The Acquisition of Noun-Phrase Structure in Japanese Children

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1. Measuring development

Typically developing children acquire the basic grammatical knowledge of their language in a period of four or five years, but the speed of development varies considerably (Brown, 1973; LIT Miyata, MacWhinney, Shirai, Sirai & Oshima, 2001). While early talkers will utter their first 2-word-sentences around their first birthday, other children will need one year more to cross this threshold. Also the ways tackling with this task can be very different. Some young children seem to focus nearly exclusively on the names of things, while others talk about actions from the very beginning. (Okubo, 1981; Miyata, Oshima-Takane & Nisisawa, in press). Some children take risks when they talk, fearlessly trying out new grammatical constructions, others are more cautious, and stick to a handful of well-learned expressions (Bretherton, 1983). Nevertheless, when focusing on the milestones of language development, a common pattern emerges for all these different children.

This common pattern is the basis for the measurement of language development. If the basic acquisitional course of typically developing children is known, it is possible to estimate the developmental stage of a child by just checking whether or not she or he uses already certain expressions typical of a particular stage. Language indices like the "Developmental Sentence Score" (DSS; Lee, 1974) or the "Index of Productive Syntax" (IPSyn; Scarborough, 1990) are successfully working in this way. Unfortunately no such language index is yet available for Japanese.

For this reason we started to develop a "Developmental Sentence Score for Japanese" (DSSJ; Miyata, MacWhinney, Shirai, Sirai & Oshima, 2001). DSSJ adopts the basic procedure of the English DSS, but, as the grammatical structure of Japanese varies considerably from English, the areas and items that represent a child's Japanese language development have to be extracted anew. Candidate areas, that promise to be of special interest for an index of Japanese language development, are verb and adjective morphology, case, topic, focus, and final particles, deixis and sentences conjunction, and the construction of noun phrases.

In this article we will focus on the acquisition of the NP (noun phrase) structure.

We will examine the individual acquisitional process in seven Japanese-speaking children between one and five years of age. Based on these results we will then consider the possibilities of including NP constructions within the frame of DSSJ.

2 NP structure in Japanese adult language

In Japanese we distinguish among three different types of NP constructions: subordination, coordination and adnominal clauses.

a) Subordination of one NP under another

The subordination is done with the help of the genitive case[1] particle no, as in the following example.

(1) Papa no te (o ....)
Papa GEN hand (ACC...)
'Papa's hand..'

In this case Papa is subordinated to *te* 'hand' which bears the eventual case (in the example, accusative). Note that the insertion of *no* is obligatory, in contrast to other case particles, as we will see.

(2) *Papa te
Papa hand (ACC...)
intended 'Papa's hand...'

Note that, on the other hand, the ellipsis of the NP head is possible.

(3) Papa no (o...)
Papa GEN (ACC...)
Papa's ...

b) Coordination of two NPs

For the coordination of two NPs three conjunctive particles with different semantic nuances are available: *to* 'and', *ya* 'and (for example)' and *ni* 'and (additionally)' (Kuno, 1973).

(4) Papa to Mama (o ...)
Papa and Mama (ACC...)

Unlike the subordinating structure in a), the case particle (ACC in the example) determines both nouns, and the ellipsis of the NP head is not possible.

1.3 Adnominal clause

This structure has often been called "relative clause" (Kuno, 1973; Teramura, 1991; Tsujimura, 1991). In this structure an IP structure is subordinated to a noun or a pronoun. In terms of tense, only nonpast and past are possible (ex. 4-6). In contrast to English, relative pronouns do not exist.

(5) tabe-ru hito (o ...)
eat-NONPAST man (ACC)
'the man who eats, ...'
(6) tabe-ta hito (o...)
eat-PAST man (ACC)
'the man who has eaten...'
(7) *tabe-yoo hito (o ...)
eat-INT man (ACC)
(intended: 'the man who is about to eat ...'

The IP construction can appear as a full-fledged sentence.

(8) sushi o fooku de tabe-ta hito (o...)
sushi ACC fork INSTR eat-PAST man (ACC)
'the man who ate sushi with a fork...'

In this context Teramura (1975-1978) shows the difference between internal and external relationships. While (8) constitutes an internal relationship because the NP head *hito* is at the same time the subject of the preceding sentence, in a construction like (9), the NP head has no grammatical function in the clause (cf. Masuoka, 1994).

(9) sushi o Kyoto de tabe-ta hanashi (o...)
sushi ACC Kyoto LOC eat-PAST story (ACC)

'the story that (he/she) ate sushi in Kyoto ...'

This distinction influences on the so-called *ga/no* conversion (Harada, 1984), as the conversion of *ga* (SUB) to *no* (GEN) can only occur in internal relationship clauses[2]. As Sirai & Gunji (1998) show, adnominal clauses with an internal relationship can be further divided into relative, prorelative and contracted clauses (based on whether they contain a gap or not). On the other hand, clauses with an external relationship can be classified according to the head noun into four subgroups: 1) appositive using the complementizer *toiu* 'that says'; 2) perception nouns (e.g. *nioi* 'smell', *sugata* 'form'); 3) nouns which play a semantic role in the subordinated clause (e.g. *riyuu* 'reason', *toki* 'time'); and 4) function nouns expressing a change of state for the clause (often insubstantial nouns (also called 'formal nouns', e.g. *jumbi* 'preparation', *kekka* 'result').[3]

As verbal adjectives bear tense in Japanese, any Adj+N construction will fall into this category of adnominal clauses. Examples (10) and (11) are verbal adjectives.

(10) tsuyo-i hito (o...)
strong-NONPAST person (ACC)
'the strong person ...'

(11) tsuyo-katta hito (o...)
strong-PAST person (ACC)
'the person who was strong (before)...'

It is also possible to use adjectival nouns (AN) and common nouns (N) in an adnominal position. In this case, the noun and the NP head are connected by a nonpast or past form of the copula. (12) and (13) are examples of these AN+COP+N constructions.

(12) kiree na hito (o...)
beautiful COP-NONPAST person (ACC)
'the beautiful person ...'

(13) kiree datta hito (o...)
beautiful COP-PAST person (ACC)
'the person who was beautiful (before)...'

Note that the nonpast form of the copula which is realized as *da* in the predicative position, changes to *na* in the adnominal position. This has its parallels also in other contexts, such as the so-called noda-construction, where the nonpast form of the copula *da* changes to *na* before *no da*[4] 'it is that' (Kuno, 1973; examples 14, 15).

(14) gakusee da .
student COP-NONPAST
'(he/she) is student.'

(15) gakusee na no da .
student COP-NONPAST it-is-that-
'he/she is a student, you must know.'

From this one might expect that the nonpast form of the copula takes the form *na* rather than *da* when connecting a common noun to the head noun, but in fact *na* as well as *da* are impossible (16). Instead the more formal realization *dearu* has to be used (17). On the other hand, in the case of past tense, the contracted form *datta* is possible (18).

(16) gakusee *da/*na hito (o...)
student COP-PRES person (ACC)
intended: 'the person who is a student'

(17) gakusee dear-u hito (o...)
student COP-PRES person (ACC)
'the person who is a student'

(18) gakusee deatta/datta hito (o...)
student COP-PAST person (ACC)
'the person who was a student (before)...'

In all cases the NP head can be replaced by the sentence nominalizing particle *no*[5] (Kinsui, 1995; referred to as 'formal noun' by Kuroda, 1979). In other words, the head is not simply omitted as in the case of the NP subordination as in (3), but has to be replaced by a sentence nominalizing particle. This sentence nominalizing *no* should not be confused with the subordinating *no* in (1) and (3)[6].

(19) tsuyo-i no (o...)

strong-NONPAST PRON (ACC...)
'the strong one ...'

A special case are adnominals, frozen forms derived from verbs, adjectives or nouns (*aru* 'a certain', *taishita* 'considerable', *ironna* 'a variety of', *isshu no* 'a sort of'; Masuoka & Takubo, 1992). To this group also belong some exceptional adjectives that oscilliate between verbal and nominal adjective forms (e.g. *chiisana* 'small', *ookina* 'big', *okashina* 'funny').

3. Previous research on the acquisition of the NP structure

The acquisition of the NP structure starts out with subordination (1.1). The first appearance is the elliptic construction N+*no* as in (3). This construction appears very early, often before a child's second birthday, and makes *no* one of the earliest case particles. In contrast to adult grammar its meaning is apparently restricted to possession (Clancy, 1985; Ito, 1993; Komura, 1981; Miyahara, 1974; Miyata, 1998; Okubo, 1967). In a second step two nouns are juxtaposed producing the ungrammatical structure *N+N as in (2) (Clancy, 1985; Ito, 1993a). Finally the target structure N+*no*+N appears and is used frequently. After a transitional phase *no* is not omitted anymore (Clancy, 1985; Komura, 1981). Most children seem to have acquired the N+*no*+N early in their third year.

At about the same time first constructions with attributive verbal adjectives as in (10) appear, but they remain comparatively rare during the third year, and are not inflected except for the default nonpast inflection ending until later. The same can be said about adjectival nouns, which exclusively appear with *na* the adnominal nonpast form of the copula (such as in 12). Attibutive verbs as described in (5) appear even later.

A common error in this period is an insertion of *no* in the case of the adnominal clause construction, and most research is devoted to this phenomenon.

⑳ aka-i *no patokaa (Tai 1;10)
red-NONPAST GEN patrol car
'the red patrol car'

Although most instances of the so-called "overgeneralized *no*" are reported for verbal adjectives (Ito, 1993; Clancy, 1985), also cases including nominal adjectives as

well as verbs can also be found. Yokoyama (1989) shows that for K (1;8-2;11) who produced 70 overgeneralizations, 53% included verbal adjectives (similar to example 20), 34% adjectival nouns (example 21) and 13% verbs (examples 22 and 23). For R (1;8-2;11) 126 overgeneralizations were found, with 80% being verbal adjectives and 19%, verbs, but not with adjectival nouns (percentages computed by the authors).

(21) hen na *no uta (K 1;11 after Yokoyama, 1986)
funny- COP-NONPAST GEN song
'a funny song'

(22) chiga-u *no gohan (Ryo, 2;7, after Miyata, 1998)
differ- NONPAST GEN meal
'the other meal'

(23) morat-ta *no ichijiku (Sumihare, 3;6, Noji data after Yokoyama, 1989a)
received-PAST GEN fig
'the fig I got'

There are several explanations for the overgeneralization: final particle hypothesis (Nagano, 1960), the case particle hypothesis (Yokoyama, 1989), the complementizer hypothesis (Murasugi, 1991), the ellipsis hypothesis (Miyata, 1998) and frequency hypothesis (Clancy, 1985). The frequency hypothesis is in fact the simplest explanation. As Clancy (1985:460) notes, N+no+N constructions "are much more frequent than prenominal adjectives and this difference in frequency may also favor the use of *no* with adjectives." The figures presented by Yokoyama (1989) support this. N+*no*+N is 5.8 (for K) and 2.0 (for R) times more often than the Adj+N and Adj+**no*+N constructions together (same time span as above). There is no data concerning the input but it can be assumed that for the child it is the noun construction more often than the adjective or verb.

A syntactical explanation is offered by Nagano (1960) with his final particle hypothesis (*juntaijoshi setsu*). Following Nagano, the child reverses structures like (24). The structure in question then should therefore be interpreted as (25) and not as (21).

(24) booru aka-i no.
ball red- NONPAST FinalPtl
'the ball is red'

(25) aka-i *no booru
red- NONPAST FinalPtl ball
intended: 'the red ball'

This hypothesis has been criticized on two grounds. Yokoyama (1989) indicates that it is difficult to explain why this structure will then disappear, and why this process does not affect the N+*no*+N structure (i.e. in this later period no errors of the type *N+N can be observed anymore). Naka (1997a,b) argues that structures of this type (23) should appear before the overgeneralization starts, but does not find any instance in the extensive diary data of Noji (1974-77), although the child produces many overgeneralizations. Furthermore it is not obvious why the child should perform such a reversal.

Yokoyama (1989a) elaborates on the idea of case particle overgeneralization proposed first in Iwabuchi & Muraishi (1968). According to his argumentation, Adj+**no*+N is derived from an overgeneralization of the subordination structure N+*no*+N. As evidence he shows that the N+*no*+N structure precedes the overgeneralization. In the case of R, the correct Adj+N appears first (1;9), but once the N+*no*+N structure (1;11) is established, the overgeneralization starts (2; 0). For both children the correct use Adj+N precedes the overgeneralization. The second evidence is that this error is not restricted to verbal adjectives but also occurs with nominal adjectives and verbs (see above).

Murasugi (1991) argues that the IP clause is misinterpreted as a complementizer phrase with *no* as head. Only when the child realizes that the adjective bears tense, will she switch to an IP structure and drop *no*. Ito (1993) shows, though, that in this case one would expect that Adj+**no*+N constructions appear earlier than the correct Adj+N constructions, and that they should not appear simultaneously. Neither expectation can be confirmed. Ito's (as well as Yokoyama's) data show that Adj+N precedes Adj+**no*+N, and that both parallel each other for a rather long time (8 months to over one year in Yokoyama's R and K data).

Miyata's (1998) ellipsis hypothesis is based on the case particle hypothesis. The ellipsis hypothesis is based on the fact that the sentence nominalizing particle *no* (SNR) as in (19) becomes especially frequent in the maternal input shortly before the child starts out to overgeneralize. Although Adj+N structures do occur in the input, Adj+*no*(SNR) is much more frequent. This frequent use fosters a misinterpretation of the Adj+*no*(SNR) structure as the elliptic structure in (3), namely as

Adj+*no*(GEN)+(N). This misinterpretation will not attract attention as an error as long as the child does not supply the noun. In other words, the rather small amount of errors may be in fact only the tip of the iceberg. Also the fact that some children apparently do not produce overgeneralizations (e.g. Okubo, 1967) might be explained by this hidden underlying construction. Because of the rather infrequent input of full Adj+N structures, the child will need some time to receive enough contradicting data and to revise her hypothesis. For a certain time the two hypothesis' will be coexisting (and the child will produce a certain amount of overgeneralization errors), until the she has received enough data input to decide for one interpretation.

Concerning the later development of the NP structure, only Ito (1990) reports that insubstantial nouns like *toki* 'time (when)' and *mae* 'before' are used from the second half of the third year. In the first stages simple combinations prevail: adjective + *toki* (e.g. *kurai toki* 'when [it] is dark', 2;8), or noun + *toki* (**gohan toki* intended: 'meal time', 2;5; note that the obligatory genitive particle *no* is omitted). Later more complex structures connecting complete sentences appear (S + *toki* + S, e.g.: *otoochan chaachi iku toki okaasan mo iku ne* 'when Father goes to church, Mother will go, too', 3;1)

Shirahata (1993) reports on L2 acquisition of Japanese of the four year-old Korean boy T, observed from the 3rd to 13th month (4;4 - 5;3) during his stay in Japan. The N+*no*+N structure appeared in the 5th month, without any instances of *N+N as reported for L1 children. At the same time the overgeneralized Adj+**no*+N structure appeared and was used for a duration of 4 months. During 2 months the correct Adj+N structure coexisted with overgeneralized structure. Similarly, Matsumoto (1998) reported an overgeneralization of *no* after adnominals (*iroiro *no mono* 'many things', 34th week) and verb (*suwaru *no tokoro* 'the place to sit' 36th week) in the case of a 9 year-old Chinese boy acquiring Japanese.

In our current research we are trying to extract a common pattern of acquisition that applies to all children acquiring Japanese. We will focus especially on the order of acquisition of the NP-constructions which are acquired by all children under investigation, and try to identify constructions typical of specific stages of acquisition.

4. The data

The basis for this study consisted of longitudinal observational sessions (mother-child interactions) of 7 children acquiring Japanese. Table 1 gives the specification of the data. The first 3 children are 3 boys aged 1;2 - 3;0 who were observed weekly:

Aki (Miyata, 1995), Ryo (Miyata, 1992, 1993), and Tai (Miyata, 2000). These data are available on CHILDES database (MacWhinney, 2000, <http://childes.psy.cmu.edu/index.html>). The next child, Tar (Kokuritsu Kokugo Kenkyujo, 1982a,b, 1983a,b), was observed on a more irregular basis, but for at least 2 hours per month, between 0;11 and 4;0. The last three children (Mic, Tat, Maj; Nisisawa, in work) are participating in a larger longitudinal study of language development. For the present study we have selected 1 session per month from their fourth year, and 1 session every 2 months from their fifth year.

Table 1 Specification of the data

Child's Name	Observational Span	No. of Sessions	No. of Utterances	MLUm Span
Aki	1;5.7 - 3;0.0	56	14,553	1.0 - 3.0+
Ryo	1;3.3 - 3;1.25	83	8,317	1.0 - 3.5+
Tai	1;5.20 - 3;1.29	75	23,048	1.5 - 5.0+
Tar	0;11.26 - 3;11.3	207	16,013	1.0 - 4.3+
Mic	3;1.16 - 5;0.17	16	5,982	3.1 - 4.8
Tat	3;0.28 - 4;11.17	16	6,593	3.2 - 5.0
Maj	3;0.2 - 4;0.5	19	11,752	3.4 - 5.0

Note : The number of utterances in this table is restricted to self-initiated, fully recovered utterances

All sessions were transcribed in Japanese CHILDES/JCHAT format (Oshima-Takane, MacWhinney,1998; Sugiura, Naka, Miyata & Oshima-Takane, 1997) following Wakachi2002 v.2.1 (Miyata, 2002). MLUm values for Aki, Ryo and Tai are identical to the results in Miyata (1999). The analysis was performed with CLAN (MacWhinney, 2000).

The data were screened for repetitions, imitations, rote-learned forms. For the present study, only self-initiated, fully recovered utterances were used. Complete and immediate imitations and self-repetitions, rote learned phrases like song texts, nursery rhymes and commercials, as well as partially incomprehensible utterances were eliminated from the data set investigated. The obtained "clean data" set was analyzed with JMOR02 (Miyata & Naka, 2002), a semi-automatic analytical program for the analysis of Japanese language corpora based on CLAN. On the basis of the information provided by JMOR, all tokens of the morpho-syntactical items investigated were identified.

The different items were measured by Productivity Levels (below P-level). The

number of different types constitutes the P-level. In other words, the child was judged as having reached P3-level on a certain item when three different types of this item had appeared in the previous sessions or in the same session. For inflections, the same ending with three different verbs would constitute three types (e.g.: for the PAST tense ending *-ta*, three different verb stems are necessary, *tabe-ta* eat-PAST, *yat-ta* do-PAST, *ochi-ta* fall-PAST), while in the case of word items, the immediate environment was considered (e.g.: in the case of the deictic *kore* 'this', the following 3 expressions would constitute 3 different items: *kore atta.* 'there is this', *kore mo* 'this [one], too', nani, kore? 'what's this?). Word items were also considered as a different type when occurring in isolation (*kore.* 'this one'), or with a particle inserted (e.g.: *kore atta.* 'there is this' vs. *kore ga atta* 'there is this-SUBJ'; compare Miyata, MacWhinney, Shirai, Sirai & Oshima-Takane, 2001, Miyata, MacWhinney, Shirai, Sirai, Oshima-Takane & Otomo, in work).

5. Results and discussion

5.1. Items that became productive

Table 2 summarizes the order of acquisition for the items which became productive at P4-level. Three of the four younger children (Aki, Ryo, Tai) started out with the subordination structure N+*no*+N (genitive). Ryo used the elliptic N+*no* for four months, before N+*no*+N became productive at Productivity Level 4 (P4-level) in 2;5. For Aki and Tai both structures became productive simultaneously in 2;3 and 1;9, respectively. Tar started out with Adj+N, which became productive at P-4 level at the end of 1;8. The ungrammatical juxtaposition *N+N appears next in1;10, before in end of 2;1 N+*no*+N and N+*no* became productive at P4-level (Fig. 1-2). In the case of Tai we see an early productivity in the elliptic Adj+*no* in 1;8, one month before the genitive N+*no*+N structure, but the full construction not acquired at P4-level until 5 months later.

Coordinating structures using *to* 'and' became productive in the next stage. In the case of Aki and Tar, these items appeared within one month after the N+*no*+N structure became productive (at 2;4, and 2;2, respectively), while Ryo (2;9) and Tai (2;2) needed 6 and 4 months, respectively, before N+*to*+N became productive at P4-level.

Around this stage, also simple non-elaborated clausal structures containing verbal adjectives in nonpast form (Adj+N) as well as adnominals (Adn+N) became productive. In the case of Aki, Ryo and Tai, Adj+N items appeared at the same time

as the conjunctive N+*to*+N (at 2;4, 2;3 and 2;1, respectively), while Tar had already acquired Adj+N at 1;8, before other NP complements became productive in 2;1. Adn+N was comparatively late for Aki (2;10), but for the other 3 children it became productive at the same time as N+*to*+N. At the same time as Adn+N all children to use verbs in the prenominal clause, in both nonpast and past forms (e.g. *nenne suru toko* 'a place to sleep', Ryo, 2;7.4; *Akichan notta tokyuu* 'the express train Akichan had been riding with', Aki, 2;10.12).

Shortly after, recursive structures appeared, coordinating with *to* 'and' (e.g.: *shooboojidoosha to Jiputaa to shooboojidoosha to kyuukyuusha* 'the fire engine and Jiputaa [character name] and the fire engine and the ambulance', Aki, 2;6.30) or subordinating with no (e.g. *Ryookun no hommono no ootobai* 'Ryo's real bike', Ryo, 2;8.22). At this time also more elaborate structures became productive (e.g. ojichan ni moratta yatsu 'the one [I] got from the uncle', Tai, 2;4.3; *Nagoya itta toki* 'when [I] went to Nagoya', Ryo, 2;9.27).

On the other hand, many items did not reach P4-level for all children. None of the younger children produced instances of past forms of the verbal adjective. Clauses containing adjectival nouns (e.g.: *suteki na jidoosha* 'a fancy car', Tar 3;1.0) became productive at P4-level only for Tai at 2;8 and for Tar at 3;1, while the other 2 children did not become productive on adjectival nouns before their 3rd birthday. None of the children produced a past tense clause with an adjectival noun. Prenominal clauses including WH words became productive only for Aki (2;8) and Tar (2;7), while Tai produced only 1 item in 2;3 (*koko nan no omise?* 'what kind of shop is here?', 2;3.4; P1-level), and Ryo did not use any pronominal WH words at all.

The three older children (Maj, Mic, Tat) whose observation started after age of three, were clearly productive with the genitival and the coordinating structures N+*no*+N and N+*to*+N, and reached P4-level in the very first session. Also the tense-inflected structures Adj+N and V+N appeared to be already productive in all 3 children, reachjng P4-level in 3;2, although past tense forms only appeared for verbs. WH question words including NPs became productive in 3;6 for Maj and Mic, but, for this item, Tat reached only P2-level in 3;10. For this construction type, two of the younger children had already become productive around 2;7 - 2;8. The construction including adjectival nouns connected with a copula form (AN+*na*+N) was another structure which became productive rather late (Maj 3;10, Mic 4;1, Tat 3;9). However, two of the younger children were using it productively at a rather early rage (Tai 2;8 and Tar 3;1). Prenominal clauses including more sophisticated verb forms such as

passive, potential or negation (V[neg/pot/pass]+N), were productive for the younger child Tar already at 3;1, and for the older child Tat at 3;5, but the other two older children reached P4-level only at 5;0.

5.2. Errors connected to the NP structure

An analysis of the errors produced by the three children showed considerable individual differences. Tar produced a number of N+N omitting the genitive particle *no* from 2;0, (**Taachan futon* 'Taachan's mattress', **shiro manjuu* 'white cake', Tar 2;0.4), ten days before using the first correct N+*no*+N construction (*pinku no botan* 'the pink button'; 2;0.15, which became productive at 2;1.1. The N+N construction still continued to be used rather frequently for another month, but did not appear again after 2;2. Tai and Ryo on the other hand, started out with the correct full or elliptic N+*no*+(N) in 1;9, but showed sporadic omission errors after the second birthday (e.g.: **kore yatsu* 'this one', Tai, 2;7.13), and after 2;7, respectively (e.g.: **jibun booru* 'my ball', Ryo 2;7.4).

All three children produced overgeneralization errors with *no*. Tai's first overgeneralization of *no* appeared at 1;10 (*akai *no patokaa* 'the red patrol car' 1;10.20), and continued to appear also after his third birthday (*dondon tte yaru *no yatsu janai ?* 'isn't that the one that make dondon?, Tai, 3;10.1). Aki's first overgeneralization appeared rather late at 2;10.12 (*oto nai *no hanabi* 'a firework without noise'; *kaita *no hanabi* 'a painted firework') after 9 months of correct use, and continued until the end of the observation. Ryo showed only a few instances of overgeneralization at 2;7 and 2;8 (e.g.: *chigau *no gohan wa?* 'And what about the other meal?', Ryo, 2;7.19). All children produced overgeneralization errors not only with adjectives but also with verbs, as can be seen by the examples above. Tai produced the most errors of the three children, not only overgeneralization errors, but also errors concerning other restrictions of no (e.g.: *kore to *no issho no Nampuu* 'the Nampu [= name of train] similar to this one', Tai 2;5.12). Also for Tar we found a rather high number of overgeneralizations for about one year between end of 2;2 and 3;2 (e.g.: *katta *no shooboojidoosha* 'the fire engine we bought', 2;2.25; *denki paq tte tsuku *no mono kowai* 'things [where] the light suddenly goes on, are scary' 2;3.22; *kodomo ga matchi sawatteru *no ehon* 'the book [in which] children were touching matches' 3;2.0). Even at 3;8 an overgeneralization could be found (*yoru ni natta *no toki* 'when it became night', 3;8.2).

Also the older children produced many instances of overgeneralization in their

fourth and the first half of their fifth year. In these overgeneralizations verbs in the present and past tense form as well as adjectives in the present tense form appeared. (*akai *no kumasan* 'the red bear, Maj 3;2.1, *koko made yatta *no e* 'the picture [which] I did up to now', Maj 4;2.3; *chitchai *no hoochoo* 'the little knife', Mic 3;4.15; *akachan no koro kiteru *no yatsu* 'the stuff I was wearing when I was a baby', Mic 4;4.7; *shimatteta *no hon* 'the book we had put away' Tat 3;0.28; *tanoshikunai *no toki mo aru* 'times when it is not so much fun', Tat 4;2.7). Note that the correct form V+N and Adj+N were apparently already productive at 3;0, and all children used them in concurrence to the overgeneralizations.

Another characteristic of the older children is the tendency to overuse no (*Pokemon tsuite (i)ru yatsu no *no bansookoo* 'the band-aid with Pokemon on it' Maj 3;8.10; *aoi no *no dareka no nokori* 'the blue one is somebody's left-behind [one]' Mic 4;6.10). There are also a number of errors occurring in combination with adjectival nouns, illustrating the children's uncertainty concerning the grammatical status of these words (*jama *no mono* 'things that get in the way' Maj 4;6.10; *kirai wa kirai *no ko ga iru* 'there are children who hate it' Mic 4;1.31).

5.3. Selection of items suited for DSSJ

Table 3 summarizes the P-levels reached by the seven children. N+*no*+N, N+*no*, N+*to*+N, Adj+N, Adn+N, and V+N became productive at P4-level for all children, while V(neg/pot/pass)+N and AN+*na*+N were used productively only by the older children. WH+(*no*)+N was used productively by only two of the older children, although the younger child Tar had already acquired it prior to his third birthday. The past tense including forms Adj-

Table 3 P-levels for different NP constructions produced by the seven children investigated

	1-3-year olds			1-4-year old	3-5-year olds		
NP constructions	Aki	Ryo	Tai	Tar	Maj	Mic	Tat
N+no+N	P4	P4	P4	P4	P4	P4	P4
N+no	P4	P4	P4	P4	P4	P4	P4
N+to+N	P4	P4	P4	P4	P4	P4	P4
Adj+N	P4	P4	P4	P4	P4	P4	P4
Adj-PAST+N	–	–	–	–	–	–	–
Adn+N	P4	P4	P4	P4	P4	P4	P4
V+N	P4	P4	P4	P4	P4	P4	P4
V(neg/pot/pass)+N	(P1)	(P1)	(P1)	P4	P4	P4	P4
AN+na+N	(P1)	(P1)	P4	P4	P4	P4	P4
AN+datta+N	–	–	–	–	(P1)	–	–
WH+(no)+N	(P1)	–	(P1)	P4	P4	P4	(P2)

Table 4 Qualifications for DSSJ Items (Miyata, MacWhinney, Shirai, Sirai, Oshima & Otomo, in work)

Stages 1 and 2	The 4 younger children (Aki, Ryo, Tai, Tar) reach P4 for this item before 3;0
Stage 3	At least 3 of the 4 younger children (Aki,Ryo,Tai,Tar) reach P4 for this item; the 4rth child reaches P3 before 3;0
Stage 4	The older children (Maj, Mic, Tat, Tar) reach P4, the younger child Tai reaches at least P3 for this item.
Stage 5	At least 2 of the older children (Maj, Mic, Tat) reach P4, the third child reaches P3 for this item.

PAST+N and AN+*datta*+N were not used by any of the children.

The next step is the selection of the items qualifying for the DSSJ index. Following the "Qualifications for DSSJ Items" guideline (Miyata, MacWhinney, Shirai, Sirai, Oshima & Otomo, in work; Table 4) we obtain the following results for NP structures.

Qualifying for stages 1 - 3: N+*no*+N, N+*no*, N+*to*+N, Adj+N, Adn+N, V+N

Qualifying for stage 4: AN+*na*+N

Qualifying for stage 5: V(neg/pot/pass)+N

Not qualifying: Adj-PAST+N, AN+*datta*+N, WH+(*no*)+N

Next, we arrange these items on a graph according to the monthly age, when they are acquired at P4-level (Figure 1). Through comparison with items of other areas, especially verb inflection, the items could be identified as belonging to the stages 1, 3 and 4 (Table 5). From the graph it was also apparent that Adj+N which was extremely early for Tar, showing a deviant pattern from the other items. Also V(neg/pot/pass)+N showed an irregular pattern, appearing early for Tat but extremely

late for Maj and Mic. Both irregular items were excluded from the stage model.

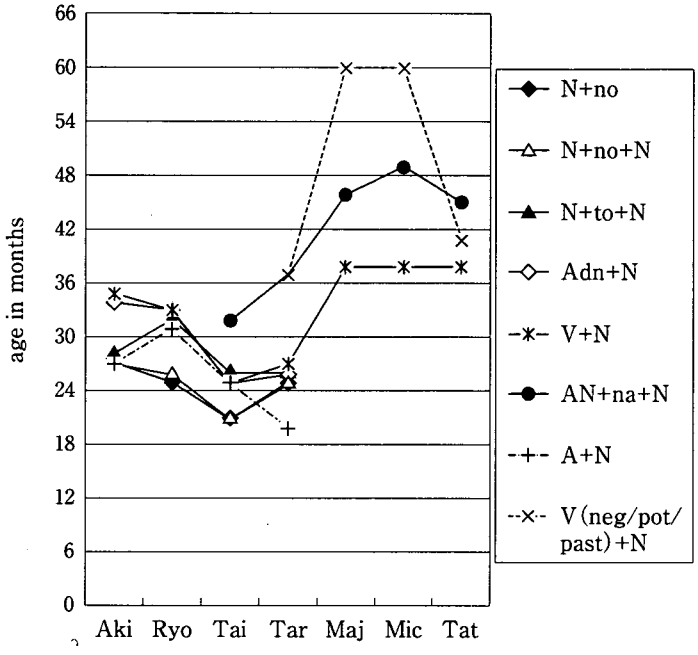

Figure 1 Qualifying DSSJ items and their age of P4-level acquisition for 7 children

Table 5 The development of NP structure within the 5 stages frame of DSSJ

DSSJ Stages	NP Structure
Stage 1	N+*no*, N+*no*+N
Stage 2	
Stage 3	N+*to*+N, Adn+N, V+N,
Stage 4	AN+*na*+N
Stage 5	

Following this procedure, we could identify 4 items acquired in stages 1, 3 and 4 (Table 5). In the first stage, the subordination structure with *no* (genitive) appeared. In the third stage, coordination with *to* 'and' as well as adnominals and verbs appeared in the prenominal position. In the third stage the adjectival noun with the connecting present tense copula na became productive. Consistent with the overall development of the children (Miyata, MacWhinney, Shirai, Sirai & Oshima, 2001; Miyata, MacWhinney, Shirai, Sirai, Oshima & Otomo, in work), a clear difference in developmental speed among the seven children was observed. This difference was

also reflected in the MLUm values for the four younger children (Miyata, 1999; Miyata et al., in work). Despite the different developmental speed, we could identify regular patterns in the process of acquisition of the NP-structure, which could be exploited for a developmental index.

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Acknowledgements

We gratefully acknowledge the support of this research by the Ministry of Education, Science, Sports and Culture through the Grant-in-Aid (A)(2)(1999-2000) No. 11694009 (Head Investigator: H.Sirai) and the Grant-in-Aid (B)(2001-2004) No. 13410034 (Head Investigator: K. Otomo). We thank Beverley Curran (Aichi Shukutoku University) not only for her linguistic but also emotional support and encouragement throughout this work. Our warmest thanks though go to the seven children and their parents. Without their understanding collaboration, this project would not have been possible.

1) In the present article we will use the expression 'case' particle for *no*, although it is not assigned by the verb or adjective, but exclusively by nouns. For a discussion of the status of case particles in Japanese see Nishigauchi (1994).

2) compare Tsujimura (1991:265); Sirai & Gunji (1998) claim that ga/no conversion can also occur in external clauses with the complementizer *toiu*.

3) For an exhaustive list of insubstantial nouns see Masuoka & Takubo (1992:36f).

4) *no da* 'it is that' can be analyzed as special case of the sentence nominalizing particle no (see ex. 19) in combination with the copula *da*. For an analysis see Kuno (1973, pp. 223ff) and Martin (1975, pp. 851ff).

5) Kinsui (1995) discusses whether there is a difference between its use as clausal marker (*hobun hyoshiki*) as in *Tanaka ga kaetta no wa akirakada* 'It was clear that Tanaka was back' and as pronoun (*daimeishi*), as in *ookii no o kudasai* [A big one please], with the conclusion that both

uses of *no* are identical in modern Japanese. We share his view.

6) With this interpretation, we differ from Kinsui (1995) and also Narita (1994). We assume that no in *kono hon wa Tanaka no da* 'this book is Tanaka's' (Kinsui) and *boku no wa doko desu ka* 'where is mine' (Narita) is not a pronoun as proposed, but rather the GEN case particle with a following ellipsis.