PAST, BUT INDEX+MALE BE-THERE NOT.

The first clauses in the both sentences say that people gathered. The second clause in (19a) can have at least two different readings: (i) there were no men in the gathering, (ii) a particular previously identified man was not in the gathering. However, with (19b) only (ii) is available. This data parallels the definiteness effect in English where a definite NP cannot be generated within a sentence with an existential reading. However, it does not follow that 'MALE' bears the indefinite feature in complementary distribution with the definite feature of 'INDEX+MALE'. It would be more appropriate to state that 'MALE' does not bear any value with respect to definiteness. The primary reason for this statement comes from the ambiguity of 'MALE', for example, the following sentence:
(20) MALE DIE PAST.

can receive either of the two readings: the indefinite reading as in 'a man is dead' or the definite reading as in 'the man is dead'. The particular interpretation selected depends on the discourse. If the speaker is talking about a traffic accident, the former interpretation will obtain. But if the speaker is talking about some man who has been staying at the hospital for a long time and the hearer knows who he is, the definite interpretation will be available. This evidence suggests that 'MALE' is neutral with respect to definiteness.

Before closing this subsection, one final argument needs to be addressed. According to Russel (1905), in order for (19b) to receive an assignment of TRUE as its truth value, there must exist one and only one individual that has the property of being a man. However, by applying definition (17), it is not our intention with (19b) to imply that one and only one man exists in the entire world. Rather, that a specific man must be identifiable to the hearer in the immediate surroundings or at least in the context of the immediately preceding discourse. I will show again that 'INDEX+MALE' bears the definite feature but 'MALE' does not, through examples with more complex contexts. First, consider a discourse which begins with (21):

(21) YESTERDAY PARTY ATTEND PAST.
MALE THREE+PERSON, FEMALE FOUR+PERSON GATHER.
WE BEER DRINK+cont.

This sentences say that I attended a party yesterday and that there were three men and four women at that party, and we drank beer. This discourse establishes a set of men that includes three members, the men who attended the party. It can be followed by (22) but not by (23).

(22) DANCE ENJOY TIME, SUDDENLY MALE FALL PAST.

(23) DANCE ENJOY TIME, SUDDENLY INDEX+MALE FALL PAST.

Both sentences say that while we were enjoying dancing, a man suddenly fell down. The semantic content of (22) asserts only that a man fell down suddenly, and thus, the truth condition is true if there is some man who fell down suddenly. However, (23) seems to say more than this since the referent of 'MALE' should be one of the three men who attended the party. Does the semantic content of 'MALE' include this connection to the set of men who attended the party? This question will be considered after explaining why (23) cannot follow (21). The semantic content of (23) is that a specific man who is identifiable to the hearer fell down suddenly. It requires that a set of men consisting of only one member be established before the utterance. There is a set of men, but it contains three members. Thus, the semantic content of (23) disallows a truth condition for this set.

To consider this problem with the semantic content of (22), let us adjust the discourse of (21)
to state that only one man and five women attended the party as in (24). It turns out that both (22) and 
(23) can follow this discourse.

(24) YESTERDAY PARTY ATTEND PAST. 
MALE ONE+PERSON, FEMALE FIVE+PERSON GATHER. 
WE BEER DRINK+cont.

(23) can now follow (24) because the speaker and hearer know that there was only one man at the party 
and the hearer can uniquely identify the entity being referred to by 'INDEX+MALE' although it is not 
required that the hearer know who the man is (i.e., name of the man).

To formalize this, one set of men that contains only one member is established by (24), and 
the utterance of (23) will obtain an accessible connection from 'INDEX+MALE' to this set of men. It is 
clear which parts of the semantic content and the discourse are responsible for (23), but it is still not 
clear for (22) since it carries one reading identical to (23) and the problem remains. However, it does 
not follow that the bare form of 'MALE' can bear definiteness because the means for obtaining the 
referent is somehow different between (22) and (23). For (23), as explained in the above, the set which 
contains only one member is already established and hence the semantic content of (23) requires the 
denotation of 'INDEX+MALE' to link up to that set to receive a value of true. The semantic content of 
(22) requires only that a man fell down suddenly. Thus, its truth condition requires only that there must 
be some man who fell down in some world. The discourse context for both (21) and (22) establishes a 
world which corresponds to the party and there is only one set of men as its domain. This explains why 
the truth value of its semantic content will be checked only in relation to that world.

As further evidence, suppose that the speaker and hearer have in common, knowledge that the 
party was held at some public dance hall and it was packed. This fixed discourse will establish the 
same world corresponding to the party room, but there are now non-members of the set of men who 
attended the party. Thus, if the semantic content of (22) is checked for its truth value in the same 
world, it will be true for the situation that some other man fell. Actually, this reading is preferred to the 
reading that refers to some man in the party group.

The discussion so far reveals that 'INDEX+MALE' always bears the definite feature but 
'MALE' does not bear any value for definiteness, outside of the discourse context.

5 Conclusion: The 'INDEX' part as determiner

Given that while 'MALE' itself does not bear any value with respect to definiteness, and 
'INDEX+MALE' always bears the definite feature and never bears the indefinite feature, it is reasonable 
to attribute the difference between them to the 'INDEX' part of 'INDEX+MALE'. We may state that the 
'INDEX' part imposes the restriction of definiteness. If this is correct, it should follow that there is no 
such restriction on the bare form of 'MALE'.

The previous discussion leads one toward a generalized quantifier perspective. Barwise and 
Cooper (1981) represent the logical structure of NP containing a determiner as:
In this representation, a set expression corresponds to sets of individuals. Thus, the denotation of 'MALE' is defined as a set of individuals who are men. Since no determiner is assumed for 'MALE', it remains in the set expression position in (25). This assumption is compatible with the fact that there is no morpheme or word which corresponds to the determiner. 'MALE' can be said to be a determiner-less set expression, and thus, cannot receive the status of quantifier. A determiner applies to the set expression to generate a quantifier corresponding to sets of sets of individuals. That is, the entire NP functions as a quantifier. The denotation of the determiner is defined as the function from sets of individuals to sets of sets of individuals. Since INDEX+MALE is argued to be as an NP, it corresponds to a quantifier in Barwise and Cooper’s theory. Furthermore, I argue the 'INDEX' part corresponds to a determiner. So this determiner applies to the denotation of 'MALE' which corresponds to a set expression. Since the determiner brings definiteness to single number of entities, its function should have one-member sets as its domain.

Barwise and Cooper (1981) suggests the following requirement for the determiner:

(26) U3. Determiner universal. Every natural language contains basic expressions, (called determiners) whose semantic function is to assign to common count noun denotations (i.e., sets) a a quantifier that lives on A.
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(Barwise and Cooper, 1981)

The notion 'live on' is defined as:

\[(27) \quad \text{In a model } M = \langle E, \ll \ll \rangle, \text{ a quantifier } Q \text{ lives on a set } A \subseteq E \text{ if } Q \text{ is a set of subsets of } E \text{ with the property that, for any } X \subseteq E,\]
\[X \in Q \text{ iff } (X \cap A) \subseteq Q.\]

(Barwise and Cooper, 1981)

By this definition, in (15b), the quantifier represented as 'INDEX+MALE' lives on the set of men which is represented by 'MALE'.

\[(15) \quad \text{b. INDEX+MALE FOOL.}\]

Therefore, we can say that the 'INDEX' part of the expression bears the basic characteristic of determiner. To examine the 'INDEX' part for other characteristics of the determiner such as 'quantity' would carry us too far away from the purpose of this paper.\(^8\) What the semantic analysis of the two expressions 'MALE' and 'INDEX+MALE' demonstrated is that:

\[(28) \quad \text{a. 'INDEX+MALE' consists of the logical structure where the 'INDEX' part functions as a determiner which imposes a 'definite' restriction on the denotation of the 'MALE' part which is a set expression.}\]

B. 'MALE' is only a set expression.

The semantic analysis showed that 'MALE' can generate three different interpretations depending on predicate type or discourse context. The other expression 'INDEX+MALE' generates only the referential interpretation regardless of predicate type and discourse context. Furthermore, only 'INDEX+MALE' generates the definite interpretation. These semantic behaviors were analyzed to show that 'MALE' is just a set expression and its denotation is determined by its predicate types. On the other hand, 'INDEX+MALE' is a quantifier composed of a determiner and a set expression in the framework of Barwise and Cooper (1981). From this analysis, it was claimed that 'INDEX' part of 'INDEX+MALE' functions as a determiner in the logical sense.

The theoretical problem raised in this semantic analysis shows how the various semantic proposals relate to each other. In particular, the status of 'MALE' is finally identified as a set-expression, like a common noun, although it was previously discussed as denoting a kind. While I can state that there is another level at which 'MALE' functions more like a proper name, it is left for future research.

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\[8. \text{ The other characteristics of the determiner, 'conservatvity' turns out to be essentially the same thing as 'live on'.}\]
to state actual semantic rules for relating the different levels to one other.

In addition, what must be included in future research is an examination of the semantic status and function of 'INDEX' in various types of sequential combinations as in 'MALE' and 'INDEX', glossed 'MALE^INDEX', or 'PEOPLE' and 'INDEX', glossed 'PEOPLE^INDEX'.

References


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9. This point was observed by one of the reviewers of this paper.
日本手話における{指差し/男}の意味論的分析

大 杉 豊
（ロチェスター大学）

名詞の指示対象が名詞の前後に現われる{指差し}によって何らかの制限を受ける傾向は世界じゅうの手話言語に共通して見られる。しかし、空間のある位置ではなく手話単語の{男}を指差す{指差し/男}は日本手話に特有の表現である。{男}と{指差し/男}のそれぞれを意味論的に、統語論的に分析することで引き算的に{指差し}の言語的な性質が解明される可能性がある。本論は明示的な意味論的分析である。

単独で現われる{男}はその生起する環境の意味的、統語的、語用的な要因に左右されて、照応的解釈、総称的解釈、存在的解釈のいずれかを取るが、{指差し/男}は常に照応的解釈しか取れない。また、同じ照応的解釈を受ける場合でも、{男}と{指差し/男}の指示対象の限定範囲に差が見られる。{男}の指示対象は先行文脈によって指定される男の人の集合内に限定されるが、{指差し/男}の指示対象は聞き手によって固定可能、ただ一つの要素しか持たない男の人の集合に限定されるという違いがある。つまり、{男}が特定性、定性、および人数の面で、中立であるのに対して、{指差し/男}は特定性と定性を持ち、人数も単数に限られている。

この一般化より導かれる本論の主張点は、Barwise and Cooper(1981)の論理学的な枠組みにおいて、{男}は限量表現でなく単なる集合表現であるが、{指差し/男}は限量表現であり、その{指差し}の部分は限定詞に相当するということである。

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