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Karin Böhme

**CHILDREN'S
UNDERSTANDING
AND
AWARENESS
OF
GERMAN
POSSESSIVE
PRONOUNS**

Children's Understanding and Awareness of German Possessive Pronouns

Promotor: Prof.Dr. W.J.M. Levelt

Children's Understanding and Awareness of German Possessive Pronouns

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Karin Gudrun Böhme

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1. INTRODUCTION

1.1 Research Aims

About a decade ago (when Gleitman, Gleitman, and Shipley published their study on "the emergence of the child as grammarian" in 1972) developmental psycholinguists became interested in the acquisition of "linguistic awareness", i.e. in the child's ability to reflect and comment on language structures and functions. However, despite a growing body of empirical data on children's metalinguistic abilities (cf. especially the comprehensive overviews in Sinclair et al., 1978, and in Hakes, 1980) it is still an open question whether metalinguistic abilities play any role in children's acquisition of "primary" linguistic skills, such as language understanding (cf. Levelt, 1974; Levelt et al., 1978; Clark, 1978a; Gleitman & Gleitman, 1979; List, 1981; Karmiloff-Smith, 1981).

The present research will try to answer this question. More particularly, we are concerned with the investigation of development and interaction of language understanding and linguistic awareness. Three major problems are addressed in our study:

- a. How do language understanding and linguistic awareness change with age and experience?
- b. How do linguistic failures create awareness of these failures?
- c. How do linguistic awareness and language understanding interact in language acquisition?

Thus, a first aim of this work is the exploration of children's understanding (= performance) and awareness (different metalinguistic abilities) of some linguistic units (in our research: German possessive pronouns) in language acquisition. A second aim focuses on causes and functions of metalinguistic abilities in language development. Failure in communication might be a cause for linguistic awareness to arise, a possible function of linguistic awareness could be prevention or repair of such failure, i.e. linguistic awareness could serve as some kind of feedback mechanism or correction device (for this argument, cf. Claparède, 1917, 1918; Vygotsky, 1962; Marshall & Morton, 1978; Campbell, 1979). Our main hypothesis to be studied is that linguistic awareness at some stage (as apparent from different metalinguistic abilities such as error detection, the ability to provide better alternatives, and explanation) can lead to improvement of the child's spontaneous under-

standing of correct forms. Rejection or confirmation of this hypothesis can shed some light on the enigmatic role of linguistic awareness in the acquisition of communicative abilities.

1.2 Some Research Requirements

In this section we will discuss some of the requirements that a systematic study of our questions must fulfill. The major ones are that our design allows for (1) an independent assessment of primary linguistic performance (here: understanding) and linguistic awareness; (2) a comparison of longitudinal data on performance and awareness; and (3) a comparison of cross-sectional data at different age levels. Furthermore the study should (4) use a "rich" linguistic domain; and include some form of (5) cross-validation.

The first requirement for our research design is a clear distinction between language understanding (primary skill, performance) and linguistic awareness (reflections, metalinguistic abilities) and independent assessment of these two kinds of linguistic abilities. Our study will be restricted to only one part of linguistic "performance", i.e. to language understanding, although we can assume qualitative differences between language comprehension and production (Deutsch, 1982, p. 4: "the receptive abilities are usually somewhat ahead of their productive counterpart"; see also Maccoby & Bee, 1965; Huttenlocher, 1974; Karmiloff-Smith, 1979b). Comprehension tests are preferable over production tests because language production shows in general only a small repertoire of language ability whereas comprehension tests can range wider in testing the child's competence. The comprehension (i.e. understanding) tests which we will call "performance tests" will be contrasted with "awareness tests". For assessing the child's awareness we will ask for error detections, corrections, and explanations of linguistic mistakes which the experimenter will make.

The second requirement is to observe whether the same child can perform better on a later test after he has demonstrated awareness in an earlier test. This within-child comparison makes a longitudinal set-up* of this study

* A longitudinal design requires that data are collected from an identical sample at two or more points of time in a defined time lag (cf. Helmreich, 1977, p. 15, cf. also Baltes & Nessebroade, 1979, p. 3-7). In follow-up studies data are evaluated which are collected before the begin of a research study (cf. Helmreich, 1977, p. 12). We will, therefore, use the term "longitudinal".

necessary. It is noteworthy that our research is not a "learning experiment" (with awareness tests as independent variables) but rather an experimentally controlled correlation study.

The third requirement is a cross-sectional comparison. Linguistic awareness might facilitate future language understanding more at one life-time than at another. In order not to miss a critical age level for our longitudinal study, different subsequent age levels have to be included in the study to start with.

A fourth requirement is to use an important linguistic domain where children show substantial variability in competence up until a relatively advanced age level. The field of pronouns is such a linguistic domain. Pronouns are among the latest acquired words. From both production and comprehension tests we know that German personal pronouns are not fully mastered before the age of 6;5 in children (Deutsch & Pechmann, 1978; Volbers, 1978). Since we have good reason to assume the same order of acquisition for personal and possessive pronouns (cf. Bohn, 1914; Goodenough, 1938) and since German possessive pronouns have not yet been systematically investigated, they will serve as our study material. This domain is, moreover, "rich" in view of morphophonological, syntactic, semantic, and deictic features (cf. Ingram, 1970) of pronouns. There are not only systematic intralinguistic relations between pronouns and other function words such as articles and demonstratives, but pronouns also relate systematically to extra-linguistic context because of semantic and deictic features. Syntactic features are relevant for distinctions of syntactic gender, semantic features for distinctions of natural gender, and deictic features for speaker/addressee shifts. This multiplicity of internal and external linguistic properties together with a slow pace of acquisition make pronouns a potentially faithful testing ground for the study of linguistic awareness.

Our fifth requirement is the possibility to cross-validate our findings by testing our hypotheses by means of comparison between two areas of problems; the results of one study might confirm or falsify those of the other.

Our first study, "shifting reference" (Study A), will not only test the role of linguistic awareness in the acquisition of possessive pronouns (variable terms) but also the more specific question of person deixis, both in the acquisition of language understanding and linguistic awareness. Deictic terms can only be understood in relation to the local-temporal position of the speaker (Bühler, 1934; Frei, 1944; Benveniste, 1965, 1966; Kurylowicz, 1972; Clark, 1974; Clark & Sengul, 1978; Lyons, 1978; Tugendhat,

1976; Tanz, 1980; Charney, 1980). This implies that they do not only have a point of reference but that they also involve "shifting reference" (Jespersen, 1922; Jakobson, 1963/1971; Harweg, 1978; Clark, 1978b; Deutsch & Pechmann, 1978; Clark & Sengul, 1978, Tugendhat, 1979; Tanz, 1980; Habermas, 1971, 1975, 1981; Bruner, 1982; Hickmann, in press).

In a speech act we must distinguish between a speaker, an addressee, and a non-speaker/non-addressee (this can be either a listener who participates in a verbal communication situation or a non-present person). Personal or possessive pronouns, which comprise either speaker or addressee, change their form according to the point of reference. If a speaker says in self-reference "my present" the addressee must refer to the same present as "your present". Pronouns which involve both speaker and addressee or only third person participants do not alter for speaker or addressee. Thus we must distinguish between pronouns which are affected by a speaker/addressee shift and those which are not. In this research we want to restrict the term "shifting reference" only to the speaker/addressee shift.

In Study A it seems especially interesting to explore "shift awareness", i.e. the ability to detect, correct, and explain errors which are due to a shift from speaker to addressee.

The second study, "natural and syntactic gender" (Study B), will also explore the role of linguistic awareness in pronoun acquisition. Study B focuses not so much on deictic features but on syntactic and semantic features of pronouns in performance and awareness tests.

In the German pronoun system a multitude of information can be stacked in one single pronoun. There exist distinct forms for the so-called "semantic" characteristics of person, number, case, status, and gender (with respect to "semantic" characteristics, cf. Fillenbaum & Rapoport, 1971; Miller & Johnson-Laird, 1976; Klein, 1979). Personal and possessive pronouns refer in the first and second person to animates (inanimates are rarely "personalized"), in their third person they can relate to animates or to inanimates. Natural and syntactic gender only play a role in the third person singular but not in plural. Therefore, the third person singular is an epistemologically interesting subject matter.

When reference is made to animates and there is no clash with syntactic gender (like in German: "das Mädchen, es ...") masculine and feminine gender indicate the sex of these animates. Here we speak of "natural gender" or "sexus". Both inanimates and animates are in German classified into three genders: masculine, feminine, and neuter "in order to account for two distinct

phenomena: (i) pronominal reference, and (ii) adjectival concord (or 'agreement')" (Lyons, 1968, p. 283). Here we deal with "syntactic gender" or "genus".

Our main interest is that natural gender has a semantic/cognitive base because of its extralinguistic reference (persons can be looked at and judged for their sex) and that syntactic gender has a more morphophonological/syntagmatic base because of its intralinguistic reference (Böhme & Levelt, 1979). Hence, our second study on "natural and syntactic gender", which will have the same design as the first one on "shifting reference", studies the role of extralinguistic versus intralinguistic factors in the development of spontaneous language understanding and metalinguistic abilities.

If we discover that metalinguistic abilities facilitate future performance in one study but not in the other we must be more cautious in our interpretation than in case of a convergence of both studies.

Before we turn now to more specific discussions, let us give a short outline on how we will proceed in the following sections. In the next section 2 different linguistic features for the classification of German possessive pronouns will be presented which - in section 3 - will be related to potential orders of skill acquisition. In section 4 we will distinguish different types of awareness which - in section 5 - will be associated with potential functions of awareness in language acquisition. In section 6 the results of Study A on "shifting reference" will be discussed and in section 7 the results of Study B on "natural and syntactic gender". The final section 8 will contain conclusions of the main findings and some suggestions for further research.

2. LINGUISTIC ANALYSIS OF GERMAN POSSESSIVE PRONOUNS

The notion of pronoun, as used in most descriptive grammars, was introduced by the Alexandrian grammarians. Dyonisius Thrax (late second century B.C.) added to the four Stoic parts of speech ('noun', 'verb', 'conjunction', 'article') four other ones, namely 'adverb', 'participle', 'preposition', and 'pronoun'. His definition is very concise: "The pronoun is a part of speech which is substitutable for a noun and which denotes certain persons. It has 6 characteristics: persons, gender, number, case, form, kind." (see Arens, 1974, p. 21-28).

We cannot discuss here how this concept originally was conceived of and how it was elaborated and re-interpreted over the centuries when applied to other languages than Greek. Roughly speaking, there are four types of features which dominated the whole discussion of pronouns:

- Morphophonological features: they concern the form of pronouns, their phonetic shape, inflection, stressability, etc..
- Syntactic features: they concern the role of pronouns within the whole sentence structure, for example whether they represent a noun, as traditionally assumed, or a noun phrase, as they obviously do in languages like German.
- Semantic features: they concern the - mostly very general and abstract - meaning of pronouns.
- Deictic features: they concern the relation between pronouns and the speech situation, or rather specific elements of the speech situation; "I", for example, usually denotes the speaker, "you" usually denotes the addressee. This denotation underlies a constant change, depending on who is just speaking or listening. This phenomenon of "shifting reference" is one of the most salient features of pronouns (see, for example, Bühler, 1934, for a discussion of the deictic nature of pronouns).

In the following we shall briefly consider these four feature types of pronouns, with special emphasis on semantic and deictic ones, since they are in the focus of our study. This discussion will neither be comprehensive nor very detailed. It should only prepare the ground for the presentation of our own investigation. Thus it will be basically limited to those pronouns which function as independent variables in our own two studies. The first of these studies deals with "shifting reference", and the second with "gender". To begin with, let us briefly list the pronouns used in the

two studies.

In the experiments on "shifting reference" (Study A), the following German possessive pronouns are used:

mein, dein, sein, ihr, unser, euer.

They are used to refer to the four "participants" of a speech situation: the experimenter, the subject, a male doll, and a female doll. It is important to note that some of the six pronouns are ambiguous: "ihr", for example, may refer to a singular female doll, or to two dolls (corresponding to English "her" and "their", respectively). In Table 1, these pronouns and some of their characteristics are listed. Whenever necessary we shall disambiguate ambiguous pronouns by subscripts; these subscript forms are given in the last columns.

Table 1: German Possessive Pronouns of the Study on "Shifting Reference"

person	number	referent(s)	pronouns	pronominal abbreviations
1st	singular	E(xperimenter)	mein	
	plural	E & S(ubject)	unser	unser _{incl.}
		E & S & two dolls	unser	unser ₄
		E & female doll	unser	unser _{excl.}
2nd	singular	S	dein	
	plural	S & male doll	euer	
3rd	singular	male doll	sein	
		female doll	ihr	ihr _{sing.}
	plural	two dolls	ihr	ihr _{pl.}

In the two experiments on "natural and syntactic gender" (Study B), only two possessive pronouns are used:

sein-e and ihr-e

Morphologically, a German possessive pronoun consists of two parts (in the two examples above, they are separated by a hyphen). The first part (= free morpheme) is the lexical component; it is determined by semantic characteristics like person, number, gender and status of the possessor. The second part (= bound morpheme) is the inflectional component; it is determined by case, number and gender of the possession (cf. Helbig & Buscha, 1979). The possession is usually indicated by the following noun(s), and the possessor is given somewhere in the context.

In our experiments, we are only interested in the gender of the possessor, that is, we are interested in the difference between, for example, "ihr-e" vs. "sein-e", but not in differences such as the one between "ihr-e" vs. "ihr-er". In the first experiment on natural gender, the possessors are a male doll, a female doll, and a pig whose sex and hence whose natural gender is unspecified; it could even be referred to in the neuter gender ("das Schweinchen"). The possession is a scarf ("die Schleife"). In the second experiment, on syntactic gender, the possessors are a dice ("der Würfel"), a watering-can ("die Gießkanne"), and a little boat ("das Boot/Schiff/Bötchen"), and the "possession" - this word is somewhat inappropriate here - is the colour these objects had ("die Farbe"). This is summarized in Table 2.

Table 2: German Possessive Pronouns of the Study on "Natural and Syntactic Gender"

gender of the possessor		referent	pronoun
natural gender task	masculine gender	scarf (die Schleife) of the male doll (e.g. <u>der</u> Peter)	"sein-e"
	unspecified gender	scarf (die Schleife) of the pig (<u>das</u> Schweinchen)	
	feminine gender	scarf (die Schleife) of the female doll (e.g. <u>die</u> Tina)	"ihr-e"
syntactic gender task	masculine gender	colour (die Farbe) of the dice (<u>der</u> Würfel)	"sein-e"
	neuter gender	colour (die Farbe) of the boat (<u>das</u> Boot/Schiff)	
	feminine gender	colour (die Farbe) of the watering-can (<u>die</u> Gießkanne)	"ihr-e"

We will now turn to a discussion of the various features mentioned above.

2.1 Some Morphophonological Features

There is one aspect of the shape of pronouns which is particularly relevant in the present context; this is the collapsing of different functions in one morphophonological form. We might expect that children have special problems with this merging of functions in the acquisition of language understanding, so we will focus on the aspect of homonymity.

Possessive pronouns, as personal pronouns in general, may be ambiguous; we already mentioned the example of "ihr". In the case of possessives, ambiguity may involve person, number, case, gender, and status. We shall consider them in turn:

- (1) Person: The free morpheme of the 3rd person singular and plural of the possessive pronoun "ihr" can be mixed up with: firstly, the 2nd person plural of the personal pronoun "ihr", and secondly, the politeness form (or 'V'-form, cf. Brown & Gilman, 1960) "Ihr", (2nd person singular and plural of the possessive pronoun) in spoken language.
- (2) Number: The free morpheme of the informal 3rd person of the possessive pronoun "ihr" can be either singular or plural (the same holds for the formal 2nd person possessive pronoun "Ihr").
- (3) Case:
 - a) The bound morpheme is identical for nominative and accusative of the masculine and neuter singular possessive pronoun "sein- \emptyset " (\emptyset denotes zero morpheme).
 - b) The bound morpheme is not distinctly marked for nominative and accusative of the feminine singular and plural pronoun "ihr- \emptyset " (moreover, these can be confused with the dative inflection of the feminine 3rd person singular of the personal pronoun "ihr").
 - c) The bound morpheme is not distinctly marked for nominative and accusative of the feminine singular and all plural pronouns "sein-e" (this also holds for "ihr-e").
- (4) Gender:
 - a) The free morpheme of the masculine singular pronoun "sein" can be natural and syntactic gender (the same holds for the feminine singular and plural pronoun "ihr").
 - b) "sein" can be masculine or neuter.
 - c) The bound morpheme of the feminine singular and all plural pronouns "sein-e" can be natural and syntactic gender (this also holds for "ihr-e").

(5) Status: The free morpheme of the informal 3rd person singular and plural "ihr" can be confused with the politeness form of the 2nd person singular and plural of the possessive pronoun "Ihr" in spoken language (similarly for "ihr-e" and "Ihr-e").

There might be two additional sources of confusion: the pronoun "sein" and the infinitive of the auxiliary "sein" ('to be') might be confused, and it might be difficult to differentiate the three meanings of "user" (see Table 1).

2.2 Some Syntactic Features

Despite several controversial issues with respect to the syntactic classification of German pronouns (cf. e.g. Schmidt, 1965) we will briefly outline three of the most important and uncontroversial syntactic features of German possessive pronouns.

Firstly, personal pronouns - including possessives - are noun phrases. In this respect, the term "pro-noun" is very misleading: pronouns do not "replace" nouns but noun phrases (as to the "noun-conception", cf. the school grammars of Duden, 1966, or Schoebe, 1974, and the linguistic notions entertained by Bloomfield, 1933; Pei & Gaynor, 1965; Lyons, 1968; Erben, 1977; as to the "noun phrase-conception", cf. Lyons, 1977a; Klein, 1979; Klein & Rieck, 1982). Possessive pronouns share three uses with noun phrases in general:

1. Argument use: Here is my house. His is bigger.
2. Predicative use: Here is the house. It is mine.
3. Attributive use: This is his house.

Secondly, coreferentiality of noun phrases and pronouns only holds for anaphoric uses but not for deictic uses. Anaphoric use is restricted to 3rd person pronouns and includes two subcases:

- anaphoric use in the narrower sense (Bühler's "Rückverweis", cf. Bühler, 1934, p. 122): full noun phrase precedes corresponding pronoun, as in: "When Paul heard the message, he dropped dead".
- cataphoric use (Bühler's "Vorverweis"): full noun phrase follows corresponding pronoun, as in: "When he heard the message, Paul dropped dead".

Thirdly, coreferentiality of noun phrases and pronouns is the basis for early linguistic descriptions which considered replacement (pronouns 'stand

for' noun phrases) to be "subject to very rigid grammatical rules" (Lees & Klima, 1963). The derivational paradigm in which pronominalization is explained by means of formal transformations (cf. e.g. Jacobs & Rosenbaum, 1968; Postal, 1969) has been given up by now (cf. Hankamer & Sag, 1976; Evans, 1980; Koster, 1979, 1981; Chomsky, 1981). In recent treatments in which semantic implications of pronouns are considered, a distinction is made between so-called "bound variable pronouns" and "free variable pronouns". The former have to be in the scope of a quantifier (like in "Everybody thinks that he is important"), or they must stand in a specific syntactic configuration to the corresponding noun phrase (so-called "c-command"-relation, see Reinhart, 1976, and, for a longer discussion, Koster, 1979). The latter don't undergo syntactic restrictions at all. They are referring expressions, names, or definite descriptions, and whether they are coreferential to another noun phrase depends on general discourse context (for example "John hates his neighbour's dog. He shot him"). Thus it is assumed that only a very specific class of occurrences is governed by syntactic restrictions.

Let us now turn to implications of syntactic functions and coreferentiality for the possessive pronouns which are used in our study. For both studies ("shifting reference" and "natural and syntactic gender"), we have to take into account at least four morphosyntactic aspects.

Firstly, all possessive pronouns tested occur in attributive use (e.g. "mein Geschenk"/my present in shifting reference; "ihre Schleife"/her scarf in the natural gender task; and "ihre Farbe"/her colour in the syntactic gender task). Possessive pronouns in attributive use can be inflected. The suffix '-e' in the gender tasks requires a distinction between the coreferentiality of free morpheme and possessor, on the one hand, and of bound morpheme and possession, on the other.

Secondly, all possessive pronouns (including the anaphoric 3rd person pronouns) get the feature (+def) since all referents will first be introduced by definite articles.

Thirdly, the introduction of the referents by their definite articles allows for a one-to-one mapping between the gender and number of the noun phrase and the gender and number of the pronoun. The syntactic characteristic "case" can be neglected because the morphophonological forms do not differ the nominative and accusative in those pronouns which we will use (cf. 2.1).

Fourthly, proper names of the dolls can carry definite articles in German. This may lead to referential confusion between natural and syntactic

gender: both dolls can be referred to as "die Puppe"/the doll. "Die" indicates feminine syntactic gender. The female doll can be called "das Mädchen"/the girl. "Das" indicates neuter syntactic gender. To avoid this confusion the definite articles of the dolls' names will be stressed in both studies.

2.3 Some Semantic Features

Although there are numerous interesting problems with respect to the complexity of semantic features we will only discuss the markedness of German possessive pronouns which plays a major role in the hypotheses of our experiments.

The concept of markedness was first introduced and systematically investigated by the phonologists of the Prague Circle, especially by Trubetzkoy and by Jakobson. In phonology, sounds are described in terms of phonological features. Thus, German [p] and [b] are only distinguished by one such feature [\pm voiced] , where b is voiced and p is not. It now often happens that only one element of such a pair is marked for such a feature, and the other element is simply unspecified or unmarked, that is, one is fixed, and the other one may be pronounced either way. This idea of an opposition between "neutral", unmarked elements and marked elements proved to be very fruitful, and various authors tried to apply it to semantic features, as well. Animals, for example, are specified for a feature [\pm male] - or [\pm female] - which separates men, bulls, boars from women, cows, pigs. Now we may use a word like "der Hund"/the dog which (as opposed to "die Hundin"/the bitch) has [+ male] for reference to any dog if we don't want to specify its sex, that is, it can be used as an unmarked form, too, whereas "Hundin"/bitch is always marked for sex. Another case in question is the asymmetric use of pairs like "young-old" where "old" - the unmarked element - is used to refer to any age ("John is one year old", rather than "one year young").

In all cases of this sort, the unmarked element is more neutral, more frequent, less informative, whereas its marked counterpart is more specific: it carries more semantic weight, with respect to the feature "male", "Hundin"/bitch says more than "Hund"/dog. Following this general idea, Greenberg (1970) has worked out a set of criteria for markedness. In her comprehensive study of German pronouns, Volbers (1978) has systematically applied these criteria and developed a most economical description of this system.

Since her analysis of personal pronouns is easily transferable to

possessive pronouns we shall adapt it for our present concern. She only discusses the features "person", "number", and "gender", i.e. those we are interested in, too. The feature "person" is split into "reference to the speaker" (+ Ego) and "participation in the speech event" (+ Se). This sub-division is based on earlier work by Huxley (1970) and Sharpless (1974). It allows the postulation of hierarchical relations of various sorts. Applied to possessive pronouns, her analysis yields the following description:

"mein"	(+ Ego)
"dein"	(- Ego; + Se)
"sein"	(- Ego; - Se)
"ihr _{sing.} "	(- Ego; - Se; + Fe(minine))
"unser"	(+ Ego; + Pl(ural))
"euer"	(- Ego; + Se; + Pl(ural))
"ihr _{pl.} "	(- Ego; - Se; + Pl(ural))

On the basis of various criteria, mostly taken from Greenberg (1970), Volbers concludes that the following feature specifications characterize the marked element:

- (- Ego), i.e. (+ Ego) is unmarked
- (- Se)
- (+ Fe)
- (+ Pl).

For a hierarchical ordering of pronoun complexity we will make three assumptions. Firstly, the more features a pronoun has, the more complex it is. Secondly, there is an intrinsic order of feature complexity. The feature (Ego) dominates (Se), (Se) dominates (Fe) and (pl.). (Ego) dominates (Se) for two reasons. Only the 2nd person and status are interrelated. We can also observe that "I and you" = "we", but not "you". (Ego) and (Se) dominate (Fe) because not all languages have gender pronouns but all have 1st and 2nd person (cf. Forchheimer, 1953). (Se) dominates the interrelationship between status and number (the V-forms are not distinguished with respect to number). Thirdly, markedness contributes to complexity.

Table 3 shows us the markedness of German possessive pronouns for the Semantic Feature Hypothesis (SFH) which is relevant for our predictions for "shifting reference" (cf. 3.2, Diagram 1). In this table different relations are displayed: a "-" means that the row element is unmarked with respect to

the column element; a "+" indicates that the row element is marked with respect to the column element. Not all items are comparable in this sense; this is designated by "0".

Table 3: Markedness of German Possessive Pronouns

	mein	dein	sein	ihr _{sing.}	unser _{incl.} / unser ₄ *	unser _{excl.}	euer	ihr _{pl.}
	+Ego	-Ego +Se	-Ego -Se	-Ego -Se +Fe	+Ego +Se +PI	+Ego -Se +PI	-Ego +Se +PI	-Ego -Se +PI
mein		-	-	-	-	-	-	-
dein	+		-	-	0	0	-	-
sein	+	+		-	0	0	0	-
ihr _{sing.}	+	+	+		0	0	0	0
unser _{incl.} / unser ₄	+	0	0	0		-	-	-
unser _{excl.}	+	0	0	0	+		-	-
euer	+	+	0	0	+	+		-
ihr _{pl.}	+	+	+	0	+	+	+	

In addition we may assume that neuter pronouns are marked with respect to masculine and feminine pronouns and that natural gender is unmarked with respect to syntactic gender (cf. Greenberg, 1970).

Though markedness theory can make rather precise statements about linguistic complexity by contrasting semantic features, more recent approaches stress the importance of deictic features for the complexity of pronouns. Tanz (1980, p. 1) expresses this point saying: "Personal pronouns are paradigmatic deictic terms."

* Note that both "unser_{incl.}" and "unser₄" are plural pronouns which include speaker and addressee.

2.4 Some Deictic Features

Deixis is a way of referring which is essentially based on the point of view of the speaker (the "I, here, and now") vis à vis the addressee in the situation of speech (as to specifications with respect to the linguistic concept of "deixis", cf. e.g. Bühler, 1934; Hirt, 1934; Fillmore, 1971; Ehlich, 1978; Jarvella & Klein, 1982). It is not only expressed by linguistic means but also by nonverbal concomitants (eye-movements, gestures, head and body turns). Deictic terms depend on extralinguistic context (as to the infant's step from 'behavioral' to 'linguistic' deixis, cf. Bruner, 1974/1975). Therefore, their meaning must be derived by linguistic and perceptual/cognitive strategies.

What distinguishes deictic terms such as pronouns from other referring expressions (proper names and definite descriptions)? There are at least two substantial characteristics which make the status of pronouns so unique although these characteristics also hold for local and temporal deixis (we will limit this analysis to person deixis and not go into the problems of temporal or local deixis, e.g. the problem of "shifting boundaries" in local deixis, cf. Clark, 1978b).

The first characteristic concerns the variability of reference. "I" can refer to any speaker but in general a definite description like "the blond author" or a proper name like "Peter" refers to a specified person in all communicative situations. Since the characteristic "variable reference" is only a matter of degree (definite descriptions are also variable in reference, cf. Nunberg, 1978) it cannot be considered to be the critical characteristic.

The second characteristic concerns the shifting between speaker and addressee. The "shifting reference" feature* is much more critical since it implies reciprocity between speaker and addressee. When a speaker says: "This is my present" the addressee could answer: "Yes, this is your present", thus changing the reference marker. This does not hold for most proper names and definite descriptions (e.g. "This is Peter's present" or "This is the present of the blond author"). Thus, the overt forms of sentences with proper names and definite descriptions do not change between speaker and addressee, but

* Although Clark & Sengul (1978) attribute "shifting reference" to 3rd person pronouns we will restrict this term to the speaker/addressee shift.

they do change for pronouns, which either involve speaker or addressee (but not both of them). A specification of "shifting reference" involves a distinction of two pronoun meanings for those pronouns which involve speaker or addressee: utterance meaning and word meaning (cf. Bar-Hillel, 1967; Lyons, 1973, 1977b). Although the same form "I" (or "my") can rotate from speaker to speaker in actual communication situations (utterance meaning), it has at the same time the invariant meaning "speaker" (word meaning). This is the case when an addressee embodies the utterance of a speaker directly, i.e. in some sort of speech quotation. In the following example, the addressee must take two perspectives simultaneously in one sentence, his own and the one of the speaker.

- (i) speaker B to A: "Your last sentence was 'this is my present.'" (both "your" and "my" refer in this sentence to the same person A).

In (i) "your" reflects B's perspective towards A and "my" B's embodiment of A's perspective. Thus, on the one hand, "your" is used in its utterance function, because B addresses A. On the other hand, "my" is not used in its utterance function but in its word function because "my" indicates A, but A is not the speaker at the very moment of the utterance. Therefore, in this one sentence (i) two different pronouns are implied which refer to the same person, utterance meaning "your" and word meaning "my". In some contexts (e.g. A to B: "This is my present. What was my last sentence?") "your last sentence was" can be deleted by B so that we get the utterance: "This is my present" from B where B is the speaker but not the owner of the present. Note that this does not hold in case of proper names and definite descriptions. Examples:

- (ii) speaker A to B: "This is Peter's present."
(iii) speaker B to A: "Yes, this is Peter's present."
(iv) speaker B to A: "Your last sentence was 'this is Peter's present'".

The distinction between word or sentence meaning and utterance meaning is relevant in speech act theory where there is a basic difference between what is said and what is implied (cf. Grice, 1975). In (i) it is said: "Your last sentence was 'this is my present'", but implied is: "Your last sentence was this is your present".

The first deictic characteristic "variable reference" is more important for 3rd person pronouns than for those which involve speaker and/or addressee since they have a larger range of potential references (e.g. inanimates).

Thus, one could conclude that the former are linguistically more complex than the latter. Moreover, speaker and addressee are usually present in the communicative situation and can be identified whereas 3rd person pronouns may be used for human beings, animals, and things which are absent. Therefore, we might assume that "mein", "dein", "unser_{incl.}", "unser_{excl.}", and "euer" are less complex than "sein", "ihr_{sing.}", and "ihr_{pl.}". Pronouns which involve the second deictic characteristic "shifting reference" are called "shift pronouns". These comprise either speaker or addressee but not both of them. We only find shift pronouns in the "shifting reference" study but not in the "natural and syntactic gender" study. These pronouns have either the semantic feature (+ Ego) or (+ Se), but not both of them:

"mein" (+ Ego),
 "dein" (- Ego; + Se),
 "unser_{excl.}" (+ Ego; - Se; + plural), and
 "euer" (- Ego; + Se; + plural).

The second deictic characteristic "shifting reference" does not apply to:

"sein" (- Ego; - Se),
 "ihr_{sing.}" (- Ego, - Se; + Fe),
 "unser_{incl.}" (+ Ego; + Se; + plural), and
 "ihr_{pl.}" (- Ego; - Se; + plural).

Whereas the "variable reference" characteristic depends exclusively on the intentions of the speaker, the "shifting reference" characteristic takes both speaker and addressee into account. Thus, we come to a different conclusion for the second deictic characteristic than for the first one with respect to deictic complexity: the shift pronouns ("mein", "dein", "unser_{excl.}", and "euer") are more complex than non-shift pronouns ("sein", "ihr_{sing.}", "unser_{incl.}", and "ihr_{pl.}").

A third deictic characteristic stresses also the importance of speaker or addressee but now of both: speaker and addressee are focused. Deutsch & Pechmann (1978) who used a similar experimental set-up as the one in the "shifting reference" study consider the "proximal-nonproximal contrast" (Lyons, 1975) as a decisive factor apart from the two principles "speaker-nonspeaker contrast" and "singular-nonsingular" contrast". They claim that "this principle establishes a boundary between two areas in the positional

structure" (p. 157) with speaker and addressee on one side and others on the opposite side. Physical proximity and eye-contact are more likely for speaker and addressee than between speaker (or addressee) and another participant. Therefore, speaker and/or addressee pronouns which include basic reference points should be less complex than speaker (or addressee) and other participant pronouns. Pronouns which refer exclusively to one or more participants are even more complex "since the content being conveyed is not congruent with the people immediately engaged in the exchange of information". The "proximal-nonproximal contrast" ranks possessive pronouns in the following order: the least complex are "mein", "dein", and "unser_{incl.}", more complex are "unser_{excl.}", and "euer", and the most complex are "sein", "ihr_{sing.}" and "ihr_{pl.}". In order to get a clearer picture of deictic complexity, different pronoun rankings will be shown in dependence of deictic characteristics (Table 4).

Table 4: Deictic Complexity of German Possessive Pronouns

	first deictic characteristic	second deictic characteristic	third deictic characteristic
order of complexity	variable reference (and "presence")	shifting reference	proximal-nonproximal contrast
high complexity	sein ihr _{sing.} ihr _{pl.}	mein dein unser _{excl.} euer	sein ihr _{sing.} ihr _{pl.}
medium complexity			unser _{excl.} euer
low complexity	mein dein unser _{incl.} unser _{excl.} euer	sein ihr _{sing.} unser _{incl.} ihr _{pl.}	mein dein unser _{incl.}

From Table 4 we can see that only one possessive pronoun is uncontroversial with respect to deictic complexity: "unser_{incl.}" is not very complex. The first and third deictic characteristic ("variable reference" and proximal-nonproximal contrast") allow similar pronoun rankings, with a further

specification for the "proximal-nonproximal contrast" which exhibits an in-between position for "unser_{excl.}" and "euer". However, the second deictic characteristic, on the one hand, and the first and third deictic characteristics, on the other hand, rank pronoun complexity in inverse order, with the exception of "unser_{incl.}".

What can we expect on the basis of linguistic complexity, morphophonological, syntactic, semantic, and deictic characteristics, for the order of acquisition?

3. GENERAL PREDICTIONS ON THE ORDER OF ACQUISITION FOR UNDERSTANDING

Because linguistic forms are for a child a means to express his cognitions of the environment (Slobin, 1973), we must distinguish between linguistic forms and conceptual implications of these forms. We should distinguish at least three conceptual implications for the predictions of skill acquisition which will be analyzed separately for the study on "shifting reference" and for the study on "natural and syntactic gender".

Firstly, potential difficulties in the acquisition of German possessive pronouns may be due to different degrees of complexity in morphophonological and syntactic features. We will base our predictions on the assumption that homonyms (such as "ihr_{sing.}" / "ihr_{pl.}") are more complex and therefore more difficult than non-homonyms (such as "mein" / "dein") (cf. 2.1). In our prognosis we will take into account to what pronouns refer (cf. 2.2) because syntactic agreement between article and pronoun can be problematic for the child's understanding of 3rd person pronouns.

Secondly, semantic features could be decisive for the order of acquisition. In 2.3 we analyzed German possessive pronouns in terms of markedness. The Semantic Feature Hypothesis (SFH) claims that unmarked words should be acquired earlier than marked ones and that children might substitute unmarked words for marked ones but not reversely. Thus, the first claim predicts the order of correct usage and the second one the type of errors during acquisition.

Thirdly, deictic characteristics could be of importance for correct pronoun acquisition. In 2.4 three characteristics were investigated which showed different degrees of deictic complexity. On the assumption that deictically more complex pronouns will be acquired later than less complex ones we will come to different predictions for acquisitional ranking.

Differential difficulties of morphophonological, syntactic, semantic, and deictic characteristics may lead to conflicting predictions for pronominal acquisition. An overview of converging and diverging expectations will be given in 3.4.

3.1 Predictions Based on Morphophonological and Syntactic Characteristics

When children acquire language they must perceive and discriminate sound differences. Which of the phonemically different pronominal forms and which of the phonemically identical pronominal forms could cause difficulties in

the referent identification of the two studies, "shifting reference" and "natural and syntactic gender"?

In the performance task of the "shifting reference" study the experimenter will ask for correct identification, one out of nine presents, after possessor relationships have been introduced. Nine possessive pronouns refer to nine different presents, but only six can be phonemically discriminated in adult language. These six possessive pronouns are: "mein", "dein", "sein", "ihr", "unser", and "euer" (cf. Table 1). However, the pronominal form "unser" can refer to three different presents, and the pronominal form "ihr" to two different presents. These two pronouns, "unser" and "ihr", are potentially confusing because one and the same form can denote more than one referent.

"Mein", "dein", "sein", and "euer" are phonemically different forms in adult language. Can we assume that "mein", "dein", and "sein" in which only the initial consonant is phonemically different will be a source of trouble for the child? It has been observed that "cluster reduction", the deletion of initial consonants (e.g. "ein" for "mein"), is a problem of expressive phonology but not of receptive phonology for children (De Villiers & De Villiers, 1978). De Villiers & De Villiers also report substitutions, such as stops for fricatives and vice versa (e.g. /d/ for /z/) in early utterances. However, Garnica (1973) who studied phonemic speech perception in children between the age of 1;5 and 1;10 found that nine out of twelve children could discriminate between stops (e.g. /d/) and fricatives (e.g. /z/). Phonological assimilation, the maintenance of the same place of articulation for phonemes can further be a problem of production in children. These findings suggest that children discriminate among nasals (e.g. /m/), stops (e.g. /d/), and fricatives (e.g. /z/) in phonemic perception at a very early age. The fact that small children sometimes substitute "mein" for "dein" and vice versa is therefore most likely due to cognitive/psychological factors and not to sound similarity. It has been observed that "ich" and "du" of the 1st and 2nd person personal pronoun are also mixed up in the same child when "mein" and "dein" are confused (cf. Baronin von Taube's child, cited in Gheorgov, 1905). Thus, we should not stress phonemic factors in case of a confusion between "mein", "dein", and "sein".

Which other morphophonological difficulties can be expected for the identification of "mein", "dein", "sein", and "euer"? Case and gender jumbles (cf. 2.1) for "sein" are irrelevant for "shifting reference" because we will

only administer this pronoun in accusative case in the performance tasks and because we will only deal with natural gender. Due to the syntactic form of the experimenter's question confusion with the infinitive of the auxiliary verb "sein" is highly unlikely. Therefore, we will not expect any effects on the use of "mein", "dein", "sein", and "euer" due to sound confusion, or homonymity.

However, "unser" and "ihr" could be problematic because of their plurifunctionality. The German possessive pronoun "unser" is not overtly marked for the inclusion or exclusion of the addressee (as to an overt inclusion-exclusion distinction for the 1st person plural in other languages, cf. Ingram, 1970). Since the experimenter will ask three times for "unser" present the child has to find out which referent could be meant. Intralinguistic information is not available for him. The three "unser" pronouns cannot be distinguished with respect to person, number, case, gender, and status. All three are 1st person pronouns, plural, and accusative. Gender and status are not marked for these possessive pronouns. This lack of information makes "unser" complex and difficult.

The pronoun "ihr" which has two referents in the "shifting reference" study is also plurifunctional. If we neglect case and gender confusions, person, number, and status conflicts are likely. A mix-up with the personal pronoun "ihr" (cf. 2.1) is not expected because of the syntactic form of the experimenter question. In the jumble between person and status in spoken language (T-form "ihr"/V-form "Ihr") status itself is considered as the main characteristic for pronominal ambiguity. This means that the so-called semantic characteristic "person" does not provide major complications in the identification of "ihr". Number confusions are very probable ("ihr" can be singular or plural). Status could be a source of trouble although it is difficult to imagine that dolls will be addressed by V-forms and although Bates (1976) reports that formal address items are not very successfully discriminated by most children before the age of 5;6 in Italian. But the fact that formal addresses are used at the age of 3;6 and that it is possible to attribute status to the experimenter could give rise to intralinguistic conflicts.

Since it is difficult to decide beforehand which of the two pronominal forms, "unser" or "ihr", are referentially more ambiguous we will solely rely on intralinguistic conflicts. We expect that "unser" is less difficult than "ihr" because "unser" is not only distinctively marked for an inclusion or

exclusion of the addressee but "ihr" is the same phonemic form for the singular "ihr", the plural "ihr", and the status "Ihr".

As to syntactic coreferentiality in the "shifting reference" study 3rd person pronouns could be easier than 1st and 2nd person pronouns. Usually, only 3rd person pronouns function anaphorically. Number agreement holds for the 3rd person singular pronouns "sein" and "ihr", and for the 3rd person plural pronoun "ihr". Gender agreement is only notable for the two singular pronouns "sein" and "ihr". Proper names of the male and the female doll will be preceded by definite articles (e.g. der Hänsel/die Gretel). Since "sein" and "ihr_{sing.}" are coreferential with respect to number and gender but "ihr_{pl.}" only with respect to number we will predict that "ihr_{pl.}" will be acquired earlier. Thus our predictions for morphophonological and syntactic characteristics in the acquisition of German possessive pronouns of the "shifting reference" study will be as follows:

Table 5: Predictions Based on Morphophonological and Syntactic Characteristics for "Shifting Reference"

	Morphophonological Characteristics	Syntactic Characteristics
Early Acquisition	euer mein dein sein	sein ihr _{sing.}
Later Acquisition	unser _{incl.} unser _{excl.} unser ₄	ihr _{pl.}
Late Acquisition	ihr _{sing.} ihr _{pl.}	mein dein unser _{incl.} unser _{excl.} unser ₄ euer

Table 5 shows us that morphophonological and syntactic characteristics do not lead to the same conclusions about the order of acquisition for the pronouns of the "shifting reference" study. There is only one exception:

"sein" should be acquired early. Let us now see which predictions are possible on the basis of morphophonological and syntactic characteristics for the study on "natural and syntactic gender".

Which entanglements do morphophonological characteristics provide in the "gender" study? Is there any chance that the child confounds the free morpheme which refers to the possessor with the bound morpheme which refers to the possession? The separation of two overt morphemes (sein-e; ihr-e) could be difficult but since this holds for both pronouns we will not consider this problem in the gender task itself. We could, however, predict that "sein" and "ihr" of the "shifting reference" study are less complicated and will thus be acquired earlier than "seine" and "ihre" of the study "natural and syntactic gender". Will the child notice that one and the same word has different referential functions? Person and case are irrelevant for the gender tasks because we only deal with 3rd person pronouns in nominative case. Number will also not play a role because singular and plural cannot be confused. In case of plural reference we would have to ask: "Ihre Schleifen/Farben sind?" (Their scarfs/colours are?). Trouble could arise for status and gender. We already mentioned that "ihr" or "ihre" are phonemically the same as the V-forms "Ihr" or "Ihre". We should not exclude that "ihre" could give rise to intralinguistic conflicts although it is not very likely that dolls will be addressed that way in the "natural gender" task. This is even more true for the objects of the "syntactic gender" task from an adult point of view but a little child who does not yet know that 3rd person pronouns can also refer to inanimates might relate them only to persons (and would thus make a random choice in the syntactic gender task). Thus, "ihre" might be more difficult in the syntactic gender tasks than in the natural gender tasks. This holds also for "seine". "Seine" is probably more ambiguous than "ihre" because it can be either masculine or neuter. In the natural gender task the male doll has masculine gender (e.g. der Hänsel) and the pig has no specific sex but will be introduced by the neuter definite article "das" (Schweinchen Dick*). This unspecificity of "seine" which is even more important in the natural gender task than in the syntactic gender task where "seine" can only refer to the dice which is masculine (der Würfel) or

* Note that "Dick" is not a nick-name for "Richard" as it is in English. This name suggests in German that it is a fat pig (dick = fat).

the boat which is neuter (das Boot/das Schiff) might pose more problems than "ihre".

There is a clash for the predictions of "seine" with respect to its precedence in the syntactic gender task, because this pronoun is referentially more specified in the syntactic gender task than in the natural gender task, and with respect to its precedence in the natural gender task because the child might only be able to refer "seine" to animates. The unspecificity of "seine" in the natural gender task is probably more problematic for the child than the exclusion of "seine" for objects since he will be told to refer the experimenter's questions to the puppets or the objects in front of him.

As to the syntactic coreferentiality we will expect that "seine" will be acquired later than "ihre" in both tasks since "seine" can refer to more than one definite noun phrase but "ihre" only to one. Both "seine" and "ihre" could be excluded for objects by the child* which would allow for their precedence in the natural gender task but we will only predict this precedence for "ihre" since the unspecificity for "seine" in the natural gender task allows for a stronger precedence in the syntactic gender task. What can we predict for morphophonological and syntactic characteristics in the acquisition of German possessive pronouns for the study on "natural and syntactic gender"?

Table 6: Predictions Based on Morphophonological and Syntactic Characteristics for "Natural and Syntactic Gender"

	Morphophonological Characteristics	Syntactic Characteristics
Early Acquisition	ihre (natural gender)	ihre (natural gender)
Later Acquisition	ihre (syntactic gender) seine (syntactic gender)	ihre (syntactic gender) seine (syntactic gender)
Late Acquisition	seine (natural gender)	seine (natural gender)

* If the child can only refer 3rd person pronouns to persons, he has to guess which possessive pronouns refer to which objects in the syntactic gender task. It is also likely that he will not give any answer.

From Table 6 we can see that predictions which are based on morphological characteristics are the same for "natural and syntactic gender" as the ones which are derived from syntactic characteristics. How do these predictions compare to what can be expected on the basis of semantic features?

3.2 The Semantic Feature Hypothesis (SFH) and Its Relation to Performance

The Semantic Feature Hypothesis (SFH) (cf. H. Clark, 1969; H. Clark, 1973; E. Clark, 1973) which provides the most elaborated and precise predictions for the order of acquisition is based on the assumption that formal semantic complexity and cognitive complexity are interrelated. In numerous studies it has been found that cognitive complexity and acquisitional difficulty go hand in hand (for some overviews, see especially Inhelder, Sinclair, and Bovet, 1974; Flavell, 1977; Gelman, 1978). If there is a close relationship between linguistic and cognitive complexity and if cognitively more complex structures and functions are acquired later, then one could expect that linguistically more complex structures and functions come later in children's language than less complex ones. These predictions can be related to markedness. The SFH claims that unmarked words, the linguistically less complex terms, should be observed before marked ones which are linguistically more complex. The basic ontogenetic principles of the SFH can be circumscribed as follows:

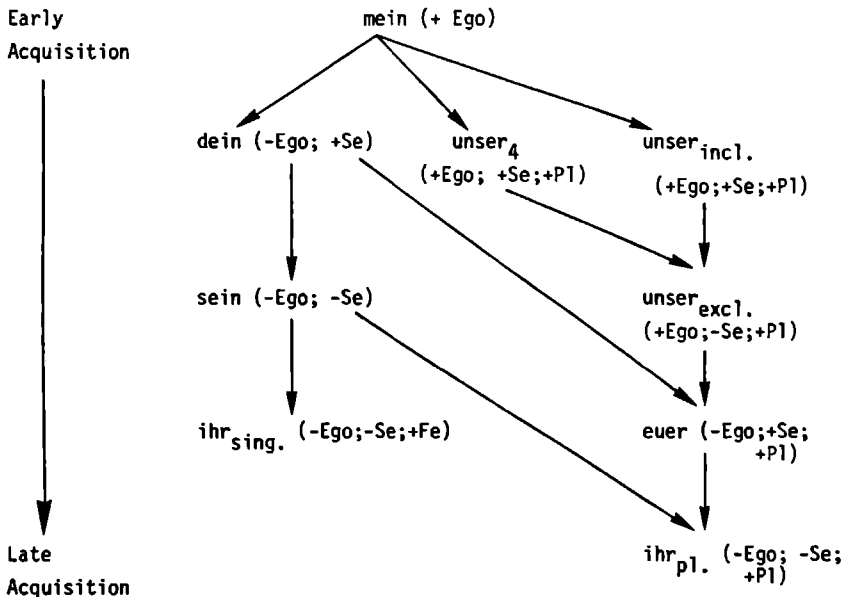
- the top-to-bottom hypothesis (more general/unmarked features should be acquired before specific/marked ones), and
- the top overgeneralization hypothesis (terms with more general/unmarked features can be substituted for the ones with specific/marked ones but not vice versa).

The first principle concerns the order of acquisition of a correct semantic term which consists "of adding more features of meaning to the lexical entry of the word until the child's combination of features in the entry for that word corresponds to the adult's." (E. Clark, 1973, p. 72). The second principle yields a possible explanation for incorrect overextensions in early language (e.g. "daddy" for all male persons). These two principles concern only semantic complexity of words (for a research overview, cf. Richards, 1979).

On the basis of our markedness analysis in German possessive pronouns (cf. 2.3, especially Table 3) we can now formulate our expectations for

semantic feature acquisition. According to the first ontogenetic principle of the SFH we come to the following prognoses for "shifting reference" (which can be derived from Table 3 in 2.3): Possessive pronouns should be acquired in the order depicted in Diagram 1.

Diagram 1: Partial Order Predictions of the SFH for "Shifting Reference"



In order to understand what Diagram 1 implies, let us give two examples: the first one concerns the acquisition of "dein", and the second one the acquisition of "euer". The possessive pronoun "dein" should be acquired before "sein", "ihr_{sing.}", and "ihr_{pl.}" but after "mein". We cannot make any predictions for "dein" with respect to "unser_{incl.}" and "unser_{excl.}". The possessive pronoun "euer" should be acquired before "ihr_{pl.}" but after "unser_{excl.}", "unser_{incl.}", "mein", and "dein". We cannot make any predictions for "euer" with respect to "sein" and "ihr_{sing.}".

No predictions can be made for differential acquisition of the two inclusive "unser" (i.e. "unser_{incl.}" and "unser₄") since they are not differently marked.

The SFH does not only concern the order of acquisition but also the referential overextensions (second ontogenetic principle which makes assumptions about the probability of certain mistakes). When mistakes occur the unmarked term should be used for the marked one but not vice versa. It is more likely that children substitute terms by a slightly less marked one than by a slightly more marked one. Fremgen & Fay (1980) report from their experiment that "children ALWAYS know the correct referents of the words they overextend", thus demonstrating that errors are due to linguistic difficulties and not to a lack of conceptual discrimination. This finding agrees with the markedness hypotheses of the SFH.

For the "shifting reference" experiment we can say that if children err on possessive pronouns they are likely to substitute: "mein" for "dein", "dein" for "sein", "sein" for "ihr_{sing.}", "mein" for "unser_{incl.}", "unser_{incl.}" (and possibly "mein" since German does not provide a phonemic difference between the two "unser") for "unser_{excl.}", "dein" (and possibly "unser_{excl.}" if (Se) is not yet fully mastered) for "euer", and "sein" (and possibly "dein" and "euer" if (Se) is still a source of trouble) for "ihr_{pl.}". These substitutions conform to direct back trackings of the arrows in Diagram 1.

For the study on "natural and syntactic gender" we will make four predictions. Firstly, since "sein-e" and "ihr-e" are more marked than "sein" and "ihr" (cf. 2.3) "sein-e" and "ihr-e" of the gender study should be acquired later than "sein" and "ihr" of the "shifting reference" study (cf. also the morphophonological prognosis for the gender study in 3.1). Secondly, the masculine "seine" should come before the neuter "seine" since masculine is unmarked with respect to neuter (cf. 2.3). Thirdly, the masculine "seine" should precede the feminine "ihre" because masculine is unmarked with respect to feminine (cf. 2.3). Fourthly, natural gender pronouns should occur before syntactic gender pronouns because natural gender is less marked (cf. 2.3). Table 7 summarizes the predictions derived from SFH for the order of acquisition of "seine" and "ihre" in the study on "natural and syntactic gender".

Table 7: SFH-Predictions for "Natural and Syntactic Gender"

	Masculine	Feminine	Neuter
Early Acquisition	seine (natural gender)		
Later Acquisition		ihre (natural gender)	
	seine (syntactic gender)		seine (natural gender)
		ihre (syntactic gender)	
Late Acquisition			seine (natural gender)

Table 7 shows that "natural gender" precedes "syntactic gender", "masculine" precedes "feminine", and "feminine" precedes "neuter". As to the second ontogenetic principle of the SFH we can only expect that children are likely to substitute the masculine "seine" (and not the neuter "seine") if they err on the feminine "ihre". Natural gender pronouns cannot replace syntactic gender pronouns because the "natural gender" task will be given separately from the "syntactic gender" task.

We can also make the prediction that "sein" and "ihr" of the "shifting reference" study will be acquired earlier than "sein-e" and "ihr-e" of the gender study because the children will be in the same age range in both studies but since the two studies will be kept apart (different children for both studies) substitutions are not possible.

Before we discuss conflicts with the predictions on the basis of morpho-phonological and syntactic characteristics we will first see what we can expect for the order of acquisition for German possessive pronouns on the basis of deictic characteristics.

3.3 Predictions Based on Deictic Characteristics

In the study of "shifting reference" (performance) we will rely on the analysis of deictic complexity with respect to three characteristics,

"variable reference", "shifting reference", and the "proximal-nonproximal contrast" (cf. Table 4). Wherever it seems appropriate we will consider additional psychological factors which will specify our predictions. One factor is the child's egocentric viewpoint* which is different in comprehension than in production tasks. The inclusion of this factor is necessary since deictic characteristics are not solely linguistic but have strong psychological and social implications. Moreover, in order to avoid gaze-directional clues the experimenter will look at the child during the performance task thus centering his attention on her.

In paralleling deictic complexity with acquisitional difficulty we will, on the basis of the first deictic characteristic ("variable reference"), predict that "mein", "dein", "user_{incl.}", "user_{excl.}", and "euer" are earlier mastered than "sein", "ihr_{sing.}", and "ihr_{pl.}". If we take into account that young children are egocentric and that visual clues will be eschewed for referential identification, we might predict the following acquisitional ranking for the 'easy' pronouns: firstly "dein" since in the experiment this pronoun refers to the child, secondly, "user_{incl.}" because this pronoun implies the child (and the speaker), thirdly, "euer" which denotes the child and a variable other person, fourthly, "mein" which indicates the speaker, and fifthly, "user_{excl.}" which comprises the speaker and a variable other person. As to the 'difficult' pronouns we cannot specify our predictions except for a precedence of the sex-identical pronoun, i.e. of that pronoun with which the child is more familiar (and which has been less variable for him or her in everyday conversations) by his or her sex.

The second deictic characteristic, "shifting reference", suggests different predictions. The pronouns "sein", "ihr_{sing.}", "user_{incl.}", and "ihr_{pl.}" are less complex than "mein", "dein", "user_{excl.}", and "euer" (cf. Table 4) because the latter are shift-affected. A further subcategorization can be made with respect to "user_{incl.}" which should come earlier than the other three 'easy' pronouns because of the involvement of the child. Concerning the relative difficulty of "sein", "ihr_{sing.}" and "ihr_{pl.}"

* Since we deal with possessive pronouns "mining" can be an important factor. I owe this term ("mining") to John Gumperz (personal communication) who uses it for children's egocentric possessiveness.

we might expect precedence of the sex-identical pronoun. As to the 'difficult' pronouns (in the analysis of the "shifting reference" characteristic) we can draw parallels to the 'easy' "variable reference" pronouns, i.e. "dein" first, "euer" second, "mein" third, and "user_{excl.}" last.

The fourth deictic characteristic, the "proximal-nonproximal contrast", proposes that "mein", "dein", and "user_{incl.}" should come before "user_{excl.}" and "euer", which are followed by "sein", "ihr_{sing.}" and "ihr_{pl.}". In supplying psycho-social factors we might predict the acquisitional order as follows: "dein", "user_{incl.}", "mein", "euer", and "user_{excl.}". With respect to the 'highly complex' pronouns (cf. Table 4) we can only predict priority of the sex-identical pronoun. Let us now contrast these three different predictions (Table 8).

Table 8: Predictions for "Shifting Reference" on the Basis of Deictic Complexity

Order of Acquisition	Variable Reference	Shifting Reference	Proximal-Nonproximal Contrast
Early ↓ Late	1. dein 2. user _{incl.} 3. euer 4. mein 5. user _{excl.} {sein *{ihr _{sing.} ihr _{pl.}	1. user _{incl.} *{sein {ihr _{sing.} ihr _{pl.} 5. dein 6. euer 7. mein 8. user _{excl.}	1. dein 2. user _{incl.} 3. mein 4. euer 5. user _{excl.} {sein *{ihr _{sing.} ihr _{pl.}

From Table 8 it becomes clear that predictions on the basis of deictic characteristics are dissimilar for the three deictic characteristics.

What can we expect for the study on "natural and syntactic gender" on the basis of deictic characteristics? We will make only two claims. The first one states that sex-identical pronouns (i.e. "seine" for boys, "ihre" for

* = sex-identical pronoun first.

girls) should be acquired before sex-differential ones. The second one maintains that extralinguistic reference (natural gender) precedes intralinguistic reference (syntactic gender). In the natural gender task the child will have also a visual clue, the looks of the puppets, apart from the linguistic one (coreferentiality of the pronoun with the definite article) which he also has in the syntactic gender task. Proper names of the male and the female doll could also help to determine natural gender items earlier than syntactic gender items. Diachronically, there is much dispute over the origin of gender. The so-called "sexus-theory" stresses extralinguistic factors as a historical base for the development of gender (this view is advocated by e.g. Brinkmann, 1954; Wienold, 1967; and Jarnatowskaja, 1968), the "genus theory" intralinguistic factors (cf. e.g. Lohmann, 1932; Fodor, 1959; Ibrahim, 1973). Ontogenetically the 'linguistic input hypothesis' (e.g. Braine, 1971) favours precedence of syntactic gender, the 'cognition hypothesis' (e.g. Cromer, 1974) predicts precedence of natural gender. Schlesinger (1977) who pleads for an interaction of linguistic input and cognitive development in the determination of linguistic growth proposes a complex relationship. We assume that perceptual/cognitive factors are decisive in gender identification. Different from, for instance, French (cf. e.g. Karmiloff-Smith, 1976) noun suffix clues are less likely to be discriminated in German since syntactic coreferentiality clues are the same in the syntactic and the natural gender task. Thus, predictions on the basis of deictic characteristics will be as follows (cf. Table 9).

Table 9: Predictions for "Natural and Syntactic Gender" on the Basis of Deictic Characteristics

Early Acquisition	Natural Gender: seine ihre > *
Late Acquisition	Syntactic Gender: seine ihre > *


* = sex-identical pronoun first.

Table 5, Diagram 1, and Table 8 list different predictions for the acquisition of those German possessive pronouns which play a role in the performance test of the "shifting reference" study. Table 6, Table 7, and Table 9 show what we might expect with respect to pronominal precedence in the study on "natural and syntactic gender". Since the predictions for the two studies, "shifting reference" and "natural and syntactic gender" are not unanimous, we will compare them in 3.4.

3.4 Comparison of the Predictions on the Basis of Morphophonological, Syntactic, Semantic, and Deictic Characteristics

Let us first see which predictions can be made for the acquisition of German possessive pronouns in the "shifting reference" study (Table 10).

Table 10: Predictions for "Shifting Reference" (Performance)

Order of Acquisition	Predictions Based on					
	Morphophonological Characteristics	Syntactic Characteristics	Semantic Characteristics	Deictic Characteristics		
				Variable Reference	Shifting Reference	Proximal-Nonproximal Contrast
Early  Late	euer mein dein sein	sein ihr sing.	mein dein unser incl.	dein unser incl. euer	unser incl. * (sein ihr sing. ihr pl.)	dein unser incl. mein
	unser incl. unser excl. unser ₄	ihr pl.	sein unser excl. ihr sing. euer	mein unser excl. euer	ihr pl. dein euer	euer unser excl.
	ihr sing. ihr pl.	mein dein unser incl. unser excl. unser ₄ euer	ihr pl.	* (sein ihr sing. ihr pl.)	mein unser excl.	* (sein ihr sing. ihr pl.)

* = sex-identical pronoun first

Table 10 shows us that some predictions are alike and that others differ strongly. Relatively similar predictions are the ones which are based on semantic, "variable reference", and "proximal-nonproximal characteristics". There exist slight variations among these three hypotheses, so, for instance, for "euer" which should be acquired comparatively late according to the SFH but has an intermediate position in the order of acquisition if we rely on the two deictic characteristics "variable reference" and the "proximal-nonproximal contrast". The pronoun "sein" is later for these two deictic predictions than for the SFH. On the other hand, "mein" precedes all other pronouns in the SFH-prediction but "dein" should be the earliest according to "variable reference" and the "proximal-nonproximal contrast".


The predictions which are based on morphophonological, syntactic, and "shift" characteristics are relatively disparate. If we rely on syntactic and "shift" characteristics "mein" and "dein" should be comparatively late but 3rd person pronouns should be among the first ones. Conflicting predictions hold especially for "mein", "dein", "ihr_{sing.}" (late acquisition because of morphophonological, "variable reference", and "proximity" characteristics but early because of syntactic and "shift" characteristics), and "sein" (similar predictions as for "ihr_{sing.}" except of the morphophonological prognosis).

Is it possible that conflicting predictions are in some way mirrored in the course of possessive pronoun development? Or could it be that linguistic conflicts (our hypotheses are based on linguistic characteristics) are reflected in problems of linguistic judgments in the first place (to be observed in the tests on "linguistic awareness")?

Which predictions are possible for the study on "natural and syntactic gender"? Which pronouns are acquired sooner, "natural gender" pronouns or "syntactic gender" pronouns? In order to illustrate different hypotheses we should contrast predictions which are based on morphophonological, syntactic, semantic, and deictic* characteristics (cf. Table 11)

* Note that there are no further specifications with respect to deictic characteristics (we will only study 3rd person pronouns in the gender study).

Table 11: Predictions for "Natural and Syntactic Gender" (Performance)

Order of Acquisition	Predictions Based on			
	Morphophonological Characteristics	Syntactic Characteristics	Semantic Characteristics	Deictic Characteristics
Early 	ihre (natural gender)	ihre (natural gender)	seine (masc.) (natural gender)	seine (natural gender) } *sex-identical pronoun first
	ihre (syntactic gender)	ihre (syntactic gender)	seine (masc.) (syntactic gender) ihre (fem.) (natural gender)	
	seine (syntactic gender)	seine (syntactic gender)	ihre (fem.) (syntactic gender) seine (neuter) (natural gender)	seine (syntactic gender) } *sex-identical pronoun first
	seine (natural gender)	seine (natural gender)	seine (neuter) (syntactic gender)	
Late				

From Table 11 we can see that our four predictions are only partly comparable. Since - in the expectations based on deictic characteristics - a masculine/neuter differentiation of "seine" could be in conflict with the expected precedence of the sex-identical pronoun we did not specify masculine and neuter for the two "seine". Predictions based on semantic and deictic characteristics differ from those which were derived from morphophonological and syntactic characteristics. The former two claim that the natural gender "seine" (masculine) should come before the syntactic gender "seine" (masculine), the latter two predict the inverse order. The specified expectation on the basis of semantic characteristics for "seine" favours masculine before neuter. As to "ihre", only the "morphophonological and syntactic" predictions assume that "ihre" is in general sooner than "seine". In the SFH-prognosis the feminine form "ihre" comes after the masculine form "seine" but before the neuter form "seine" (this holds for natural and syntactic gender). For the deictic prediction we have to leave this question open. It will be interesting to look at other studies on the acquisition of possessive pronouns, both longitudinal and cross-sectional ones, in order to check our predictions for possessive pronouns.

3.5 Studies on the Acquisition of Possessive Pronouns as Related to Predictions

A research overview of the development of possessive pronouns could help us to determine which of our theoretical assumptions for the order of acquisition (cf. 3.4) hold the most valid predictions. Although Chipman (1980, p. 79) claims that "From the point of view of developmental psycholinguistics, it appears that nothing has been done with possessive pronouns.", a number of longitudinal and cross-sectional studies on (first) correct usage and mistakes are quite informative (they have been even tested experimentally, cf. e.g. Baron & Kaiser, 1975).

Most of the data selection which we will present are based on longitudinal observations. If we want to relate our predictions to empirical investigations we should be aware that the reported analyses of longitudinal data on the acquisition of possessive pronouns provide at least four complications (apart from the small number of subjects). Firstly, most observations yield only information about the singular pronouns, especially 1st and 2nd person

pronouns*. This is due to an interest of some early researchers in the development of the "self" and in the beginnings of the differentiation between "Ego and Alter". Secondly, intra- and extralinguistic information is scarce. Even if we know at which age a child masters a possessive pronoun we often do not know under which circumstances and in which situations the first correct usage occurs and whether unsuccessful attempts preceded. Thirdly, most studies are on production rather than on comprehension. Fourthly, most observations concern English-speaking children. The homonym "your" can be singular or plural but is sometimes not distinguished with respect to the two functions (the possession suffix of German possessive pronouns). Case and gender of possessions and status of possessor are not relevant for English possessive pronouns. Still, it seems that some of the available longitudinal data provide a rich and useful data base which allows to draw some conclusions with respect to correct usage and mistakes. Let us first look at the findings of some early diary studies.

3.5.1 Longitudinal Studies on the Acquisition of Possessive Pronouns

The singular 1st and 2nd person possessive pronouns are acquired earlier and have been more extensively studied than other pronouns. In Table 12 we will compare some diary studies in order to see which of these two possessive pronouns have been uttered first, in which syntactic function (predicative or attributive use), and which mistakes have been made.

* Actually, only the singular 1st and 2nd person possessive pronouns are necessary in communicative situations. 3rd person pronouns can be substituted by proper names or definite descriptions. Plural pronouns can be given in "decomposed" forms (e.g. "my and Peter's" instead of "our"). Apart from comprehension problems there is no need for the child to produce other pronouns besides "my" or "mine" and "your" or "yours", especially in view of the fact that 3rd person pronouns are often more ambiguous than proper names or definite descriptions.

Table 12: Longitudinal Data of the Acquisition of Singular 1st and 2nd Person Possessive Pronouns

Author(s)	Language	sex of child	month of first occurrence for				substitutions/mistakes
			"my"	"mine"	"your"	"yours"	
Deville,* 1891	French	female	23 (mon/ ma)	?	24 (ton)	?	?
Lindner, 1898	German	male	22	?	23	?	"my" for "your" "your" for "my"
Gheorgov, 1905	Bulgarian	male (1st)	(25?) 32	32	?	32	"you" (dative for "your")
Gheorgov, 1905	Bulgarian	male (2nd)	20	22	25	28	"you" (dative for "your")
Cooley, 1908	English	female	23 (echo?)	27	not until 27	28	"my" for "your" "me" (dative) for "my" (also "me's")
Bohn, 1914	English	female	20	27	22	?	?
Stern & Stern, 1928	German	female	20	3rd year	3rd year (wrong)	4th/6th year	"your" for "my" "Hilde's" for "my"
Bain, 1936	English	female	20	22	21	?	"I"/"my" con- fusion, "my" for "your", "mine" for "my"
Trantham & Pedersen, 1976	English	6 Ss	18-29	28-34	23-33	?	"my's" for "mine"

* cited in Gheorgov, 1905.

Table 12 indicates that 1st person possessive pronouns are earlier produced than those of the second person, and the attributive use comes before the predicative use. The precedence of 1st person pronouns can be explained by the SFH. This finding is, moreover, in correspondence with predictions which are based on morphophonological characteristics and with deictic ones which are based on "variable reference" and the "proximal-nonproximal contrast". However, "syntactic characteristics" and "shifting reference" predictions cannot be confirmed.

The precedence of attributive use before predicative (sometimes incorrect) use agrees with Karmiloff-Smith's hypothesis (1979) that initially words function as descriptors and only later as determiners (The descriptor function is defined as: "... a word is used by the speaker to give additional information about a referent already implicitly or explicitly under focus of attention by speaker and addressee.". The determinor function is described as: "... a word is used by the speaker to enable the addressee to pick out a referent amongst other potential candidates.", cf. p. 46).

Two other kinds of mistakes can be observed: person confusion ("my" for "your" is more often reported than "your" for "my"), and a substitution of personal pronouns (both nominative and dative) and proper names for possessive pronouns. Person confusion is probably due to a failure to "shift" pronouns (initial or subsequent correct usage implies that children go beyond imitation*). Such pronoun reversals have been observed in "normal" children (cf. Tracy, 1893; Moore, 1896; Hogan, 1898; Lindner, 1898; Gheorgov, 1905; Cooley, 1908; Bohn, 1914; Jespersen, 1922; Bain, 1936; van der Geest, 1977; Halliday, 1979; Chiat, 1982). They also seem to be typical for autistic children (cf. Rutter, 1978; Fay, 1979; Tanz, 1980). The fact that "my" for

*The steps which must be taken in the acquisition of person deixis could be as follows. In a first step pronouns may initially be used like proper names (cf. McNeill, 1963). In a second step (which necessitates a clear-cut disjunction between the concept of person and its linguistic realization) the child discovers that one single pronominal form can denote more than one person (mastery of "variable reference"). In a third step he masters the speaker/addressee shift (data hint at a slightly earlier precedence of "variable reference" before "speaker/addressee shift", cf. the protocols of Bain, 1936). In a final step the child is able to consider simultaneously variable utterance meaning and invariable pronoun meaning. This last step presupposes the ability to decenter and should therefore be acquired at the end of the preoperatory level (cf. e.g. Piaget & Inhelder, 1969).

"your" has been more often found than "you" for "my" can be explained by the second ontogenetic principle of the SFH ("my" is unmarked with respect to "you") and the "ownership" assumption which suggests that children refer more likely to their own possession than to that of others.

Personal pronoun and proper name substitutions have been frequently found. Early researchers of child language could not agree on the precedence of either personal or possessive pronouns. Deville (1891), Gheorgov (1905), Cooley (1908), Bohn (1914), Bain (1936), and Trantham & Pedersen (1976) observed a simultaneous or slightly earlier occurrence of personal pronouns, on the one hand, but Lindner (1898), Meumann (1903), Stern & Stern (1928), Anes (1952), and Huxley (1900/'Katriona') found precedence of possessive pronouns, on the other hand. This issue was hotly debated (Stern & Stern, 1928, p. 277). "Wieder hat hier der Intellektualismus irre geleitet." because of its relation to volition and will. A similar dispute can be reported for the precedence of either (possessive) pronouns or proper names. Pronoun doubling has also been found (cf. Oltuszewsky, 1897). What can we say about the development of other possessive pronouns?

As to "his", "her", "our", and "their" (the plural "your" has neither not been observed or cannot be distinguished with respect to number) we found the following order (Table 13).

Table 13 Longitudinal Data of the Acquisition of "his", "her", "our", and "their"

Author(s)	Language	Sex of child	month of first occurrence for				substitutions/mistakes
			"his"	"her"	"our"	"their"	
Gheorgov, 1905	Bulgarian	male (1st)	36	?	35 (incl.)	33?	male name for "his"
Bohn, 1914	English	female	22	22	22	25	?
Stern & Stern, 1928	German	female	4th/6th year (sein/seins)	?	end of 6th year (incl.)	?	"his" for "her"
Bain, 1936	English	female	25,26	25,21	26,27	?	spontaneous correction (first "my", then "her")
Trantham & Pedersen, 1976	English	6 Ss	20-31 (correct by 25-34)	24-34 (not correct by 36)	30-36	33-36	him" or "he's" for "his" (23-24 mths), "hers" or "she" for "her" (24-34 mths)

The possessive pronouns "his", "her", "our", and "their" are later acquired than "my" and "your" (cf. Table 12 and Table 13). It is likely that the pronoun "his" occurs either simultaneously or earlier than "her" or "our" (although the Bulgarian child produces the inclusive "our" before "his"). The differences in order of acquisition are not very big but if we rely on Trantham & Pedersen's findings which comprise six children we get the following order: "his", "her", "our", "their" (the early "their" in Gheorgov's research could also be a reflexive pronoun).

We can assume that substitutions in case of "speech need" of the male name instead of "his" or the female name instead of "her" are highly frequent. The same holds probably for the combination of proper names and possessive pronouns but it can be that the pronoun is not correct. Still, Stern & Stern (1928) report that Hilde produced even the correct gender in self-reference ("Hilde ihr Stühlchen"/Hilde her stool). The mistake "his" for "her" has also been observed by Jespersen (1922): "A boy said at the age of 3;3: "An ill lady, his legs were bad.". This failure and the spontaneous correction of the incorrect "my" can be explained by the second ontogenetic principle of the SFH. Replacements of personal pronouns and/or possessive pronouns in the predicative function instead of the attributive function have also been found for the singular 1st and 2nd person possessive pronouns. Two remarks by Trantham & Pedersen (1976) are noteworthy. Firstly, they discovered that their children started using "his" and "her" correctly, produced then incorrect forms, and re-established later the correct usage. Such overgeneralizations have been also observed in other parts of grammar (e.g. "went" before and after "goed", cf. Clark & Clark, 1977). Secondly, in "language impaired" children which they also investigated, "his", "her", "our", and "their" did not emerge before the age of 36 months (Trantham & Pedersen did not proceed their analysis beyond this age).

Sharpless (1974) did a longitudinal study on production and comprehension of singular possessive pronouns ("my", "your", "his", and "her"). She came to the conclusion that children understand these pronouns in dependence of the speech situation: "my" was better than "your", and "your" better than "his" or "her". But if the child did not participate in the speech event "his" and "her" were better than "your".

The discussion of the longitudinal data suggest that the SFH and the predictions based on morphophonological, "variable reference", and the "proximity-nonproximity contrast" characteristics are, so far, more valid than

those of syntactic and "shifting reference" characteristics (cf. Table 10). Since these longitudinal data should not be overinterpreted for the reasons mentioned, we will have a closer look on the cross-sectional studies.

3.5.2 Cross-Sectional Studies on the Acquisition of Possessive Pronouns

The cross-sectional studies on possessive pronoun acquisition are either frequency counts or experiments.

In general, the frequency data (cf. Goodenough, 1938; Young, 1942; Wiederhold, 1971; the Cross-study, cited in Wales, 1979) seem to support the predictions of the SFH and the predictions based on the proximal-nonproximal contrast (the speaker/addressee pronouns precede 3rd person pronouns).

Field or laboratory experiments on possessive pronouns are reported by Baron & Kaiser (1975), Rondal (1977), Wales (1979), Chipman (1980), and Charney (1980). Since Rondal's and Chipman's experiments do not focus on specific pronouns (the gender distinction in Chipman's study was not conceived as a trouble source even in the youngest three-year-old subjects) and since they rely on syntactic characteristics we cannot draw any conclusions with respect to our predictions.

The Wales-study poses some very interesting problems with respect to the speaker/addressee shift, although it is not very conclusive with respect to our predictions. Wales studied the understanding of English possessive pronouns in two groups of children with mean ages 4;6 and 6;0 years. The children had to act out for two male and two female dolls sentences like: 'Mary says to John, "Give me your hat"'. Despite the better performance of the older group there was no statistically significant improvement. The fact that 1st and 2nd person pronouns were better handled than those of the 3rd person, although gender itself did not seem to be a problem is interpreted by Wales in terms of the precedence of the "pointing function". Since this study is not fully described it is impossible for us to draw any conclusions. We even do not know whether Wales' interpretation relates to the personal pronoun (the dative "me") or to the possessive pronoun ("your"). How did the child manage person identity and person differences of personal and possessive pronouns (person identity: "Give me my.."; person difference: "Give me your..")? Did the child really understand the speaker/addressee pronouns or did he just relate to the dolls because they were introduced by their proper names ("Mary says to John")? In fact, this task looks very complicated for such young children. There are three potential perspectives involved:

the child's perspective (he had to act out the utterance), the doll's perspective (children had to act out 'for the dolls'), and the experimenter's perspective (he or she made the utterance first). It would certainly be more informative if the original data could be inspected.

Charney's study with twenty-one girls (age: 1;6 - 2;6) yields results which agree with the predictions of the SFH: first comes correct self-reference, then addressee-reference; thereafter the non-deictic use of the 3rd person, and finally the deictic use of the 3rd person. It is noteworthy that "my" and "your" were at first correctly used when they referred to the child's own speech role, i.e. "my" was produced by the child as speaker (although not correctly interpreted when used by other persons) and "your" was correctly understood when the child was addressed (although not correctly produced by the child).[Note that the SFH-predictions do not make different assumptions for production and comprehension]. This observation suggests that children's egocentric point of reference is a starting point in the development of possessive pronouns (cf. also Sharpless, 1974, for support of the "egocentric role hypothesis").

Baron & Kaiser's experiment gives us some clues about the incorrect usage of (possessive) pronouns in 3, 4, and 5 year old children. Only two findings confirm the expectations which we made on the basis of the second ontogenetic principle of the SFH. There are somewhat more male substitutions for the female referent than female substitutions for the male referent. The 3rd person plural was most often replaced by the masculine 3rd person singular and not by the feminine 3rd person singular. 2nd person plural substitutions which are also possible according to our predictions cannot be checked because of the lack of number differentiation ("you" and "your" substitutions were very low anyway: 2,4%). All the other replacements are not in agreement with our predictions but we can observe something interesting: the frequent mistake of the female 3rd person singular which is highest for the 1st person singular ("her" for "my"). Although this finding does not necessarily support our predictions based on deictic characteristics (sex-identical pronoun first) the number of male and female subjects was about the same and the results were not split up with respect to the sex of the subjects, we should be aware that sex of speaker and/or addressee should not be ignored.

Longitudinal and cross-sectional studies on possessive pronouns have not found to be very useful for confirmations or falsifications of our

hypotheses. They do not yield enough information for our predictions. In general, however, it looks as if two predictions are not very likely. The data do not seem to support the prognoses which are based on "syntactic" and "shifting reference" characteristics. Maybe one or the other characteristic could be important for the awareness of possessive pronouns. Before we go into some tentative predictions on the acquisition of linguistic awareness for German possessive pronouns we will give a short outline of both theoretical assumptions and empirical research on linguistic awareness.

4. GENERAL ASSUMPTIONS ON LINGUISTIC AWARENESS

Research on "normal linguistic awareness in adults" is usually limited to questions of grammaticality, relatedness of sentences in form and meaning, or ambiguity (cf. e.g. Gleitman & Gleitman, 1970, or Geer et al., 1972). Adult's judgments about language became of fundamental relevance in transformational linguistics because "metalinguistic data" or "linguistic intuitions" were regarded as indications for the underlying linguistic competence (cf. Chomsky, 1965). However, their accuracy and completeness can be questioned since psycholinguistic research revealed that judgments on the grammaticality of sentences are a kind of linguistic performance, and equally vulnerable to "performance factors" as any kind of linguistic activity (cf. MacLay & Sleator, 1960^{*}; Hill, 1961; Levelt, 1972, 1974; Cazden, 1976; Levelt et al., 1977; Carroll, Bever, and Pollack, 1981). Thus, psychological factors - though still largely unexplored - should be considered in validating linguistic intuitions. The metalinguistic ability to judge sentence grammaticality should not a priori relate to tacit knowledge. We might even assume that production and comprehension ("primary" performance) are closer associated with competence than linguistic judgments ("secondary" performance) (Levelt et al., 1978).

Notwithstanding, the study of explicit intuitions can be fruitful for psycholinguistic research because of at least three reasons: firstly, interpretations of "primary" performance can be compared with metalinguistic data, secondly, linguistic intuitions can yield information which might be hard to obtain by simple observing "primary" performance, and thirdly, explicit intuitions may play a role in the child's language development (cf. Read, 1978).

The present research focuses on this last question. From all we know it seems that linguistic awareness serves no special function in adults' "primary" performance, i.e. that "One need have no disposition to think about language in order to use it appropriately" (Gleitman & Gleitman, 1979, p. 121). This could be different for language acquisition when linguistic skills are still notably changing. It is possible that linguistic awareness is not a mere epiphenomenon but can facilitate future language skills al-

^{*} As to critiques with respect to methodological shortcomings of the MacLay & Sleator study, cf. e.g. Miller & Isard, 1963, or Vetter, Volovecky, and Howell, 1979.

though "The studies we have cited would argue not, for the language functions seem developmentally to precede the metalanguage functions, with only some rare exceptions" (Gleitman & Gleitman, 1979, p. 122). A somewhat different point of view is taken by Karmiloff-Smith (forthcoming, cf. Hickmann & Weissenborn, 1982, p. 39) who also argues against the assumption that metalinguistic can play a role in language development: "... whilst explicit metalinguistic awareness has no specific function in language acquisition, it may have a function in general cognitive development in that when various aspects of human behavior are encoded in the same way, e.g., by language, then generalities may become salient for the child which were not obvious when the representations were in different codes, e.g. spatial, verbal and perceptual.". Although the assumptions of Gleitman & Gleitman and Karmiloff-Smith are based on empirical observations, the question whether linguistic awareness can facilitate further performance remains unresolved as long as we cannot compare early linguistic performance and awareness with later linguistic performance in the same child over time. The present research will try to give an answer to this question in fulfilling this requirement.

This chapter on linguistic awareness will be split into three parts. Some assumptions on the structure of linguistic awareness will be outlined first (4.1). Next come assumptions on functions of linguistic awareness (4.2), and finally assumptions on relevant metalinguistic abilities from empirical studies (4.3). Relevant for our research are studies on error detections, corrections, and explanations given by children. Although assumptions on structure and functions of linguistic awareness are made with respect to children's metalinguistic abilities, they can also be related to those of adults.

4.1 Assumptions on the Structure of Linguistic Awareness

The question of "awareness" or "consciousness" as a state of mind is an old problem in the study of human behavior which has been mainly tackled by philosophers, physiologists, and psychologists. The beginning of academic psychology was featured by a theoretical interest in the "stream of consciousness" (James, 1890) and in the investigation of the so-called "Bewußtseinslagen" (usually translated as "imageless thought") by means of systematic introspection or retrospection (the German "Wurzburger Schule" and their representatives Kulpe, Ach, Buhler, and Marbe).

The further development of these notions in psychology has been described in detail by Underwood & Stevens (1979) and by Ericsson & Simon (1980). We do not go into these issues particularly. Our main interest concerns just the following structural aspects of meta-behavior: notions of meta-behavior, classifications of metalinguistic abilities, and the relationship between language and cognition, especially specificity and generality of linguistic skills and of reflective abilities.

4.1.1 Notions of Meta-Behavior

Despite the growing interest in the acquisition of "linguistic awareness" in the past decade there is still much confusion and even disagreement about its definition and demarcation from similar constructs (cf. e.g. Gleitman, 1979; Gleitman & Gleitman, 1979; Gearhart, 1980).

The most comprehensive term "meta-abilities" refers to all kinds of implicit and explicit knowledge about a variety of motor, cognitive, and verbal skills.

Piaget who uses the term "conscience" ("consciousness") for explicit verbalizations and "cognizance" for "the act of becoming conscious" (cf. Piaget, 1976, p. 332) was mainly interested in the development of knowledge about motor skills (cf. Piaget, 1974, 1976; Sinclair, 1978).

Researchers who explored knowledge about cognitive skills (memory, comprehension, communication, and attention) use such different notions as "knowing about x", "understanding of x", "monitoring x", "meta-x", "awareness of x", and "insight of x", generally without conceptual demarcations (cf. Krentzer, Leonard, and Flavell, 1975; Flavell & Wellman, 1977; Markman, 1977, 1978; Flavell, 1978; Brown, 1978; Miller & Bigi, 1979; Yussen & Bird, 1979).

Definitions on knowledge about verbal skills are usually also rather vague. However, two issues became salient in the demarcation of "linguistic awareness" which caused inconsistencies among psycholinguistic researchers: the question of "consciousness" and the degree of "explicitness". C. Chomsky (1979) and Marshall & Morton (1978) stress that consciousness is crucial to linguistic awareness whereas Slobin (1978, p. 45) differentiates "levels of metalinguistic capacity, from the dimly conscious or preconscious speech monitoring which underlies self-correction, to the concentrated, analytic work of the linguist". As to the closely related issue of "explicitness" Levelt et al. (1978) maintain that linguistic knowledge can be implicit or explicit and that "Between the two extremes one can find various degrees or

levels of explicitness" (p. 2). Thus, one might distinguish among at least three kinds of knowledge about language. Firstly, the child might use language in such a way that an observer can make inferences about his intuitions. This "implicit" linguistic knowledge becomes transparent in morpho-phonological generalizations of unknown words (cf. Brown, 1957; Berko, 1958) or in self-corrections (cf. Clark, 1978; Clark & Andersen, 1979). Secondly, the child might comment on parts of his own or other people's speech, either spontaneously or by promptings. Thirdly, he might formulate rules about the language system and explain language structures and functions. The latter two kinds are clear expressions of "explicit" linguistic knowledge. Delimitations of "linguistic awareness" in which explicitness is considered as being critical are given by Bloom, 1975; Read, 1978; Valtin, 1979; or Forrest & Waller, 1979. Definitions which imply implicit as well as explicit knowledge or in which a distinction between these two types of knowledge is somewhat blurred are those by Cazden, 1976; Foss & Hakes, 1978; Hakes, Evans, and Tunmer, 1978; Berthoud-Papandropoulou, 1978; or Hakes, 1980.

Our general definition of "linguistic awareness" as "the ability to reflect and comment on language structures and functions" (cf. 1.1) is restricted to more explicit comments and excludes -provisionally - abilities such as spontaneous repairs which are rather implicit (and which probably need only a simple comparator or monitoring device, cf. Marshall & Morton, 1978). Explicitness is stressed because comments are rather unequivocal. In the present research we confine "linguistic awareness" to the metalinguistic abilities of explicit comments on errors, corrections, and explanations thereof. These operationalizations are, except for the explanations, comparable to the ones used in the early paradigms by Gleitman et al. (1972) and DeVilliers & DeVilliers (1972).

4.1.2 Classifications of Metalinguistic Abilities

In the following section four attempts to categorize the studies on linguistic awareness will be presented: those by Clark, 1978a, by Sinclair & Levelt (1977), by Hakes et al. (1978) (cf. also Hakes, 1980), and DeVilliers & DeVilliers (1978).

A very detailed - and thus useful - classification system is offered by Clark (1978a) who takes the notion of awareness in its broadest sense thereby also considering more implicit kinds of knowledge like spontaneous repairs. The types of "awareness" which she distinguishes rely - in part - on Brown

and DeLoache's classification of a variety of metacognitive skills. Clark's uncovering of different types of linguistic "awareness" under particular metacognitive skills reveals the assumption that linguistic awareness is just one of the indications of metacognition (others could be - according to Flavell, 1976 - metamemory, metalearning, or meta-attention). On the basis of a preliminary taxonomy of "awareness" in the acquisition of primary linguistic skills, she added to Brown & DeLoache's five metacognitive skills (with respect to "linguistic" awareness these are: firstly, "monitoring one's ongoing utterances", secondly, "checking the result of an utterance", thirdly, "testing for reality", fourthly, "deliberately trying to learn", and fifthly, "predicting the consequences of using inflections, words, phrases or sentences") an additional sixth one: "reflecting on the product of an utterances (cf. p. 33/34, especially Table 1 in Clark's article). Clark maintains that these six types of awareness "have been listed roughly in their order of emergence, from most to least basic" (p. 33). Although there exist some minor overlaps with respect to subclassifications of the six awareness types (e.g. what is the exact difference between the subclassification "correcting the utterances of others" and the more specific subclassification "correcting word order and wording in sentences earlier judged "silly""), Clark's comprehensive typology can capture different metalinguistic phenomena.

Sinclair & Levelt (1977) classify in their review of the literature on implicit and explicit linguistic knowledge five domains which are relevant in children's language (we believe that they also hold for adults): firstly, grammaticality or acceptability judgments, secondly, segmentation, thirdly, transformation and manipulation (most of these studies - cf. e.g. Kaper, 1959; Weir, 1962; Smith, 1973; Limber, 1973; Cazden, 1976 - have been observational and focus rather on implicit knowledge), fourthly, comprehension/appreciation/production of riddles, jokes, humor, and metaphors (which all require abstraction of one meaning, attention to form, or detection of ambiguity), and fifthly, conceptualization of language (dissociations of word and referent). We believe that the general metalinguistic abilities of error detection, correction, and explanation can be applied to these five domains.

Hakes et al. (1978) list in their review on children's metalinguistic abilities a number of awareness types which can be brought into a similar classification system as the one which is suggested by Sinclair & Levelt. The additionally listed experiments on the ability to judge synonymy (cf.

Beilin & Spontak, 1969; Sack & Beilin, 1971, Beilin, 1975) could be subsumed under the fourth category since such judgments require meaning abstraction.

Another possibility of classification is the grouping on the basis of linguistic structures and functions. DeVilliers & DeVilliers (1978) choose the following distinctions. (1) awareness of component sounds, (2) awareness of word-meaning correspondence, (3) awareness of rules of grammar and semantics, and (4) awareness of ambiguity. We could complete these four classes by a fifth one: (5) awareness of appropriateness of communicative descriptions and speech acts (as to this type of awareness, cf. Bates, 1976; Robinson & Robinson, 1977, 1978). Among DeVilliers & DeVilliers' distinctions are some overlaps. Although most research on the awareness of component sounds (1) concerns segmentation experiments (but note that there are also segmentation experiments on words and syllables, cf. e.g. Shankweiler et al., 1974; Berthoud-Papandropoulou, 1976), there is also the interesting question of children's detection of sound ambiguity (4) (cf. e.g. Shultz & Pilon, 1973, Hirsh-Pasek et al., 1978; Peters & Zaidel, 1980). And, of course, equivocality plays often a role in the awareness of rules of grammar and semantics (3) (cf. e.g. Billow, 1975; Hirsh-Pasek et al., 1978).

All these different types of awareness have been studied in English-speaking preschoolers (although Adam's classic answer "Pop goes the weasel!" to Bellugi's attempt to elicit a grammaticality judgment (Brown & Bellugi, 1964, p. 135) did not promise much success for studies on linguistic awareness with small children). It seems that different countries concentrated in the past on different types of awareness. For instance, early Russian research was mainly on segmentation (cf. Bogayavlenskij, 1957/1963, Karpova, 1955/1966, 1977, Zhurova, 1963/1973). The isolation of linguistic units was also investigated with French-speaking children (from Switzerland) (cf. Berthoud-Papandropoulou, 1976, 1978, DeBellefroid & Ferreiro, 1979). Rumanian and German researchers noticed transformation and manipulation (for Rumanian, cf. Slama-Cazacu, 1957, 1979; for German, cf. Stern & Stern, 1928, Leopold, 1949; Augst, Bauer, and Stein, 1977; Oksaar, 1977). Scandinavian psycholinguists who are interested in the impact of awareness in learning to read focused often on sound awareness (cf. Lundberg & Torn us, 1978; Lundberg, 1979; Lundberg, Wall, and Olafsson, 1980, Luukkonen, 1979). Ongoing research on different types of awareness in European countries is reported in Levelt, Mills, and Karmiloff-Smith, 1981.

4.1.3 On the Relationship between Language and Cognition

Before we enter the discussion of whether there exists a language-specific awareness or whether there is a general awareness for all kinds of skills (motoric, cognitive, and linguistic) some points are worth mentioning with respect to the relationship between language and cognition.

Language acquisition can be regarded either as being independent from the development of intelligence or as being inseparately linked to it. In the Piagetian tradition, the development of cognitive structures is not only conceived as being relevant for the explanation of language acquisition but also as a necessary precursor. Sinclair (1973, p. 11) asserts that "..., it seems easier, and much more hopeful, to suppose that the child brings to the task of acquiring his mother tongue a set of universal cognitive structures which have been built up during the first year of life and which provide enough assumptions about the nature of human language to enable the child to begin to join the talking community at about the age of 1 1/2.". This position has been severely attacked by Chomsky who denies the explanative power of constructions of sensorimotor intelligence for the acquisition of language: "The expectation that constructions of sensorimotor intelligence determine the character of a mental organ such as language seems to me hardly more plausible than a proposal that the fundamental properties of the eye or the visual cortex or the heart develop on this basis" (Chomsky, 1980a, p. 37). His emphasis on specific formal language universals is in sharp contrast to Piaget's general universals of cognition.

Despite much discussion and research, especially on problems which focused on the sensory-motor period, the nature of relationships between the acquisition of cognitive and linguistic skills is still an issue which is very much undecided. Most researchers seem to agree that during this period some special cognitive achievements are prerequisites for some related linguistic developments (cf. Hakes, 1980; Szagun, 1980). Despite theoretical refinements (cf. Piatelli-Palmarini, 1980) and numerous proofs and counter-proofs "the question of the role of intelligence in language acquisition remains" (Mehler, 1980, p. 347).

Still, the specificity of language must be kept in mind in making assumptions about different skills and awareness thereof.

4.1.3.1 Specificity and Generality of Linguistic Skills

A major topic in psycholinguistics is the question of language specificity. What distinguishes human language from other human skills, and can the human capacity for language be reduced to general principles of cognitive functioning?

In Lecture 1 of his "Lectures on language performance" (1980), Osgood gives a detailed overview of defining characteristics for "a language", and for "a human language", as he sees these.

For something to be a language, Osgood requires it to display nonrandom recurrency of physical forms (sounds, gestures), reciprocity of producing and receiving these forms by the organism, pragmatics, i.e. relations between the use of these forms and other behaviors of the organism, semantics, i.e. the forms should allow for the representation of the "not-here", and "not-now", syntax, i.e. nonrandom combinations of elementary forms, as well as potentially infinite combinatorial productivity of forms.

For something to be a human language Osgood adds the following structural requirements: the channel should be vocal-auditory, it should display nondirectional transmission (several hearers can receive the same message at the same time), but directional reception (a listener can attend to one of several simultaneous messages), evanescence in time of the signals, integration over time on a "left-to-right"-basis by the receiver, prompt feedback in the sense that the speaker is his own listener.

Many (psycho) linguists would reject these criteria. The natural sign languages of the deaf would, for instance, be excluded as a human language, in spite of strong evidence to the contrary: not only do they share all important syntactic, semantic, and pragmatic characteristics of spoken languages, they also show the same developmental phasing in young children, and they presumably use the same neurological substrates in the left hemisphere. Moreover, contrary to early suggestions in the literature, natural sign languages cannot be acquired by even the highest non-human mammals. By intensive training chimpanzees can acquire a limited set of signs with which they are able to refer, even to the "non-here", or "non-now", but there is a complete lack of human syntax (see below) in the use of these signs (cf. for these issues Klima & Bellugi, 1979, and Terrace et al., 1979; Terrace et al., 1980).

Osgood adds five defining functional characteristics for a human language: Arbitrariness of semantics, i.e. referring is done in typically non-

iconic fashion, discreteness of signals, hierarchical organization, compositional organization, i.e. higher level units are decomposable in lower level units, and transferral via learning by which he means that experience rather than "germ plasm" is responsible for the dissimination of language within the species.

Especially the latter requirement reveals Osgood to be a generalist. Language is a property of the cultural environment: general principles of learning are sufficient to explain the child's acquisition. There is no species-specific genetic constraint on what makes a human language.

These views are presently highly controversial. Though there can be no doubt that languages are in several respects resultants of "arbitrary" socio-cultural history, there is at the same time a growing body of knowledge on language universals (cf. Greenberg, 1957, 1966, 1970; Hawkins, 1980) which suggests the existence of at least some universals which cannot be explained by such general principles as "advantageous for communication", "allows for easy production/perception", or "can be easily acquired". Chomsky (1980b) argues that these arbitrary but universal properties of human language express the genetic basis of grammar. Among these properties of "universal grammar" are (1) the recursiveness of syntax, and (2) the universal properties of "binding", i.e. of relating syntactic elements to other elements in the sentence; these binding relations are universally restricted by quite arbitrary "locality" and "government" principles. These features arise in the child's language at a rather fixed age level, for spoken language as well as for sign language (none of these properties appear in Osgood's list).

Linguistic and developmental (cf. especially Gleitman & Wanner, 1982) research of the last decade has made it highly likely that human languages are, in part, based on species-specific genetic endowment. To this extent the learning of a language essentially depends on maturation of these language-specific mechanisms rather than on general "shaping" through experience.

Still, the assumption of language-specific developmental mechanisms does not preclude the existence of similarities between language skills and other skills. One candidate for a rather general commonality between different skills is their automaticity, especially with regard to his lower level process (cf. Levelt, 1978). Motor skills, for instance, can be executed without much reflection. There may be reflection about goals or subgoals, but lower-level components of a skill tend to be automated. While walking, one might think about where to go but not about how to move one's weight

from one foot to the other.

Linguistic skills are used for communicative purposes. One will, surely, reflect on what to say but otherwise language production and comprehension can be considered as fast, low-level, and automatic processing (in the present research we refer to these skills as "performance"). In case of frequent practice, automation becomes more likely (cf. Shiffrin & Schneider, 1977). These speedy processes and their intermediate products are not available to working memory and are therefore inaccessible for explicit reflections (cf. Hakes, 1980).

In contrast, language reflections and judgments arise only through slower, higher-level, and controlled processes. They involve some kind of "execution" although one may doubt Hakes' assumption that awareness implies "an element of choice in whether or not the operations are performed" (Hakes, 1980). Is there any reason for assuming qualitative differences in reflectiveness for language and for other skills?

4.1.3.2 Specificity and Generality of Reflective Abilities

Despite differences in performance we do not assume that reflection on performance is different for different behavioral phenomena, i.e. the ability to reflect is general and not skill-specific (for an early mention of this assumption, cf. Gleitman, Gleitman, and Shipley, 1972). There are some indications from recent research that this assumption is correct and that middle childhood between the ages of four and eight years is a decisive developmental period for the development of general reflectiveness.

In the experiments of Hakes, Evans, and Tunmer (1978) (cf. also Hakes, 1980) 100 children between the ages of four and eight years had to perform a conservation and three metalinguistic tasks (synonymy judgments of sentence pairs, grammaticality judgments, and segmentation of phonemes in spoken syllables). Correlational analyses and a scalogram analysis (a limited non-parametric equivalent to a factor analysis) revealed a clear relation between the results of the conservation task and the three metalinguistic tasks. Hakes, Evans, and Tunmer offer as an explanation for their finding that cognitive and metalinguistic developments in the transition from pre-operational to concrete operational cognitive abilities are parts of the same general developmental change, the emergence of the ability to decenter (attention). "This development, it is suggested, is the emergence of an ability to engage in controlled information processing, which allows the

child to "stand back mentally" from language and other inputs and to deliberately reflect upon them" (cf. Hakes, 1980, the cover of his book).

Positive correlations between the results of cognitive and linguistic reflection tasks (cf. also Lundberg, 1978; Watson, 1979; Holdridge-Crane, 1980) or among the results of different cognitive reflection tasks (cf. Yussen & Bird, 1979) present some evidence for two assumptions: firstly, reflective competence is dependent on developmental factors, and secondly, there might be a universal underlying meta-ability. Thus, we might summarize more generally that although different skills are distinguishable we do not (yet?) have any evidence for proposing skill-specific reflective competence. We rather hypothesize that a general reflective ability underlies different kinds of cognitive, linguistic, and motoric meta-behavior. This point is also stressed by more theoretically oriented language philosophers and psychologists.

Seuren (1978, p. 203) distinguishes between CC (central control - Ericsson & Simon (1980, p. 224) use the term "central processor": "The CP, which controls and regulates the nonautomatic processes, ...") and RP's (routine procedures). CC can get information from different RP's, it can receive outputs from and transmit commands to other RP's. CC "is (largely) open to introspection" and its "operations can be brought to awareness". RP's, on the other hand, are not open to introspection and may be quite specific in character. Seuren writes: "... behavior caused by CC-intervention is not limited to any precisely definable behavioral category or class of categories ...", (cf. p. 218). He also claims that procedures which have been acquired under the direct supervision of CC can become degraded to routine procedures. This, for instance, can be the case in studying a second language or in learning motoric behavior like skiing or dancing. With respect to such activities consciousness (or CC, or CP, respectively our "general reflective ability") is necessary in the early stages but with frequent practice the deliberately acquired activities become automatic skills. Ericsson & Simon (1980, p. 235) maintain also: "With increase in experience with a task, the same process may move from cognitively controlled to automatic status, so that what is available for verbalization to the novice may be unavailable to the expert".

Piaget (1974/1976, p. 341), however, who attests degrees of consciousness due to different degrees of integration (e.g. consciousness can only be temporary) pertains to the view that "it is doubtful that an action that is

successful after automatic regulations can become completely unconscious, even if success is extremely precocious".

Developmental psycholinguists have wondered whether first language acquisition follows - at least in part - a similar line as those activities which become automatic after having been conscious or whether language skills can proceed without any reflection (cf. e.g. Hakes, 1980, p. 23: "Comprehension processes, ... may be inherently automatic processes").

In fact, there are some definite parallels with respect to consciousness between first and second language acquisition (e.g. direct questions about language). As to Anthony Weir's linguistic variations in his soliloquies Jakobson (1968) notes: "Many of the recorded passages bear a striking resemblance to the grammatical and lexical exercises in textbooks for self-instruction in foreign languages." (Though we should note that Anthony Weir's monologues show forms of implicit rather than explicit knowledge!). Even if L1-acquisition shows a comparable progression as the learning of L2 (from conscious reflection to automaticity) the controversial question (see the arguments by Seuren and Ericsson & Simon, on the one hand, and by Piaget, on the other hand) remains: is it possible that skills which have been conscious become completely unconscious?

According to Seuren, the mechanisms involved in routine procedures cannot be directly reflected upon ("Quite clearly, it is a matter of good functional economy that RP's, which are nothing but ancillary routines, are screened from access so that they cannot be interfered with by some CC-command, retrieved or reported upon", cf. p. 214). Piaget (1974/1976, p. 334) argues in the same way: "These two aspects [goal and results, K.B.] of the immediate action are conscious in every deliberate activity, while the fact that the scheme that assigns a goal to the action immediately triggers off the means of effecting it (regardless of how appropriate these may be) may remain unconscious, ...". Thus, internal mechanism within a behavioral "system" (be it cognitive, linguistic, or motoric performance) cannot be brought to consciousness. The same holds for structures which guide reflections.

Nisbett & Decamp Wilson (1977) argue similarly: subjects have hardly any direct introspective access to their mental processes. And if people give verbal reports on higher order cognitive processes they do so on "a priori, implicit causal theories" and often on motivational grounds. These arguments are severely criticized by Ericsson & Simon (1980) and Guerin &

Innes (1981). Ericsson & Simon propose a model which treats verbal reports to be more than post-hoc idiosyncratic rationalizations. In contrast they claim "that verbal reports, elicited with care and interpreted with full understanding of the circumstances under which they were obtained, are a valuable and thoroughly reliable source of information about cognitive processes" (p. 247). Thus, in concurrent verbalizations (i.e. if information is verbalized at the time the subject attends to it) heeded information in short-term memory is available (at least as long as particular processes are not fully automated).

Consciousness is triggered by routine procedures. Seuren even hypothesizes that a model could be conceived which specifies the kind of CC-activity in dependence of complex inferences of routine procedures. By what can CC be influenced? Which effects does CC have? These questions lead us to the discussion of causes and functions of the "general reflective ability" with respect to language performance.

4.2 Assumptions on the Functions of Linguistic Awareness

In her studies on children's gradual construction of systems of plurifunctional markers, Karmiloff-Smith (1979b, p. 239/240) attempts to explicate the grounds for "epilinguistic awareness" (which corresponds to our "linguistic awareness"): "It will be recalled that for the gender problem, for instance, epilinguistic awareness was primarily based on syntactic and semantic clues and, surprisingly, not on the predominant phonological ones. It is suggested that this can be explained by the fact that basic procedures and basic functions, because they stem from positive examples, become highly compiled and thus 'automatic', whereas 'sentries' and standby procedures may be more easily retrieved from memory because they are used in special circumstances. They may also be more easily retrievable because they stem from conflict rather than from the highly compiled system based on recognizing positive examples".

This quotation implies two possible explanations for the rise of "epilinguistic awareness": special circumstances (which often implies infrequency of occurrence) and conflict. Both of these reasons seem also plausible from common experiences: in case of unusual situations and in case of contradiction reflections are more likely than in case of habitual and frictionless regularity. One could subsume both "special circumstances" and "conflict"

under the broader category of "differences". The emergence of "epilinguistic awareness" stemming from special circumstances is basically due to a difference between familiar and unfamiliar (or between expected and unexpected) information. Conflicts involve - by definition - differences. In case of differences between actual and target information such as an unexpected outcome (special circumstance) and such as a source of trouble (conflict) resulting reflections could fulfill two basic functions: supplementation and rearrangement.

Before we make an endeavor to specify possible causes and functions for explicit reflections on language (= linguistic awareness) with respect to their role in language acquisition, we want to suggest a general hypothesis concerning emergence of linguistic awareness. This hypothesis relates to different behavioral phenomena and is based on early observations of perceptual phenomena: "... la théorie classique des psychologues anglais (Bain, Spencer), selon laquelle << le premier fait fondamental, celui qui constitue la conscience, c'est la perception d'une différence >> (Claparède, 1918, p. 67, quoting Ribot: "Psychologie anglaise contemporaine"). Results from Claparède's investigation with five to eight year old children show: "La conscience de la différence surgit plus aisément, plus tôt que celle de la ressemblance" (cf. p. 71). We propose very generally that "differences" such as conflicts within a behavioral system or between two "systems" of behavior, are more likely causes for the rise of (explicit) reflective ability than "similarities" such as regularities within a behavioral "system", or between two (respectively among more) "systems of behavior".

One might think of at least four pairs of cause and function from which the first one has already been introduced in 1.1 because of its fundamental importance for the present research. Firstly, failure in communication (the "errors" can occur in production and comprehension) might be a cause for linguistic awareness to arise (a difference between inappropriate and appropriate information). A possible function could be the repair (correction) or the prevention of such failure. Thus, linguistic awareness would serve as some kind of feedback mechanism or correction device.* This first pair of

*Repair strategies with respect to "implicit knowledge" have been observed in a number of investigations (Levelt, 1979, mentions the early study by Bohn, 1914; more recent studies are, for instance, those by Käsermann and Foppa, cf. Käsermann, 1978, 1979, 1980; Foppa, 1978; Foppa & Käsermann, 1979, 1981; Käsermann & Foppa, 1981).

cause and function becomes transparent from Claparède's early works: awareness results from a failure to adapt (Claparède, 1917, p. 362; "Et l'on est en droit de penser que l'intérêt ne s'est porté sur ces <<catégories>> [des diverses catégories de questions, K.B.], que lorsque l'action s'est trouvée désadaptée à l'égard de l'une d'elles. C'est le besoin qui crée la conscience;.."). In 1918 (p. 73), Claparède does not only generalize his supposition ("La prise de conscience marque toujours une désadaptation.") but specifies two necessary conditions for the rise of awareness: "... lorsque le réajustement automatique a raté, et lorsque le développement mental s'est trouvé à un stade assez avancé pour découvrir la comparaison consciente; ..." (p. 76). In order to become aware, automatic readjustment must fail and the subject must be able to discover the conscious comparison. The function of awareness is adaptation (Claparède, 1917, p. 362: "La conscience du problème est donc la conscience d'un manque particulier, de ce qui manque au sujet pour qu'il ajuste son action au but désiré."; Claparède, 1918, p. 76: "... les circonstances qui nécessitent un réajustement conscient"). As soon as "normal" functioning is reestablished, awareness is no longer needed (cf. Vygotsky, 1962; Piaget, 1974/1976; Campbell, 1979)-

Communicative failure is of major importance according to Marshall & Morton (1978, p. 237) who make the following claim with respect to the emergence of linguistic awareness: "We believe, then, that "awareness" arises from the operation of error-detecting mechanisms...". With respect to the function(s) of the "fault-finders and fault-describers" they say: "...mechanisms which are required to change errors into correct responses." (p. 238). An example would be a child's explicit correction (function) of a formerly wrong morphophonological form after misunderstandings such as an incorrect object identification (which was due to the wrong morphophonological form) of another person in the course of conversation (cause).

Secondly, closely related to the maladaptation in communication, but still to be distinguished as possible cause for linguistic awareness is what could be called "speech need" ("Sprachnot", Stern & Stern, 1928): lacking the verbal means to express a particular idea. Thus, the cause is more some kind of nonadaptation (unavailable information). More generally speaking, when the child is confronted with unknown words or "working at" a specific part of his grammar, he may become aware of his inability to produce utterances which are appropriate in this respect. The function of this awareness might then be to provide himself with the appropriate lexical

or grammatical means. In such a case, linguistic awareness could operate as some kind of completion or filling device. Examples are yielded by children who have contact with a number of foreign languages (cf. e.g. Slobin, 1978). Not knowing a foreign or unusual word X (cause) could give rise to questions of the type: "What does X mean?" in order to learn the meaning of that word X (function).

Thirdly, a conceivable cause could be "intralinguistic incoherence". Karmiloff-Smith (1979a, p. 2) characterizes it more specifically as "the need to get a tangible grip implicit on distinctions by marking them externally, the reorganization of isolated morphemic units into systems whose elements have plurifunctional status". A corresponding function of this type of awareness is intralinguistic coordination and integration such as the consolidation of "two separate meanings normally expressed by a single surface element" (Karmiloff-Smith, 1979b, p. 239).

Here, the child is supposed to have an intrinsic interest in managing linguistic structures and functions and as working on language as a "problem space per se" although lack of understanding in communication cannot account for this. In this case, linguistic awareness is useful as some kind of coordination and integration device (but cf. section 4 for a different point of view held by Karmiloff-Smith). An example could be an English child who has trouble in distinguishing the suffix 's' of the plural from the suffix 's' in the genitive (cause) and who, after having become aware, can handle the two possible 's'-endings despite the fact that there has been no communicative pressure (function).

Fourthly, and finally, unexpected outcomes or novelty in the course of language acquisition could be a cause for linguistic awareness. If some linguistic forms or functions are rarely used or completely new for the child, he might be (pleasantly) surprised. In this instance the process is more one of accommodation than of assimilation. A possible function of this awareness could be a more creative use of the language potential. Here, linguistic awareness would serve as some kind of superaddition device. It can be assumed that "surprise" during linguistic progress is the motor for playful language activities, such as rhymes, riddles, metaphors, and jokes, which school-children love to make and which can be, in a rudimentary form, already observed in an infant's verbal play (Weir, 1962). Linguistic "function pleasure" ("Funktionslust", Bühler, 1918, p. 332) of the child would

then operate for his own and other people's entertainment or amusement. An instance for the emergence of this type of awareness could be the child's discovery that word order can be manipulated and that subtle manipulations involve changes in meaning (cause). Once having noticed that word order manipulation can imply funny outcomes the child alters word order systematically in order to amuse himself or others (function). Let us now oppose the four types of awareness (cf. Table 14).

Table 14: Causes and Functions of Linguistic Awareness

mechanism/device	cause of linguistic awareness	function of linguistic awareness
1 feedback mechanism or correction device	failure in communication ("errors")	repair (correction) and/or prevention of such failure
2 completion or filling device	"speech need"	provision with new verbal means
3 coordination and integration device	intralinguistic incoherence	coordination and integration of procedures
4 superaddition device	unexpected outcomes or novelty	more creative use of language potential

4.3 Empirical Studies of Metalinguistic Abilities

In this section we will concentrate on those metalinguistic abilities which are relevant for our research. These are error detections, corrections, and explanations.

4.3.1 Studies of Children's Detections and Corrections of Linguistic Errors

In the early experiments by Gleitman et al. (1972) and DeVilliers & DeVilliers (1972, 1974), children were asked to judge and correct linguistic errors. As to the detection of errors, these early studies indicate that

linguistically less developed children base their judgments rather on semantic than on syntactic criteria whereas verbally advanced children judge both semantic anomaly and reversed word order accurately. As to the corrections of errors, the developmental sequence goes as follows: no corrections at early stage IV (MLU 3.0 - 3.5), corrections of semantic anomaly at late stage IV (MLU 3.5 - 4.0), semantic corrections for syntactically wrong sentences at early stage V (MLU 4.0 - 4.5), and direct word order corrections in later development (cf. Table 2 in DeVilliers & DeVilliers, 1974). In general, there seems to be a slight precedence of judgments, corresponding corrections follow one stage later (although we should be aware that error detections are more sensitive to chance factors than error corrections: in binary judgments about 50 per cent of the answers could be correct by chance alone). Most other studies on children's judging acceptability of sentences (e.g. Howe & Hillman, 1973; James & Miller, 1973; Moore, 1975; Scholl & Ryan, 1975; Bohannon, 1976; Hakes, Evans & Tunmer, 1978 - cf. also Hakes, 1980; Carr, 1979; Scholl & Ryan, 1980) are not directly comparable with each other.

Age of the studied children varies greatly: e.g. in Carr's longitudinal study her subjects were between 2;0 and 5;0 years; Scholl & Ryan's children in the 1980 study were in kindergarten, second, and fourth grade; Moore collected data from twelve-year-olds.

Materials differed greatly: e.g. Scholl & Ryan presented in their 1975 experiment 52 sentences varying in grammatical complexity, i.e. different forms of questions and negations; Moore asked for judgments of sentences which contained such violations as subject-verb disagreements, noun-adjective disagreements, or lexical category violations; Hakes, Evans, and Tunmer included in their acceptability task the following sentence types: word-order changes, subcategorization violations, selectional restriction violations, some-any violations, violations of inalienable possession, and meaningful false sentences.

With respect to the tasks, error detections and corrections were not required in all of the above mentioned studies (e.g. Scholl & Ryan asked in both of their experiments - 1975 and 1980 - only for attributions of sentences to an adult speaker or a child speaker).

There has been some dispute with respect to the formulation of the acceptance and rejection of the nondeviant and deviant sentences (e.g. "good" vs. "right" or "ok"; "silly" vs. "wrong", "stupid", or "doesn't make sense"). The controversy about particular wordings (which was raised by

Scholl & Ryan (1975)) seems to be superfluous because Hakes, Evans, and Tunmer did not find a response bias in their data toward saying "right" or "good", respectively "wrong" or "silly".

The amount of pretraining and instructions also varied. The assumption that children may be influenced in their task performance by instructional variation was confirmed by an experiment of Markman (1979, study 3). From this study it can be concluded that indications to hidden problems within a task might facilitate the search process in the detection of errors and inconsistencies.

Despite variations regarding age, materials, tasks, formulation of the judgments, pretraining, and instructions in studies on children's acceptability of sentences one finding seems to be common to most studies (especially to those of Gleitman et al., 1972; DeVilliers & DeVilliers, 1972; Howe & Hillman, 1973; James & Miller, 1973; Hakes, Evans, and Tunmer, 1978 - cf. Hakes, 1980; Carr, 1979): small children rely in their judgments and corrections more on content and meaning than on formal properties whereas older children are more often able to master both meaning and form. This change in reflective ability takes place during middle childhood, i.e. during the transition from preoperational to concrete operational cognitive abilities (cf. Hakes, Evans, and Tunmer, 1978). As to the small children's metalinguistic abilities, Hakes & Foss (1978) make a very interesting suggestion for the early concentration on meaning: "... it appears that young children's earliest metalinguistic judgments are tied very closely to their comprehension strategies: if their strategies allow them to understand an utterance, they will accept it; if not, they will reject it." Since three-year-olds (and some four-year-olds) are not yet troubled by syntactic changes such as word order modifications, they can accept ungrammatical sentences such as reversed order imperatives. Older children which have become sensitive to syntactic anomaly are in this respect similar to adults: they can reject syntactically incorrect but semantically comprehensible sentences. Even if an utterance is hard to understand, linguistically more advanced children can nevertheless spot purely syntactic deviance, repair, and correct it. In general, there seems to be a slight developmental precedence of appropriate error detections before appropriate corrections.

However, error detections and corrections are often not very informative with respect to the bases on which judgments and modifications are given. Better insights may be obtained in giving the child a chance to verbalize his reasons for his decisions (error detection and correction).

4.3.2 Studies of Children's Linguistic Explanations

There have been relatively few studies in which children were asked to explain their linguistic judgments and/or language structures and functions. They are also often problematic with respect to their interpretation since children's verbalizations cannot be so unequivocally classified as error detections and corrections (usually binary classifications as "yes/no", "good/silly", or "correct/incorrect"). Even if children are invited to give explanations, neither the exact wording of their answers is given nor - at least in some studies - explicit scoring criteria so that some research results have mere face validity. In most research the bases for comments on general linguistic relations, processes, or rules have been single sentences which the children had first to judge and sometimes also to correct.

To ask little children about their linguistic intuitions requires great care from the researcher who must consider at least two possible pitfalls: firstly, the experimenter should choose his words so that the child can understand him, and secondly, the experimenter should be familiar with children and their language in order to grasp the intention of the child's utterance and to find the adequate interpretation (more verbal fluency - which some of the small children might not yet have - is required for explanations than for judgments and corrections).

Questions for explanations range from paraphrasing and explicating (e.g. "Can you say X differently?" or "Can you explain X?") and contextual information gathering (e.g. "Would you ever say X?" or "When, where, under which circumstances would you say X?") to more rule-directed prompts (e.g. "Why can one (not) say X?"). Paraphrases and explications were, for instance, studied by Shultz & Pilon (1973) in six to fifteen-year-olds and by Hirsh-Pasek, Gleitman, and Gleitman (1978) in children from grade 1 to grade 6.

The results of the Hirsh-Pasek et al. study (in which exact scoring criteria for paraphrases and explications were given) are partially in contradiction to the ones obtained by Shultz & Pilon (who did not give exact scoring criteria); in their study phonological ambiguity is easiest whereas

it is much harder in the Hirsh-Pasek et al. experiment. This conflict stems from a different classification of ambiguities and also from a different stimulus presentation (e.g. different renditions in the punch-line of the jokes) in both studies.

Researchers with an interest in the gathering of contextual information are, for instance, Gleitman et al. (1972) and Forrest & Waller (1979). In an often-cited example seven-year-old Claire Gleitman was asked by her mother Lila Gleitman: "Would you ever say Claire loves Claire?". It becomes evident by Claire's answer that this seven-year-old can already explain under which circumstances that sentence can be said: "Well, if there's somebody Claire knows named Claire. I know somebody named Claire and maybe I'm named Claire.". Another example of contextual information-gathering is given in a study by Forrest & Waller (1979). In this study which can be criticized for confounding linguistic skills and metalinguistic abilities it was found that younger children (and poor readers, the children ranged from grade 3 to grade 6) can only recognize incorrect sentences but cannot offer explanations whereas only the older children and better readers can explain how something should be said and why a given sentence was wrong.

Apart from the why-questions in the Forrest & Waller study, more rule-directed prompts and requests which concern linguistic behavior were, for instance, also important in studies by Robinson & Robinson (1977, 1978), by Sinclair (1981), and by Hakes (1980).

No precise scoring examples for children's explanations are given in the studies by Robinson & Robinson and by Sinclair. The studies by Robinson & Robinson were aimed to explore children's pragmatic understanding and their knowledge about the communicational requirements for speaker and addressee. In the 1977 experiment with children aged between 5;9 and 8;0 it was found that younger subjects nearly never allocated communicational failures to the speaker, slightly older ones were dependent on the outcome of the messages, and only the oldest children could evaluate good messages as adequate and bad messages as inadequate (irrespective of outcome).

In the first experiment of 1978 with 65 children between the ages of 4;11 and 6;11 the main result is that younger children have difficulties both in comparing referents with nonreferents and in differentiating between speaker's and listener's perspectives. Both of these weaknesses may be dependent causes of immature understanding about communication. In the second study 1978 Robinson & Robinson conclude (on p. 139) "that an awareness of

a need to take the listener's requirement into account precedes the development of an ability to make the necessary comparisons to achieve effective communication" (although they are cautious with respect to premature generalizations because of previous findings).

Pragmatic knowledge of young children was also investigated by Sinclair (1981). She asked three to eight-year-old Dutch kindergartners what they know about language production (e.g. "How do people talk?"), language function (e.g. "Why do people talk?"), characteristics of language ("Can animals talk?"), language acquisition ("Can babies talk?"), and incomprehension ("Do you always understand everyone and everything?"). Children's answers showed "that it is only gradually that children dissociate language or language behavior from other kinds of activities. Gradually, with age, certain ideas and conceptions develop and are coordinated, and the role played by the interlocutor, the communicative function of language, the fact that it has to be learnt, and its structure" (cf. p. 19).

Hakes (1980; cf. also Hakes, Evans, and Tunmer, 1978) gives a detailed description of metalinguistic explanations in which examples and scoring criteria are listed. The percentages of different kinds of reasons given in the acceptability task for judgments of unacceptability at each age level (cf. Fig. 4.4 in Hakes, 1980, p. 80) show clearly that partially correct answers increase with age, especially in the preschool years. Hakes notes that this trend does not only reflect children's increasing maturing of grammatical rules but also the articulateness with which this knowledge is communicated (cf. also the corresponding decrease in the categories "no reason" and "nonsense"). Interestingly, there is a strong decline in "content oriented" answers ("content oriented" answers comprise "denial of truth", "possible negative consequences", and "against societal rules") which were relatively often given by four-year-olds. This decline is especially strong after four years of age (cf. p. 92). The finding for the sharp decline of "content oriented" reasons in the preschool children goes hand in hand with error detection and correction data: "It appears, then, that 4-year-olds, and to some extent 5-year-olds, are strongly disposed toward finding sentences unacceptable because of what they assert rather than because of the linguistic manner in which they convey that assertion". (cf. p. 84). Only older children are able to consider sentences per se, independently of meaning and content, and to pay attention to grammatical constraints. After clear arguments and disclaims that the nature of the task and the mode of

instruction might have created an artifact, Hakes summarizes the findings of error detections, corrections, and explanations of the acceptability task: the development of these metalinguistic abilities suggest that children focus first on a single criterion and only later on multiple criteria. However, "The change is not a substitution of one criterion for another but, rather, an increase in a number of criteria" (cf. p. 87). Initially, children rely only on their comprehension when confronted with metalinguistic tasks, by the age of 4 years they use also a content criterion, and only later - by the age of 7 or 8 years - the linguistic criterion becomes an additional, third alternative. We can observe a parallel to Hakes' suggestion (i.e. a shift from one to several possible criteria) in other metalinguistic studies (for a similar finding in Hakes' research, cf. also the synonymy judgments).

For instance, in segmentation tasks four-year-old children concentrate only on "the tangible elements of reality", i.e. on comprehensible events (cf. Berthoud-Papandropoulou, 1978, example of a child aged 4;1: "Six enfants jouent: ('Six children are playing') "How many words?" "Six" "What are those six words?" "Moi, mon petit frère, et Christiane, Anne, Jean, etc." ('Me, my little brother, and Christiane, Anne, Jean, etc.'). Older preschool children enumerate often only content words (Berthoud-Papandropoulou: "privileged constituents"): "Le garçon lave le camion - "How many words?" "Trois" ('Three') "What are they?" "Le garçon, lave, et le camion" ('The boy, washes, and the truck')." whereas at a still later age they can take also function words into account (in addition to the content words) (cf. also Karpova, 1966; Holden & McGinitie, 1972).

It is remarkable that in a number of examples (cf. Piaget, 1929; Vygotsky, 1962; Markman, 1976; Papandropoulou & Sinclair, 1974; Berthoud-Papandropoulou, 1976, 1978; Hirsh-Pasek et al., 1978; Hakes, 1980) we can notice an expansion of criteria in children's explanations rather than a substitution. Thus, it seems that the development of metalinguistic abilities is not so much marked by a quantitative intensification (improvement with respect to one criterion - which would be the case if with increasing age a criterion can be applied in more tasks) but rather by additional, qualitative differentiation (as to the "attention shift" from meaning to form, cf. Lundberg, 1978).

From an 'extrapolation' of error detection, correction, and explanation data which have been discussed (cf. Shultz & Pilon, 1973; Hirsh-Pasek, Gleitman, and Gleitman, 1978; Forrest & Waller, 1979; Robinson & Robinson,

1977; Robinson & Robinson, 1978; Hakes, 1980) there seems to be no critical difference between error detection and correction, on the one hand, and explanation, on the other hand: younger children focus more on transparent reality-bound meaning and content than on opaque linguistic forms (for instance, in the 1977 experiment by Robinson & Robinson younger children consider more the effect of communication than the actual message).

The fact that in general explanations seem to follow (i.e. come later in the developmental sequence) error detections and corrections can have at least three different reasons. Firstly, it could be that this finding is due to different scorings (binary coding for error detections and corrections and several coding possibilities for different kinds of explanations could result in diverging probabilities and create a scoring artifact). Secondly, due to a lack of articulateness in small children some of their arguments might be classified as irrelevant or nonsensical (as to the verbalization handicap in young subjects, see Levelt et al., 1978; Hakes, 1980). And thirdly, it might be easier to say "yes" or "no" when asked for judgment than to give a complex explanation (as to the psychological barrier, cf. also Hakes, 1980).

In every research, it is highly likely that all of these reasons hold. A still open question is the relationship of error detections and corrections, on the one hand, and explanations, on the other hand, for different grammatical violations. It is conceivable that different metalinguistic abilities follow a different developmental sequence for different linguistic violations. It will be interesting to see if different profiles for error detections, corrections and explanations can be found for different violations in the present research.

5. GENERAL PREDICTIONS ON THE ROLE OF LINGUISTIC AWARENESS WITH RESPECT TO THE PRESENT RESEARCH

In the present research two different studies ("shifting reference" and "natural and syntactic gender") will explore the role of linguistic awareness in language acquisition. The awareness tests which comprise error detections, corrections, and explanations of errors will be given to children from three age groups either before or after the performance tests which shall investigate children's automatic comprehension skills. The awareness tests of both studies (as well as the performance tests) will be administered twice; the second testing will be the same as the first one, only five months later. Our general hypothesis on linguistic awareness and its relation to performance will refer to both studies if no further specification is made.

Linguistic awareness will be stimulated in both studies by some sources of trouble which the experimenter will provide (among the incorrect items are some "filler tasks", i.e. correct items and "ambiguous" items, will function as "distractors" in order to discover response sets of the children). We proposed in 4.2 (Assumptions on the Functions of Linguistic Awareness) a general hypothesis concerning emergence of linguistic awareness which has been derived by Claparède's observation that young children are more aware of differences than of similarities ("at an age when they are prone to excessive generalizations", cf. Piaget, 1974/1976, p. 333).

We expect that "differences" (such as conflicts) within a system of behavior, or between two (respectively among more) systems of behavior stimulate metalinguistic abilities more than "similarities" (such as regularities) within a behavioral system, or between two (respectively among more) systems of behavior.

This "difference hypothesis" means for the present research, first of all, that a mismatch between sentence content ("sentence meaning", cf. 2.4) and communicative intent ("utterance meaning", cf. 2.4) within a given utterance is more likely a cause for metalinguistic abilities than a correspondence between these two within an utterance.

Thus, error detections, corrections, and explanations of errors should more likely arise if in the two studies a pronoun is "said" which is not "meant" (as it will be the case in most awareness tasks of both studies; e.g. in the awareness task of "shifting reference" the experimenter might say "his present" but mean "her present") than if wording and intention are in

unison (as it might be the case in the performance task of 'shifting reference' where the experimenter might say "his present" and also mean "his present").

Secondly, this general "difference hypothesis" implies also that a discrepancy between utterance and nonverbal reference, such as pointing or gaze in a special direction, is more likely to give rise to metalinguistic abilities than a correspondence between these two behavioral systems. This means for the study on "shifting reference" (where a difference between utterance and pointing is frequent) that spontaneous reflections of the child should more likely arise when a pronoun utterance and the simultaneous gestural reference of the experimenter do not match than when they do match.

In the awareness tests of both studies inconsistencies of these two behavioral systems (verbal and nonverbal mismatch in "deviant" sentences) should be easier detected, corrected, and explained than agreements between verbal and nonverbal reference in "nondeviant" sentences, i.e. in correct distractor sentences.

Thirdly, awareness should be more easily stimulated if differences between two behavioral systems (such as between the linguistic "system" and the cognitive "system") exist than if there is no such difference within a behavioral system. The implication for the present research is that in the study on "natural and syntactic gender" we propose that metalinguistic abilities can be observed earlier (respectively more often) for natural gender where cognitive and linguistic factors coincide than for syntactic gender where only linguistic factors play a role.

With respect to predictions on the role of linguistic awareness in language acquisition, five additional major issues are of interest for the present research. The first two issues concern only metalinguistic abilities and the following three the relationship of these abilities and language performance. Hypotheses will be formulated for, firstly, the relationship among error detections, corrections, and explanations at one point of time, secondly, for the differential development of these metalinguistic abilities with age, thirdly, for the coherence of these metalinguistic abilities with performance at one point of time, and fourthly, for the possible influence of error detections, error corrections and explanations on later performance. The fifth and last hypothesis concerns the possible influence of early linguistic performance (which should be stronger than the possible influence of early metalinguistic abilities) for later linguistic performance.

5.1 On the Relationships among Error Detections, Corrections, and Explanations Within a Test

As to the relationship among different metalinguistic abilities within a test we assume that a general reflective ability underlies error detections, corrections, and explanations (cf. 4.1.3.2: Specificity and Generality of Reflective Abilities). We therefore expect a close relationship among these metalinguistic abilities.

Nevertheless, it is conceivable that a child who can detect an error in a task is neither able to correct nor to explain this error, and also that a child who can both detect and correct an error cannot explain it. Despite the fact that one general reflective ability underlies the emergence of superficially different metalinguistic abilities it is possible that the strain on this general reflective ability is different for error detections, corrections, and explanations.*

For an appropriate error judgment some shallow monitoring could be sufficient. For this it is only required that the correctness or incorrectness of an utterance is checked in a rather superficial way. For an appropriate correction of an error the exact location of the source of trouble has to be detected first and then corrected (since often more than one correction is possible the subject has also to grasp the demand characteristics of a task). Appropriate explanations demand probably most of the general reflective ability. Usually, they do not only require additional knowledge and reflections about grammatical relationships, generalizations, or rules, but also more verbal skills than error detections and corrections.

Different strains on reflective ability and different requirements with respect to verbal fluency should be reflected in a differentiated categorization of the child's responses. Both error detections and corrections are often only coded binarily, i.e. "correct/incorrect". Explanations should be multiply coded (e.g. "no reason", "partially correct reason", and "correct reason"). It will sometimes be hard to keep apart different strains on

* Different degrees of consciousness could be due to different degrees of integration (cf. Piaget, 1974/1976; cf. also Hirsh-Pasek, Gleitman and Gleitman's example of a child where awareness "flits in and out of his head", 1978, p. 126).

reflective ability, different requirements with respect to verbal fluency, and different codes for error detections, corrections, and explanations, since they can be mutually dependent, for instance, when we have the case where a child can detect an error but can neither correct nor explain the error or if a child can detect and correct an error but cannot explain it. It will be interesting, however, to see if children can explain an error but do not show error detection and/or error correction (a Piagetian type of interview will be necessary so that the child can correct former decisions and so that the experimenter can follow his reasonings). Thus, the three metalinguistic abilities of the present research have to be analyzed with respect to each other. Because of the assumption of one general reflective ability we assume that within a test they are rather more interdependent than contrasting.

5.2 On the Differential Development of Error Detections, Corrections, and Explanations with Age

As to the differential development of error detections, corrections, and explanations with age, these will be seen in a clearer light if we inspect cross-sectional and longitudinal developments. Since we do not know of any systematic longitudinal studies on error detections, corrections, and explanations we will make the same predictions for intraindividual (longitudinal) metalinguistic developments as for interindividual (cross-sectional) developments.

Our general hypothesis will be that the development of different metalinguistic abilities should be ordered according to "strain" in reflective ability, i.e. that error detections precede developmentally corrections of errors, and that corrections of errors precede explanations of such errors. The sequence of acquisition for these abilities should be: first error detections, then corrections of errors, and finally explanations of errors.

These assumptions have been confirmed by empirical observations (cf. section 4.3). Hirsh-Pasek et al. (1978, p. 125) say with respect to their investigation on the detection and explanation of ambiguities in jokes: "Along with other investigators, we have found that the ability to explain ambiguity emerges much later in developmental time than the ability to detect potential alternative interpretations of a single speech signal.". Likewise, Hakes (1980, p. 93) assumes for his findings: "... that being able to give an appropriate reason for a correct judgment represented a higher level of competence than merely giving a correct judgment.". Whereas it is possible

that error detections and corrections are already mastered beyond two and a half years (cf. Gleitman, Gleitman, and Shipley, 1972; deVilliers & DeVilliers, 1972 - whereby error detections precede corrections, cf. DeVilliers & DeVilliers, 1974, Table 2, and also DeVilliers & DeVilliers, 1978, p. 169) the onset of the ability to explain a given judgment appropriately is probably not before the age of four (there is - to our knowledge - no comparable research available but for some evidence cf. Hakes' Fig. 4.4 in Hakes, 1980, p.80).

There is an interesting parallel with respect to the relatively late onset of explanations in a study by Dimitrovsky & Almy (1972) on children's knowledge of conservation in which over a three-year period 432 children from kindergarten, first and second grade, had both to judge and to explain two Piagetian tasks involving conservation of number and one which involved conservation of liquid.* Their results indicate that consistently correct judgments on tests of conservation are not always followed by verbalizations of the reasoning underlying these judgments and that "children who respond correctly to conservation questions early in kindergarten are significantly less likely to be able to accompany these responses with acceptable explanations than are children who begin to respond correctly to such questions in first or second grade." (p. 24). Dimitrovsky & Almy's conclusion for this finding is that one group of children might indeed have achieved spontaneously conservation concepts but could not yet use their language consciously and that the other group of children might have used language as a tool for the achievement of these concepts. However, we think that it is also conceivable that the relatively late onset of explanatory ability for both groups of children is much more reflective of the ability to decenter, than to give an alternative answer to the question: "... more, less, or the same?". Moreover, in the latter case the children have a chance of one third to be correct whereas

* Hakes (1980) administered in addition to the metalinguistic tasks also the Goldschmid-Bentler Concept Assessment Kit-Conservation, Form A. The scalogram analysis in which only the judgment data were considered did not differ significantly from the one in which both the judgment and explanation data were included. Beyond this no direct correlations between judgments and explanations of Hakes' conservation tasks were evaluated in the publications (cf. Hakes, Evans, and Tunmer, 1978; and Hakes, 1980).

this is not so for reflective explanations.

In conclusion the literature suggests that the development of meta-linguistic abilities with age should be in that sequence; first error detections, then corrections, and finally explanations.

5.3 On the Coherence of Metalinguistic Abilities with Performance Within Tests

Our third general set of hypotheses concerns the coherence of error detections, corrections, and explanations with performance within tests. Three assumptions can be made.

Firstly, since research data (cf. e.g. DeVilliers & DeVilliers, 1972 and 1974) showed that primary linguistic skills can be observed independently from controlled reflections on language we assume that performance (automatic language understanding) can proceed without accompanying metalinguistic abilities (cf. also Karmiloff-Smith, forthcoming, cited in Hickmann & Weissenborn, 1981).

Secondly, we expect that performance precedes error detections, corrections, and explanations (cf. e.g. DeVilliers & DeVilliers, 1974, Table 2, or Hirsh-Pasek, Gleitman, and Gleitman, 1978, p. 98: "For a variety of language issues, judgmental performance does lag behind speech and comprehension in developmental appearance."). It is thus possible that a child uses his language skillfully, but is not yet aware of it.

Thirdly, we also expect in Study A ("shifting reference") that there is an inverse relationship between the order of acquisition of performance and the order of acquisition of metalinguistic abilities. This means for the present research that it is easier for the child to become aware of lately acquired pronouns than of early acquired pronouns and vice versa (i.e. it will be hard to become aware of early acquired pronouns. This assumption is based on Claparède's law of awareness in 1918, p. 71/72 ("une loi très générale du développement mental" = "Loi de la prise de conscience"): "L'enfant (ou en général l'individu) prend conscience d'une relation d'autant plus tard que sa conduite a impliqué plus tôt et plus longtemps l'usage automatique (instinctif, inconscient) de cette relation.".

5.4 On the Potential Role of Metalinguistic Abilities in the Development of Linguistic Skills

As far as the literature goes, the development of linguistic skills before age seven would not be any different if the child would not show any

metalinguistic abilities (cf. e.g. DeVilliers & DeVilliers, 1972 and 1974, as to pronoun acquisition, cf. e.g. Deutsch & Pechmann, 1978; Volbers, 1978). It is, however, a legitimate question to ask whether linguistic awareness can serve as a feedback mechanism or correction device (cf. 1.1 and 4.2).

The two necessary conditions for the rise of linguistic awareness, which were formulated by Claparède in 1918, are a failure to adapt automatically in case of a source of trouble or disturbance and the ability to make conscious comparisons. Although Claparède does not discuss this issue in detail we can assume that the child must have reached a level of cognitive development which allows him to attend to at least two aspects of a phenomenon for making a conscious comparison (cf. also Hakes' suggestion (1980, p. 38) about the "ability to decenter, to mentally stand back from a situation in order to think about the relationships it involves" which emerges between four and eight years of age). Marshall & Morton (1978) claim for linguistic awareness more explicitly that the "fault-finders and fault-describers" can change linguistic errors and communicative failures into correct (appropriate) responses.

We thus expect for the two studies on "shifting reference" and "natural and syntactic gender" that children who show metalinguistic abilities (error detections, corrections, and explanations) in the first test but whose automatic performance is not yet appropriate will improve their performance in the second test more than those children who are neither aware (i.e. who do not show error detections, corrections, or explanations) nor perform correctly in the first test. That is, the abilities to detect, correct, and explain errors could "facilitate" future performance (for Karmiloff-Smith's counter-claim, cf. 4.).

5.5 On the Potential Role of Early Linguistic Skills and Early Metalinguistic Abilities in the Development of Later Linguistic Skills

We do not yet have any empirical evidence that early reflective abilities are "facilitative" for later linguistic skills. However, if our data show that our main hypothesis (i.e. linguistic awareness can function as a feedback mechanism or correction device) cannot be rejected, we can still suppose that early linguistic skills are even more "facilitative" for later linguistic skills than early reflective abilities. This assumption seems reasonable in view of the fact that primary linguistic skills can be observed to develop independently from metalinguistic abilities (cf. 5.2). We thus propose that early language performance is stronger correlated with later language perform-

ance than is early reflective ability.

5.6 Synopsis of the Predictions which Relate to the Role of Linguistic Awareness in Language Acquisition

In 5. we proposed on the basis of Claparède's observation that small children are more aware of differences than of similarities the following general hypothesis (cf. 5.):

H_A1* : "Differences" (such as conflicts) within a system of behavior, or between two or more systems of behavior stimulate metalinguistic abilities more than "similarities" (such as regularities) within a behavioral system, or between two or more systems of behavior.

From this general hypothesis we derived three sub-hypotheses which are more specific for the present research (cf. 5.):

H_A 1a: Metalinguistic abilities (error detections, corrections, and explanations) arise more likely in case of a mismatch between sentence content and communicative intent within a given utterance than in case of a correspondence between these two within an utterance. H_A 1a applies for both studies, Study A ("shifting reference") and Study B ("natural and syntactic gender").

H_A 1b: Metalinguistic abilities (error detections, corrections, and explanations) arise more likely in case of a mismatch between verbal utterance and nonverbal reference in a task than in case of a correspondence between these two. H_A 1b applies only for Study A ("shifting reference") in which the pointing direction is crucial.

H_A 1c: Metalinguistic abilities (error detections, corrections, and explanations) can be observed earlier (respectively more often) for natural gender where cognitive and linguistic factors coincide than for syntactic gender where only linguistic factors play a role. Clearly, this hypothesis (H_A 1c) relates only to Study B ("natural and syntactic gender").

* "H_A" refers to hypotheses which relate to awareness and its role in language acquisition.

As to the relationships among different metalinguistic abilities within a test, we propose the following hypothesis (cf. 5.1):

H_{A2} : Metalinguistic abilities (error detections, corrections, and explanations) are all contingent on one underlying factor, "reflective ability", and should therefore covary in development. This hypothesis relates to both Study A and Study B.

With respect to the differential development of different metalinguistic abilities with age, we came to the following prediction (cf. 5.2):

H_{A3} : The development of metalinguistic abilities (error detections, corrections, and explanations) with age is ordered according to "strain" in reflective ability: first are error detections, then corrections, and finally explanations. This hypothesis relates to both studies, and should be apparent in both cross-sectional and longitudinal comparisons.

With respect to the coherence of metalinguistic abilities with performance within tests, we made three assumptions (cf. 5.3):

H_{A4} : Primary linguistic skills (= performance) can exist independently from the ability to reflect on language (i.e. independently from error detections, corrections, and explanations). This hypothesis relates to both Study A and Study B.

H_{A5} : Performance precedes error detections, corrections and explanations. This hypothesis relates to both studies.

H_{A6} : There is an inverse relationship between the order of acquisition of performance and the order of acquisition of metalinguistic abilities (error detections, corrections, and explanations), i.e. it is easier to become aware of lately acquired pronouns than of early acquired pronouns (and vice versa). This hypothesis H_{A6} can only be tested in Study A ("shifting reference") (the pronoun "seine" in the awareness tests of Study B can be either masculine or neuter, as to this problem, cf. 3.2).

With respect to the potential role of reflective abilities in the development of linguistic skills (cf. 5.4) our main hypothesis is:

H_{A7} : Children who show metalinguistic abilities (error detections, corrections, and explanations) in the first test but whose automatic performance is not yet appropriate will improve their automatic performance in the second test more than those children who are neither aware (i.e.

who do not show error detections, corrections, or explanations) nor perform correctly in the first test. Clearly, our main hypothesis must relate to both studies.

As to the potential role of early linguistic skills as opposed to early reflective abilities in the development of later linguistic skills (cf. 5.5), we propose:

H_{A8} : Early language performance is stronger correlated with later language performance than early reflective abilities (i.e. error detections, corrections, and explanations). Hypothesis H_{A8} applies to both Study A and Study B.

6. STUDY A: "SHIFTING REFERENCE"

6.1 Method of Study A

The motives for choosing German possessive pronouns as independent variables for the study of metalinguistic abilities and their relation to performance were already discussed in the introduction. We know from research on German personal pronouns (Deutsch & Pechmann, 1978; Volbers, 1978) that they are not fully acquired before the age of 6;5. Under the assumption that the development of possessive pronouns is similar to that of personal pronouns it will be interesting to see whether some possessive pronouns are not yet mastered by preschool children although these children might be able to express their ideas about these pronouns. Thus, German possessive pronouns might be a fruitful linguistic domain for the exploration of the relationship between language understanding and linguistic awareness. Another motivation for their selection is the multiplicity of their linguistic features. Deictic features are especially relevant for speaker/addressee shifts. The study of "shifting reference" focuses mainly on three questions: firstly, the child's understanding of different possessive pronouns (understanding = performance), secondly, his detection, correction, and explanation of errors with respect to shift pronouns and non-shift pronouns (cf. 2.4) (metalinguistic abilities), and thirdly, the relationship between performance skills and metalinguistic abilities, especially the impact of linguistic awareness on later performance (longitudinal relation between awareness and performance).

In the present study ("shifting reference") each child receives both performance tasks and metalinguistic tasks. In three age groups the performance tasks are given first but in one additional group (group 4) which functions as a control group the metalinguistic tasks are administered before the performance task.* The study on "shifting reference" examines the three age groups and the additional fourth group twice: in May and June 1978 the children were tested for the first time (we will refer to this first test as "PRE"); in October and November 1978 the same test procedure was repeated with the same children (we will refer to this second test as "POST"). Thus, the time lag in this longitudinal study was

* Note that order of presentation is not the main aim of our research.

exactly five months.

6.1.1 Subjects in Study A

In the first study (PRE) a total of 62 children were tested, 35 girls and 27 boys. For a proper analysis the data of three from the 62 children of the first test (PRE) were discarded because two children were sick at the time of the second test (POST). The data of one other child were not evaluated because of his response bias (acquiescence) in the metalinguistic tasks of PRE. Thus, there were 59 children partitioned over four groups: In group 1 were the 14 youngest children, nine girls and five boys, from 3;9 to 4;5 years of age (mean age: 4;2). In group 2, 16 children were tested, nine girls and seven boys, from 4;6 to 5;2 years of age (mean age: 4;10). Group 3 contained 14 children, seven boys and seven girls, ranging from 5;3 to 5;10 (mean age: 5;6).

The mean age differences between group 1 and 2, on the one hand, and between group 2 and group 3, on the other hand, were eight months. In group 4, the control group (these children got the awareness test first), were 15 children, eight girls and seven boys, ranging from 5;1 to 5;11. Their mean age was the same as the one of the children in group 3, namely 5;2. When these four groups were tested for the second time they were exactly 5 months older: group 1 (4;7), group 2 (5;3), group 3 (5;11), and group 4 (5;11). These age groups were chosen because we expected that not all of the possessive pronouns are fully mastered at this level and that there are still developmental changes to be observed in metalinguistic abilities.

All children were native speakers of German. They came from five different kindergartens and, according to the kindergarten-teachers, from different socio-economic classes (lower class families, middle class families, and upper-middle class families). All children lived in Kleve in North-West Germany. Parental and kindergarten permission was obtained prior to the testing of any child. All tested children knew the experimenter (the present author) for at least half a year. Due to the relaxed atmosphere from earlier visits no warming-up sessions were needed. Only those children who volunteered were tested.

6.1.2 Research Design of Study A

In order to give a clearer picture of how the research was planned,

Table 15 and Table 16 present the design of the study on "shifting reference":

Table 15: Research Design for the First Test of "Shifting Reference" in ,
May and June 1978 (PRE)

group	order of presentation	number of subjects	mean age
1 experi- mental	performance before awareness	14 (16) *	$\bar{x} = 4;2$
2 experi- mental		16 (16)	$\bar{x} = 4;10$
3 experi- mental		14 (15)	$\bar{x} = 5;6$
4 control	awareness before performance	15 (15)	$\bar{x} = 5;6$

* In parentheses are the original numbers of subjects.

The same procedure was repeated with the same subjects in a second test in October and November 1978 (POST).

Table 16: Research Design for the Second Test of "Shifting Reference" in October and November 1978 (POST)

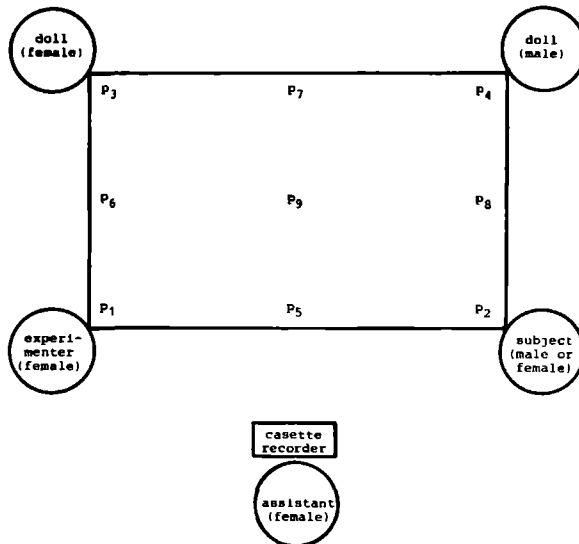
group	order of presentation	number of subjects	mean age
1 experi- mental	performance before awareness	14	$\bar{x} = 4;7$
2 experi- mental		16	$\bar{x} = 5;3$
3 experi- mental		14	$\bar{x} = 5;11$
4 control	awareness before performance	15	$\bar{x} = 5;11$

The time lag of five months between PRE and POST was chosen because of some calculations (comparisons of children in group 1 and 2 with those of group 2 and 3) after the first test. An improvement in performance could be expected after five months for at least one pronoun. The reason why we did not choose a time lag of eight months (which corresponds to inter-group intervals with respect to the mean age of the three groups) but of five months was that in two kindergartens the oldest children should begin a "reading training" after Christmas. Since the reading training could have had an effect on metalinguistic abilities it was necessary to do the second testing earlier.

6.1.3 Experimental Set-up of Study A

In the experiment on "shifting reference" the following German possessive pronouns were tested: "mein", "dein", "sein", "ihr", "unser", and "euer" which referred to four participants in the experiment: the female experimenter, a subject (either sex), a male doll, and a female doll (cf. 2., especially Table 1). Nine presents in different colours (small raisin packages) were on a table of a kindergarten room.

Table 17: Experimental Set-up of "Shifting Reference"



The arrangement was the following: the experimenter, the subject, and the two dolls sit at a table. Behind the experimenter and the child is a female research assistant with a cassette recorder. The research assistant who takes notes is seated at an angle where she can observe the situation but is not seen herself. On the table are nine presents (p): p_1 belongs to the female experimenter (E = speaker), p_2 belongs to the subject (S = addressee), p_3 to the female doll (non-addressee; participant in the game), p_4 to the male doll (non-addressee; participant in the game), p_5 belongs to the experimenter and the subject, p_6 to the experimenter and the female doll, p_7 to the female doll and the male doll, p_8 to the child and the male doll, and p_9 to all four participants together, i.e. to the experimenter, the subject, and the two dolls (for a similar experimental set-up, cf. Deutsch & Pechmann, 1978, or Volbers, 1978).

Since the experimenter is the speaker, the child the addressee, and the two dolls only participants (who cannot talk or hear) these nine presents should be labelled with the following German possessive pronouns (cf. also 2., Table 1):

p_1 = "mein" present (experimenter = speaker)	}	1 possessor
p_2 = "dein" present (subject = addressee)		
p_3 = "ihr" (= ihr _{sing.}) present (female doll)		
p_4 = "sein" present (male doll)		
p_5 = "unser" (= unser _{incl.}) present (E & S)	}	2 possessors
p_6 = "unser" (= unser _{excl.}) present (E & female doll)		
p_7 = "ihr" (= ihr _{p1.}) present (female doll & male doll)		
p_8 = "euer" present (S & male doll)		
p_9 = "unser" (= unser ₄) present (E & S & 2 dolls)	}	4 possessors

The female research assistant who took notes did not participate in the experiment (the child was told this) except for the beginning when she distributed the presents. This was done in order to make sure that the child should not think that all the presents belonged to the experimenter anyway.

6.1.4 Performance Tasks of Study A

The performance tasks were items which tested the child's understanding of possessive pronouns. The child's task was the identification of the six possessive pronouns: "mein", "dein", "sein", "ihr", "unser", and

"euer". The experimenter asked the child to point out a present:

1. "Can you show me "mein" (my) present?"*
2. "Can you show me "dein" (your_{sing.}) present?"
3. "Can you show me "ihr" (her or their) present?"
4. "Can you show me "sein" (his) present?"
5. "Can you show me "unser" (our) present?"
6. "Can you show me "euer" (your_{pl.}) present?"

Since "ihr" can refer to two presents (p_3 = sing. female 3rd person and p_7 = plural 3rd person), a further question was asked after question 3. and the identification of a present:

- 3a. "Is there another present which is "ihr" (her or their) present?"**

The pronoun "unser" can refer to three presents (p_5 = "unser_{incl.}", p_6 = "unser_{excl.}", and p_9 = "unser₄"), thus two further questions had to be asked after question 5. and the identification of a present:

- 5a. "Is there another present which is "unser" (our) present?", and
5b. "Is there still another present which is "unser" (our) present?"***

There were all together nine questions (1., 2., 3., 3a., 4., 5., 5a., 5b., and 6.) but three with different wording (3a., 5a., and 5b.). It was felt that the wording "Is there another present ...?" and "Is there still another present ...?" was more natural as a second, respectively third question than the wording "Can you show me another (still another) ... present?". The questions 3a., 5a., and 5b. were also asked if the child pointed out a wrong present. In some cases the children denied the presence of another "unser" present. In these instances 5b. was not questioned and the child was not further prompted.

Before the experiment started the six questions (3a., 5a., and 5b. followed always the kernel question, 3. or 5. respectively) were randomized for each child (but note that the child got the same order in POST as in PRE).

*The German question was: "Kannst du mir mal ... Geschenk zeigen?"

**The German question was: "Gibt es noch ein Geschenk, das ... Geschenk ist?"

***The German question was: "Gibt es noch ein anderes Geschenk, das ... Geschenk ist?"

The V-form "Ihr" was not tested since in German it can only be used for grown-ups and the addressee was a child. The motivation for testing three different referential possibilities for "unser" ("unser_{incl.}", "unser_{excl.}", and "unser₄") was the examination of the child's comprehension of addressee-inclusion and addressee-exclusion. The two inclusive "unser" pronouns ("unser_{incl.}" and "unser₄") were selected because we wanted to see whether the implication of the two dolls facilitated correct identification of "unser".

6.1.5 Awareness Tasks of Study A

Each awareness task (= error detection task) consisted of an error detection which was followed by a correction and an explanation. We decided to use standardized questions for error detections but took the Geneva "clinical interview" approach for error corrections and explanations (for a beautiful discussion on the problem of experiments and "clinical interviews", cf. Karmiloff-Smith, 1979b). Only in cases where the child had been aware that the given pronoun was mistaken or where his answers were hesitant or contradictory (e.g. nodding and a "no"-answer) he was further prompted for corrections and explanations. The error detection tasks were the following:

- I. E pointed at the present of the female doll (p_3) and asked: "Can I say this is "sein" (his) present?" (Kann ich sagen, dies ist sein Geschenk?). The correct pronoun would be "ihr" (ihr_{sing.}/her). The utterance is "sein" and the reference "ihr_{sing.}" (in the following we will refer to this task as "task I" ("sein"/ihr_{sing.})). This item should test the child's awareness of natural gender (-Ego-Se versus -Ego-Se+Fe).
- II. E pointed at the present of the subject (p_2) and asked: "Can I say this is "mein" (my) present?" (Kann ich sagen, dies ist mein Geschenk?). The correct pronoun would be "dein" (your_{sing.}). The utterance is "mein" and the reference "dein" (henceforth: Task II ("mein"/dein)). In this task the singular speaker/addressee shift was investigated (+Ego versus -Ego, + Se).
- III. E pointed at the present of the subject and the male doll (p_8) and asked: "Can I say this is "unser" (our) present?" (Kann ich sagen, dies ist unser Geschenk?). The correct pronoun would be "euer"

(your_{pl.}). The utterance is "unser" and the reference "euer" (henceforth: Task III ("unser"/euer)). The problem involved in task III is a plural speaker/addressee shift where E utters a pronoun which implies the speaker but refers to a present which involves the addressee (+Ego, +Se, +Plural versus -Ego, +Se, +Plural).

- IV. E pointed at the present of the male doll (p₄) and asked: "Can I say this is "dein" (your_{sing.}) present?" (Kann ich sagen, dies ist dein Geschenk?). The correct pronoun would be "sein" (his). The utterance is "dein" and the reference "sein" (henceforth: task IV ("dein"/sein)). This task should test the child's ability to discriminate between addressee and another participant (-Ego, +Se versus -Ego, -Se).
- V. E pointed at the present of E and the female doll (p₆) and asked: "Can I say this is "euer" (your_{pl.}) present?" (Kann ich sagen, dies ist euer Geschenk?). The correct pronoun would be "unser_{excl.}" (our_{excl.}). The utterance is "euer" and the reference "unser_{excl.}" (henceforth: task V ("euer"/unser_{excl.})). Like in task III, task V concerns a plural speaker/addressee shift, but here E utters a pronoun which implies the addressee but refers to a present which involves the speaker (-Ego, +Se, +Plural versus +Ego, -Se, +Plural).
- VI. E pointed at the present of the two dolls (p₇) and asked: "Can I say this is "euer" (your_{pl.}) present?" (Kann ich sagen, dies ist euer Geschenk?). The correct pronoun would be "ihr_{pl.}" (their). The utterance is "euer" and the reference "ihr_{pl.}" (henceforth: task VI ("euer"/ihr_{pl.})). In this task we were interested whether the child notices that a plural addressee involvement is not appropriate when the reference is only made with respect to other participants (-Ego, +Se, +Plural versus -Ego, -Se, +Plural).

The four remaining awareness tasks were "filler tasks", two "correct" tasks and two "ambiguous" tasks.* Moreover, these four tasks functioned as "distractors" for the detection of response sets, i.e. of either acquiescence or negation. The "correct" awareness tasks are:

*The two "correct" tasks functioned not only as "fillers" but also to have an opportunity to test Claparède's suggestion that awareness for "incorrect" precedes awareness for "correct" (cf. H_A1a and H_A1b in 5.6). The two "ambiguous" tasks were not only "fillers" but also a possibility for testing the Gricean maxims of "quantity" and "quality" (the specification of this assumption follows after presentation of the "ambiguous" tasks IX and X).

VII. E pointed at the present of the subject (p_2) and asked: "Can I say this is "dein" (your_{sing.}) present?" (Kann ich sagen, dies ist dein Geschenk?). The correct pronoun is "dein" (your_{sing.}). Thus, the pronoun utterance is in conformity with the reference (we will refer to this task as "task VII ("dein"/dein)").

VIII. E pointed at the present of E and the female doll (p_6) and asked: "Can I say this is "unser" (our) present?" (Kann ich sagen, dies ist unser Geschenk?). The correct pronoun is "unser_{excl.}" (our_{excl.}). Thus, the pronoun utterance is in conformity with the reference (we will refer to this task as "task VIII ("unser"/unser_{excl.})"). Since the "unser"-utterance is an exclusive "unser"-reference difficulties can be expected. It will be necessary to contrast task VIII with the error detection task V where E also points at the present of E and the female doll (p_6) and asks: "Can I say this is "euer" (your_{pl.}) present?" (Kann ich sagen, dies ist euer Geschenk?). Both of the pronouns ("unser" and "euer") are plural but the former includes the speaker and the latter the addressee.

In the two "ambiguous" tasks (the statements questioned in tasks IX and X are not completely incorrect and are thus "ambiguous" tasks) E's question could be affirmed but another pronoun would be more appropriate:

IX. E pointed at the present of E and S (p_5) and asked: "Can I say this is "mein" (my) present?" (Kann ich sagen, dies ist mein Geschenk?). The pronoun "mein" (my) is correct but "unser_{incl.}" (our_{incl.}) would be more appropriate (we will refer to this task as "task IX ("mein"/unser_{incl.})"). The contrast between utterance ("mein") and reference ("unser_{incl.}") is: +Ego versus +Ego, +Se, +Plural. Especially interesting will be those cases where the child affirms the question ("yes") but changes the given pronoun into "unser_{incl.}".

X. E pointed at the present of all four participants (p_9), i.e. of E, S, the female doll, and the male doll, and asked: "Can I say this is "euer" (your_{pl.}) present?" (Kann ich sagen, dies ist euer Geschenk?). The pronoun "euer" (your_{pl.}) is correct but it is more appropriate to include the speaker: "unser₄" (our₄) (we will refer to this task as "task X ("euer"/unser₄)"). The contrast between utterance ("euer") and reference ("unser₄") is: -Ego, +Se, +Plural versus +Ego, +Se, +Plural (note that the two inclusive 'unser' - 'unser_{incl.}' and

"unser₄" - are not distinguished with respect to their features). Again, those cases will be interesting where the child affirms the question ("yes") but changes the given pronoun into "unser₄".

Both of the ambiguous tasks (task IX ("mein"/unser_{incl.}) and task X ("euer"/unser₄) are a good testing ground for the two Gricean maxims of quantity and quality (Grice, 1975). If the child follows the maxim "Make your contribution only as informative as required" he might only affirm the two 'ambiguous' questions although he knows that another pronoun would be more appropriate when prompted. If the child follows the maxim: "Make your contribution one that is true" he should deny questions IX and correct "mein" into "unser_{incl.}", respectively include the speaker in task X, i.e. he should deny the experimenter's question and give a correction which includes the speaker.

The ten awareness tasks were presented in random order for each child (in POST, however, the children got the same order as in PRE). Let us now give an overview of these tasks.

Table 18. Overview of the Awareness Tasks of Study A

task-type	task	utterance	reference	contrast
error detection tasks	I	"sein"	p ₃ = 1hr _{sing.}	-Ego, -Se vs. -Ego, -Se, +Fe
	II	"mein"	p ₂ = dein	+Ego vs. -Ego, +Se
	III	"unser"	p ₆ = euer	-Ego, ±Se, +Plural vs. -Ego, +Se, +Plural
	IV	"dein"	p ₄ = sein	-Ego, +Se vs. -Ego, -Se
	V	"euer"	p ₆ = unser _{excl.}	-Ego, +Se, +Plural vs. +Ego, -Se, +Plural
	VI	"euer"	p ₇ = 1hr _{pl.}	-Ego, +Se, +Plural vs. -Ego, -Se, +Plural
"correct" tasks	VII	"dein"	p ₂ = dein	no contrast -Ego, +Se
	VIII	"unser"	p ₆ = unser _{excl.}	no contrast +Ego, -Se, +Plural
"ambiguous" tasks	IX	"mein"	p ₅ = unser _{incl.}	+Ego vs +Ego, +Se, +Plural
	X	"euer"	p ₉ = unser ₄	-Ego, +Se, +Plural vs. +Ego, +Se, +Plural

We mentioned before that for further exploration the "(Genevan) clinical interview" method was used. This means that we approached each child individually after the introductory awareness questions. We also intended to elaborate the first awareness question if a child would respond that X could be said (meaning: even if the utterance is incorrect it could be said) thus taking the question: "Can I say this is X present " literally. However, the intended change ("Is it correct if I say this is X present?") was not necessary in the actual experiment.

Whenever the child denied in an awareness task E's pronoun suggestion like when he said to the experimenter: "No, you can't say that", and also if his reaction was hesitant or contradictory he was prompted for correction and explanation.

The correction part of the awareness tasks. Questions for corrections were: "How do I have to say for this present?" (Wie muß ich bei diesem Geschenk sagen?) or "What do I have to say for this present?" (Was muß ich bei diesem Geschenk sagen?) (for different elicitations of verbalizations in experiments with young children, cf. Blank, 1975).

The explanation part of the awareness tasks. Questions for explanations were worded as follows: "Why is it impossible to say X?" (Warum - also: 'wieso' or 'weshalb' - ist es unmöglich, X zu sagen?) or: "Why do I have to say Y?" (Warum - also: 'wieso' or 'weshalb' - muß ich Y sagen?), or the like. In cases where the child spontaneously said that the experimenter could not say X but had to say Y the question was usually elliptic: "Why (not)?" (Warum (nicht)?). In questions with speaker/addressee shift for pronoun correction the speaker's utterance "I" like in "How do I have to say for this present?" was especially emphasized. The speaker/addressee shift becomes fundamentally important in task II, task III, and task V, i.e. the speaker utters here pronouns which are correct from the addressee's point of view. In the other error detection tasks and the two "ambiguous" tasks (I, IV, VI, IX, and X) the child can keep his own point of view for a correction.

6.1.6 Experimental Procedures and Instructions of Study A

In this experiment on "shifting reference" each child was tested individually in one session (for one test) which lasted approximately 15 to 25 minutes. The sessions took place in a quiet room of the child's kindergarten. The children were escorted to the experimental room by the experi-

menter and assistant and were seated next to the experimenter (cf. 6.1.3). Some children wanted the company of a boy-friend or girl-friend. This was possible but the little friend was told to be quiet and was seated at an angle where the tested child was not diverted by any nonverbal cues of the companion. After the female research assistant Veronika had been introduced to the children, instructions were given. The instructions for the first performance tests (PRE) in the three experimental groups were as follows:

"You see these little packages here, right? These are presents from Veronika. The little packages belong now to you, to me, and to the two dolls. Do you want to give a name to this doll? (E points to the female doll) (All children gave the female doll a female name thus showing that they knew the sex of the female doll). And also to that one? (E points to the male doll) (All children gave the male doll a male name, thus showing that they made a distinction between the sexes of the two dolls). I now want to play a game with you in which you have to answer a few questions. Veronika does not play with us but Inge (respectively the child's choice of the name for the female doll) and Hans (respectively the child's choice of the name for the male doll) will play with us. Inge and Hans cannot talk or hear.

How, listen carefully which presents belong to whom. Well, I got this present (E points to p_1), you this one (E points to p_2), Inge this one (E points to p_3), and Hans this one (E points to p_4). Some presents belong to two together ("zweien zusammen")*. You and I together ("du und ich zusammen") got this present (E points to p_5), Inge and I together this present (E point to p_6), Inge and Hans together this present (E points to p_7), and Hans and you together this present (E points to p_8). (At this point there was often an interruption after the attributions of the eight presents when the child pointed to p_9 and asked: "And this one?") Now, this present in the middle is for all four together. Hans, Inge, you, and I got this present

* Pilot studies had indicated that the children had difficulties if E said: "This present (...) belongs to A and B". Under this instruction a number of children pointed out two presents (one of A and the other one of B) when asked in the recall test: "Which present belongs to A and B?", thus ignoring the singular form of "present". Therefore we decided to instruct the children differently: "A and B together got this present.". With this instruction there were no problems as indicated by the recall-test.

together. Now, this was a lot to remember. Do you still know which present Inge and Hans together got?" (eight further recall questions in random order). Thereafter, the attribution explanations (who had which present) were repeated. Finally, a recognition test was administered where E pointed out all nine presents and asked: "Who got this present?".

After these memory checks the nine randomly ordered performance questions followed. The cassette-recorder was not used for the performance tests but E had for each child the random order of questions in front of her. During the actual test-session the experimenter tried to avoid non-verbal hints. She always looked at the child when asking the questions. The research assistant took notes on specially prepared answer sheets, also of some nonverbal reactions, when the child pointed out a present.* As an additional check for the research assistant the experimenter repeated the color of the little packages which the child pointed out and said 'neutrally': "The pink one" or "Number eight" (respectively, one of the other eight colors or numbers). The research assistant knew by some pretraining that a special color or number indicated a special present.

Directly after the performance task the instruction for the first awareness items (PRE) was given to the child: "You did very well. We now do something else. I want to see if you notice when I make a mistake. Can I say this is Inge's present? (E points at p_4 = present of the male doll)". All children said "no" and when asked how E had to say they replied: "The present of Hans". When asked why 'Inge's present' was wrong most children said: "Because it is not Inge's; it belongs to Hans". The same procedure was done with p_3 , but this time with a correct question: "Can I say this is Inge's present?" (...). Then E said: "We now do more of this game. But watch out: I sometimes make a mistake but not always." (as to this instruction, cf. Markman, 1979, experiment 3). After this, the ten randomly ordered awareness questions followed. The child's name and age, his or her answers to the ten awareness questions (cf. 6.1.5), the whole interview sequence with children's error detections, corrections, and explanations was tape-recorded. Additionally, the research assistant took notes of the child's verbal and some nonverbal reactions (and also of unusual occurrences

* It would have been useful to observe children's nonverbal reactions systematically but such observations were beyond the scope of the present research.

such as telephone ringing or interruptions by the kindergarten-teacher's accidental dropping-in). On the awareness protocols were columns for notes on error detections, corrections, explanations, and other comments or relevant nonverbal reactions of the children. At the end of the experiment the experimenter said: "Thank you! You did very well. Did you like this game?". Only a few children found it very difficult and said that they did not like it. In such cases the child was asked what he or she liked and the child's favorite game was played. All children got p_2 (present of the child). The children were not told that a retest was planned.

The control group (group 4) had the awareness questions before the performance test. Here, the child was first given the instruction in which the "possessors" of the presents were identified. Immediately after the identification of possessive relationships the instructions for awareness followed. The ten awareness questions were given in random order. Again, minutes were kept from the child and special occurrences. The whole interview sequence with children's error detections, corrections and explanations was tape-recorded.

After the awareness questions the child was introduced to the performance tasks: "Now, we do something else. Can you show me...?". The performance questions were administered in random order. The final sequence was the same for the children of the control group as for the children in the three experimental groups. For standardization performance and awareness questions of the first test were repeated in the second test for each child individually. In the instructions of the second test (POST) the children were asked which names they had given to the two dolls (about one third of the children knew still the names of both dolls, one third of one doll, and one third could not remember the dolls' names). Then E asked the children what they remembered (a few children still knew correctly the owners of the present; these attributions were nearly always dative constructions such as: "To me belongs this one". (Mir gehört das da.)). For most children the whole sequence (present attributions) had to be explained again. The second tests were the same as in the first tests. At the end of the experiment the child was thanked, told about his or her excellent performance, and got p_2 (present of the child).

6.2 Results of Study A

Before we turn to the results of the study on "shifting reference"

(Study A), let us explain the procedure of the analyses.

Performance tests

A first step in the analyses of the performance tests was a check of children's correct performances in the first test (PRE) and in the second test (POST). This was done for the three "experimental" groups which got the performance test prior to the awareness test (group 1, group 2, and group 3) and for the "control" group 4 which obtained the performance test after the awareness test. We analyzed both interindividual, cross-sectional correct performance of all three groups and intraindividual, longitudinal correct performance for each group.

In order to find out which items (pronouns) were more difficult than others in the different age groups we used Bart & Krus' Item Tree Analysis (1973) for determining pronoun hierarchy structures. Bivalued items (correct pronouns are scored as 1, incorrect pronouns as 0) are compared pairwise and analyzed with respect to their relationship within the item matrix. By means of identifying item pairs, a hierarchy among items (a tree-diagram) can be set up which shows "logical" relationships within the item set. The rationale of this method is described in a detailed way by Deutsch & Pechmann (1978, p. 161):

"... within a defined set of items the relations between all pairwise combinations of items are examined and tested for whether the relation can be assessed as prerequisite, equivalent, or independent. An item i is prerequisite to an item j if the number of subjects who did not solve item i but solved item j is less than or equal to a present tolerance level of error. The zero-one response pattern for an item i and an item j is viewed as a disconfirmation that item i is a prerequisite to item j . If the response pattern zero-one as well as the pattern one-zero occurs at a frequency less than or equal to that established by the tolerance level, the two items are said to be equivalent. They are independent if more subjects solve item j than would be accepted by the tolerance level and if the same holds for the number of subjects who solved item j but not item i . A tree-diagram can be used for the simultaneous representation of all the existing relations, showing the structure of the set as a whole".

Since the item response matrix for the first test of the youngest children already revealed intransitivities ("unser_{incl.}" was preceded by "ihr_{sing.}" but "ihr_{sing.}" was "logically" independent at a tolerance level of 10%), v. Leeuwes' program EDITA (Experimental Deterministic Item Tree

Analysis) (v. Leeuwe, 1974a, 1974b) was run in order to control transitivity and to yield reproducibility coefficients and correlational agreements. Because of numerous intransitivities at higher tolerance levels (cf. especially v. Leeuwe, 1974a) the radical tolerance level of 0% was chosen for the items although quite a number of branches and even independency of some items were obtained. These item trees will be presented to illustrate the results.

Presentation order effects were examined by comparing the results from experimental group 3 and control group 4, item order effects by checking whether the position of one of the pronouns within the sequence of pronouns influenced the correct performance of this pronoun (although pronouns were presented in random order we wondered whether, for instance, the pronoun "sein" was better mastered in case of prior or posterior presentation with respect to the pronoun "ihr_{sing.}"). The same procedure was applied for incorrect performances ("mistakes").

We also analyzed children's preferences for "unser" and "ihr" (which of the three "unser" pronouns was chosen first, which of the two "ihr" pronouns?), their refusals ("there is no such present" and "I don't know"-responses), and their spontaneous comments as well as some of their non-verbal reactions during the experiment.

Although all of these analyses were done comprehensively (except for the analysis of children's nonverbal reactions), we will only present those results which are of theoretical interest.

Awareness tests

All utterances and relevant nonverbal responses of the experimenter (E) and the child (S) in the awareness tests were transcribed and coded by means of a special computer program.

The experimenter and the research assistant transcribed and coded independently all interview texts. In case of different codes for one and the same text, discussions between E and the research assistant either brought uniformity or a revision of the coding scheme. The coding scheme had to be changed several times. In the final coding scheme interrater agreement was 94%. Children's error detections and corrections were not a source of trouble in the coding procedure. The printing of the text interviews was done under Unix operating system (Faculty of Mathematics and Physics Graphics group, University of Nijmegen). In order to analyze codes which concerned the context of the interview texts the RSX operating system of

the Max-Planck-Institut was used. Since Unix and RSX do not have a compatible file-structure the files had to be converted. In order to do so a third operating system was necessary (RT-11, Psychological Laboratory, University of Nijmegen). By means of a Fortran program we received print-outs of code frequencies, frequencies of code combinations, and, if necessary, texts which enriched the abstract codes. This procedure was helpful because we dealt with nearly 400 pages of transcriptions (in general there were about three pages of transcription of each child per test session) and nearly 12.000 codes (about one hundred for each child per test session) for the awareness data of "shifting reference". Frequencies of codes and code combinations were analyzed statistically (sources of reference: Siegel, 1956; Adler & Roessler, 1972; Kriz, 1978). The essential parts of the awareness data concerned the children's error detections and their error corrections.

Error detections

When E made a mistake, saying, for instance: "Can I say this is my present?" thereby pointing to the subject's present (task II "mein"/dein), the subject had several possibilities to react. He could say "yes", thus showing that he had not been aware that the wrong pronoun was used, or he could say "no", thus demonstrating that he had detected the error. In a few cases, children changed their opinion during the interview, first agreeing, then denying, or vice versa. Here, the last reaction of the child was taken as answer. The children could, of course, also say that they did not know. If in such a case E's prompts and interventions did not result in a reaction of the child which showed his ability to detect an error, the "I don't know"-answer was interpreted as an inability to detect an error. These are all instances of error detections.

Corrections (pronoun changes)

Whenever the child said "no" or if a "yes" was hesitant, E asked: "How do I have to say to it?". Here, S had basically five reaction possibilities. He could say: "I don't know" (no pronoun correction), he could give a wrong pronoun (e.g. "euer" present in task II "mein"/dein) or the pronoun which was appropriate for his own point of view as speaker ("mein" present in task II "mein"/dein), he could ignore the speaker/addressee involvement (e.g. "Paul's" present when the child's name was Paul), and he could correctly take the point of view of the experimenter ("dein" present in

task II "mein"/dein). These are - except for "I don't know" answers - all examples for error corrections (or so-called "pronoun changes").

Thus, pronoun changes are not only incorrect pronouns, names (when the child used his or her name for self-reference or E's name for addressee-reference, we speak of "name substitutions") and correct pronouns (which result from the perspective-taking in tasks II, III, and V), but also pronouns which are appropriate from the child's point of view. If, for instance, a child says "mein" present to E's correction question in task II ("mein"/dein) he denotes another "mein" than E's "mein". In such a case (denial of E's "mein" and the subject's emphasis of "mein") the same pronoun is regarded as a pronoun change since the morphophonological form is the same but not the utterance function. Non-changes are given if a child accepts E's utterance ("Yes, you can say that") and either repeats the given pronoun or does not comment on it.

Error detections and corrections did not cause coding problems. This, however, was different for "changes of reference" and "explanations". Despite several trials to find unambiguous codes for these two classes of reactions on which both E and the research assistant could agree we could not come to acceptable reaction classifications for both "changes of reference" and "explanations".

How does one code a child's reasoning like: "You said that it belongs to me and therefore it is not yours" or "You cannot say "mein" present because I sit here and it is "mein present" in task II ("mein"/dein)? Is the first example "a change of reference" (the child seems to "know" which present belongs to E) or is it an explanation (but what kind of an explanation is this then)? Does in the second example the child "know" the difference between speaker and addressee? Since he does not explicitly explain this difference (like "You have to say "dein" present but I can say "mein" present") explanations and their classifications are difficult to evaluate (cf. also Levelt et al., 1978) and to summarize. Because of such problems and because "changes of reference" and "explanations" were relatively infrequent we will only present the children's error detections and corrections.

This means that we just consider a very small amount of the actual data. However, the few data which are selected on the basis of theoretical questions cannot reflect the arduous process of transcribing 40 hours of interviews, of comparing E's 400 pages of transcription with those of the

research assistant, and of checking and re-checking nearly 12.000 codes in one study (the original data and statistical computations which cannot be presented here are available on request since they might comprise useful information for other researchers).

The relationship between performance and awareness

The main focus of this research is the investigation of the relationships (cross-sectional and longitudinal) between performance (i.e. language understanding) and linguistic awareness. Language performance has been checked by a comprehension test ("Can you show me X present?" whereby 'X' stands for different German possessive pronouns). Linguistic awareness, on the other hand, was stimulated by a mismatch of E's utterance and E's reference. In the awareness test of Study A we will consider only two different metalinguistic abilities: children's error detections and their corrections. The comparison between performance and metalinguistic abilities reveals some possible pitfalls. At least three kinds of complications are to be faced. Firstly, there are unequal chances with respect to correct answers in the two tests. Whereas in all performance tasks there were eight incorrect alternatives to the one correct alternative (except for the pronoun "unser" with a guessing probability of .33 and the pronoun "ihr" with a guessing probability of .22) there were only two incorrect response alternatives ("yes" and "I don't know") in the error detection tasks (correct are only the "no"-answers). A second difficulty concerns the task comparisons. In the performance tasks E's utterance could match the performance of the subject (e.g. E: "Can you show me "mein" present? - S shows E's present); in the awareness tasks we deal a priori with two pronouns (an "utterance" pronoun and a "reference" pronoun) which result from the mismatch between E's utterance and E's reference (e.g. E: "Can I say this is "mein" present?" thereby referring to the present of the subject for which "dein" would be the correct pronoun). The third difficulty is closely related to the second one. The awareness tasks did not cover the whole range of possible linguistic contrasts (we did, for instance, not administer an item which tests the singular/plural contrasts with respect to the addressee such as "Can I say this is "euer" present?" whereby E refers to the present of the subject - which would in retrospect have been quite interesting). In fact, there are quite a number of interesting linguistic contrasts which could be tested and analyzed, but the necessity to hold the child's attention limited the number of awareness tasks.

The within-test relations between performance and awareness

Despite of these reasons the procedure for analyzing the relationship between language performance and linguistic awareness was in the within-test relations between performance and awareness based on a comparison of identical pronouns in both performance and awareness tasks. Since we dealt with "qualitatively" different pronoun changes in the corrections (e.g. "egocentric" pronouns or name substitutions) we will only present data on the within-test relations between performance and error detections. Thus, we asked, for instance, whether correct performance of "mein" corresponded to error detections in the awareness task II ("mein"/dein).

Longitudinal relations between awareness and performance

In the analysis of the longitudinal relations between awareness and performance (i.e. between awareness in PRE and performance in POST) we decided to use a different procedure in order to check whether early awareness might be "instrumental" or "facilitative" for later performance. Here, the intraindividual comparison was based on each child's general performance and on his general abilities to detect and correct errors.

The general analysis was done as follows. We first dichotomized the performance scores in the first test (PRE) for each child, i.e. we looked whether a child's performance in PRE was above or below the average performance of his age group. For instance, the average performance of a group might have been six correct pronouns (out of nine pronouns which were tested). A child of this group who had only four pronouns correct showed "low performance". However, a child with seven correct pronouns showed "high performance". We then similarly dichotomized the error detection scores and the correction scores in PRE (the dichotomized scores were based on error detections and corrections of the six error detection tasks, I, II, III, IV, V, and VI). After having analyzed the child's relative performance and his relative metalinguistic abilities in the first test we determined his performance scores in the second test (POST).

In a final step we performed two tests (error detection and correction) for each group (and after this, for all four groups together). The first one is an analysis of difference in means of performance in POST for two groups of children: those with "high error detection" in PRE but "low performance" in PRE and those with "low error detection" in PRE and "low performance" in PRE. Before we applied the t-test we checked for equal variances of the two types of independent observations. The second test is

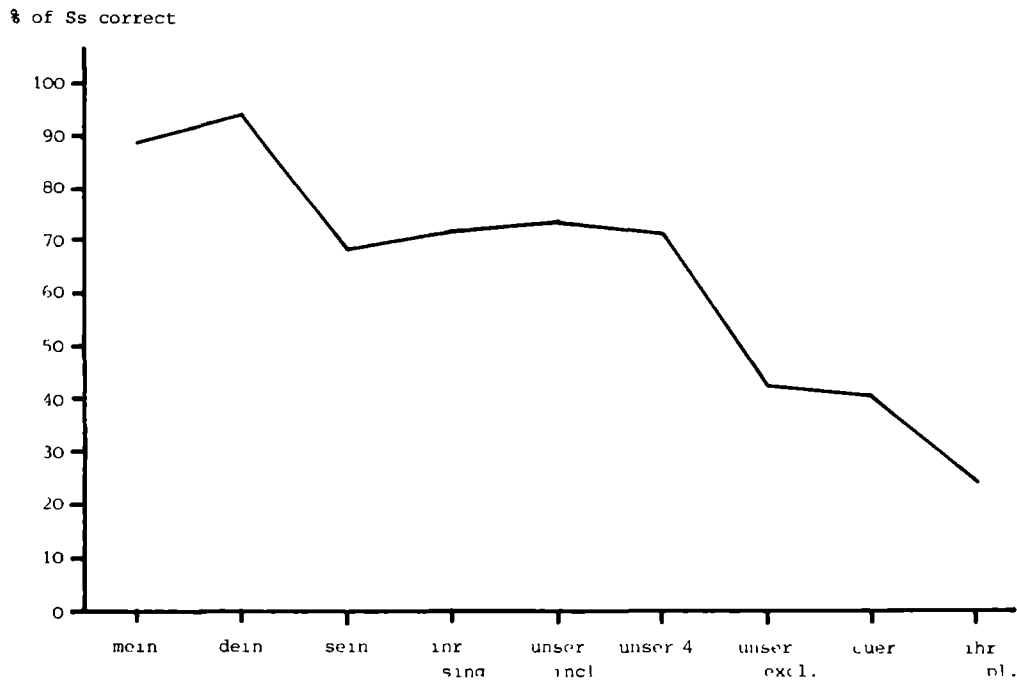
an analysis of difference in means of performance in POST from children with "high correction" in PRE but "low performance" in PRE and children with "low correction" in PRE and "low performance" in PRE. These two tests which are applied to each of the four groups, and to the four groups taken together, shall show whether early error detections and/or corrections can be predictive of later performance (and, if this is the case, at which age early awareness is most predictive). So far for the procedures of analysis to be applied to the data.

6.2.1 Performance Tests

6.2.1.1 General Results of the Performance Tests

Before we go into a detailed discussion of the results of the study on "shifting reference" we want to look at the general picture of all correct performance scores (mean values of PRE and POST for the three experimental groups and the control group), cf. Fig. 1:

Fig. 1: Average correct performance of all children at all age levels and in both tests



Three major findings are apparent from this figure:

1. Possessive pronouns for speaker and addressee are mastered first. The pronoun "dein" which refers to the present of the subject (S) is with 94% even more often correct than "mein" with 89% which refers to the present of the experimenter (E).
2. Possessive pronouns which concern just one other participant and pronouns which concern the first person plural where speaker and addressee are included (inclusive "unser") are acquired next: "sein" (69%), "ihr_{sing.}" (72%), "unser_{incl.}" (74%), and "unser₄" (71%).
3. The least number of correct responses were obtained for pronouns which relate to speaker or addressee plus a third person, and pronouns which include only third person participants: "unser_{excl.}" (42%), "euer" (41%), and "ihr_{pl.}" (25%).

Figure 1 shows generally a dominance for correct usage of singular items over plural ones, with the exception of plural items which include both speaker and addressee.

Figures 2 and 3 show the correct performance results of the three experimental groups taken together, for PRE and POST respectively.

Fig. 2: Average correct performance of children at the three age levels in PRE

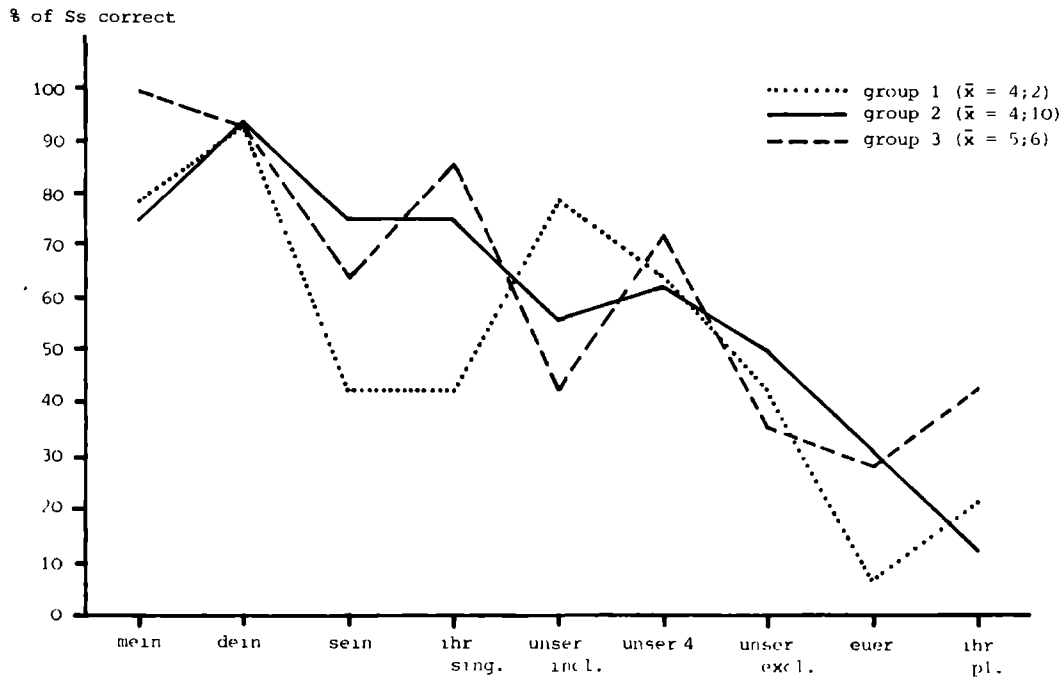


Fig. 3: Average correct performance of children at the three age levels
in POST

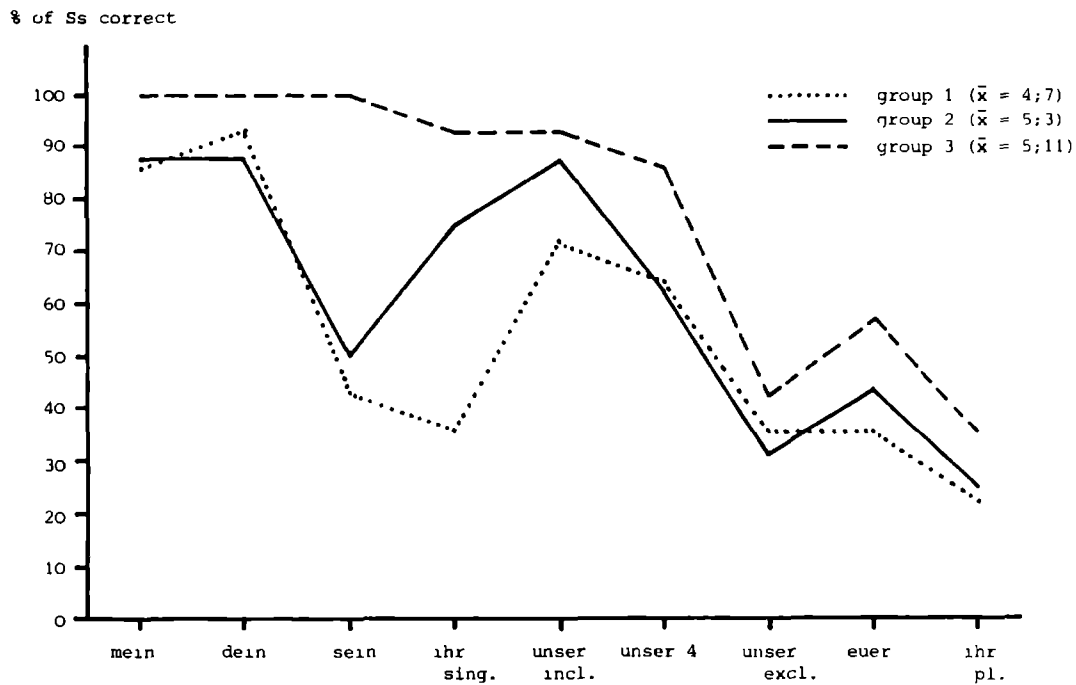


Fig. 4: Average correct performance of the youngest age group
in PRE and POST

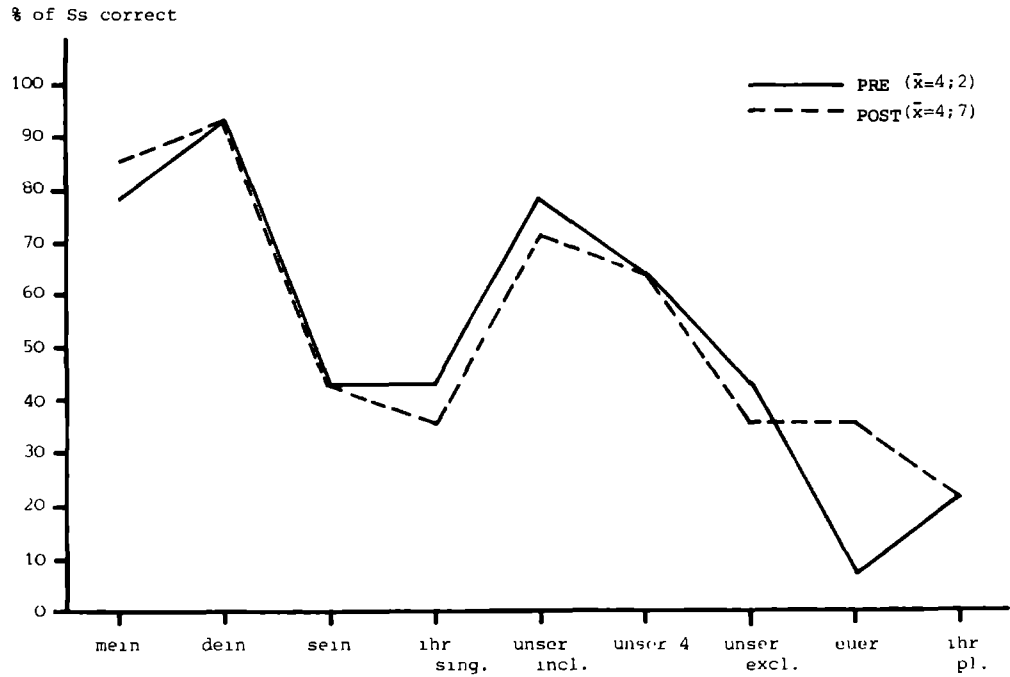


Fig. 5: Average correct performance of the middle age group
in PRE and POST

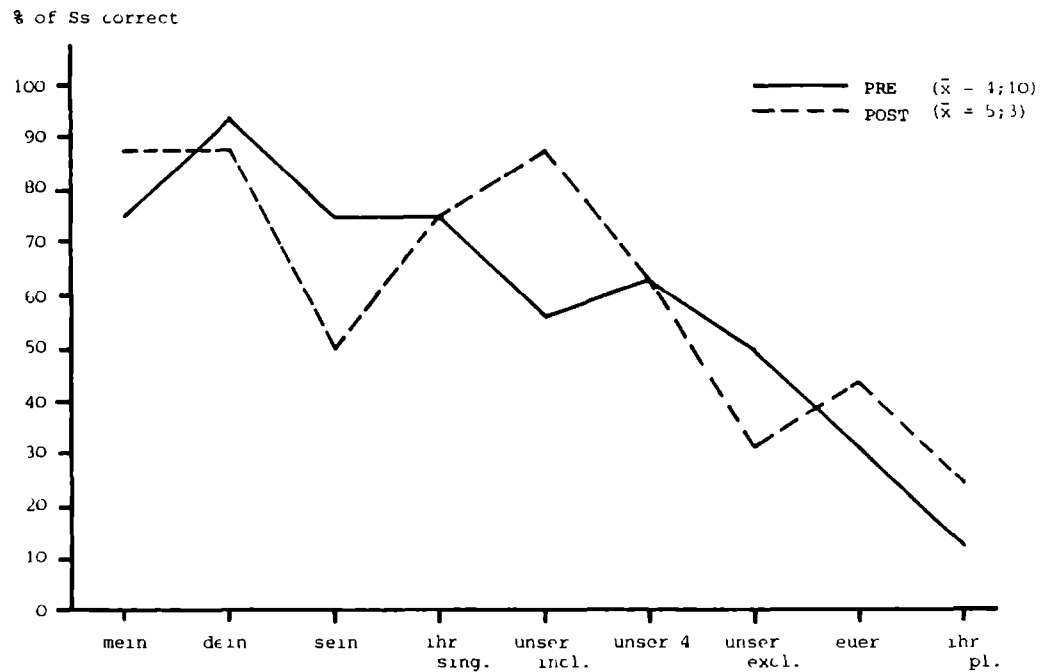


Fig. 6: Average correct performance of the oldest age group
in PRE and POST

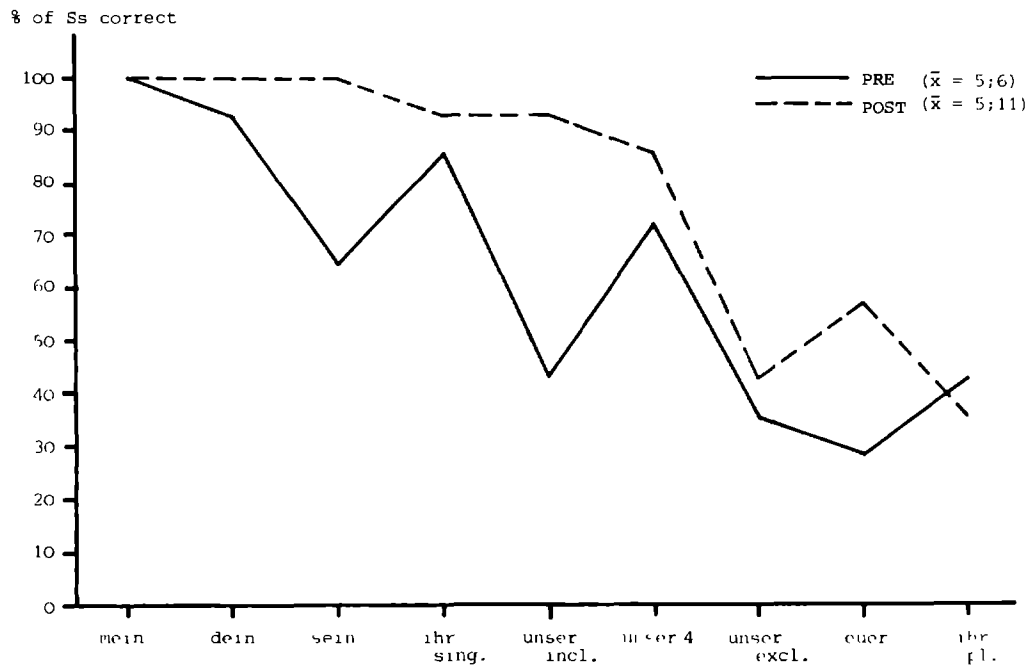
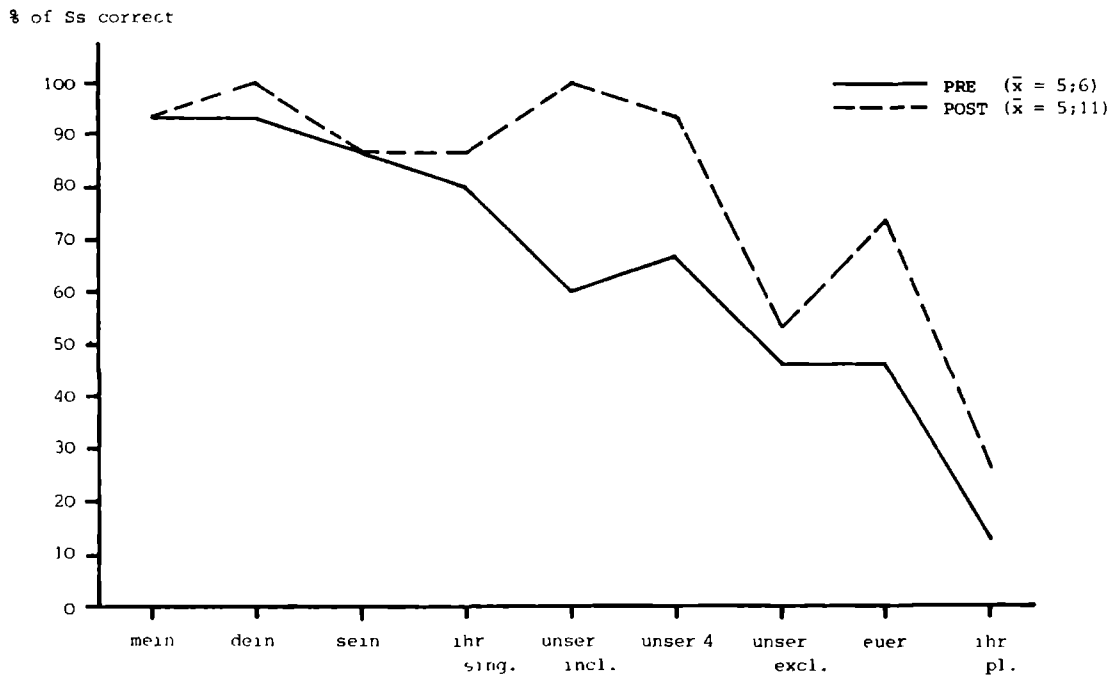


Figure 7, finally, give the performance results for the control group 4.

Fig. 7: Average correct performance of the control group in PRE and POST

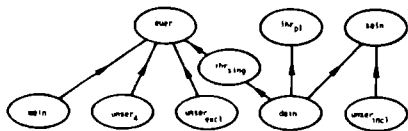


Bart & Krus's item tree analyses for correct performance

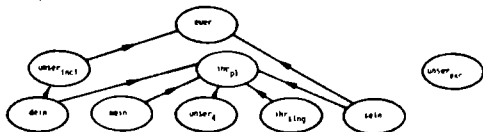
The item tree analyses for the four groups in PRE and POST give an impression of the order in the acquisition of possessive pronouns. Item trees 1 through 8 present pronoun hierarchies at a tolerance level of 0%. The notation "→" means that pronouns which are above that sign are preceded by all pronouns below that sign. "Independent pronouns" (like "unser_{excl.}" in item tree 2) are neither preceded nor related to other pronouns in the item tree.

ITEM TREES OF CORRECT PERFORMANCE

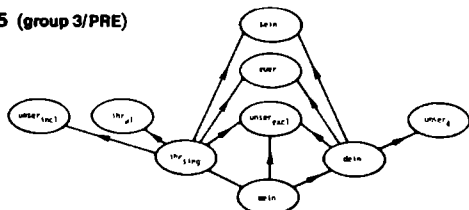
1 (group 1/PRE)



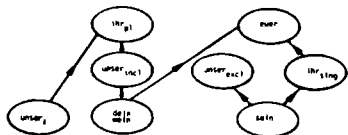
3 (group 2/PRE)



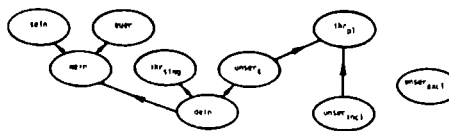
5 (group 3/PRE)



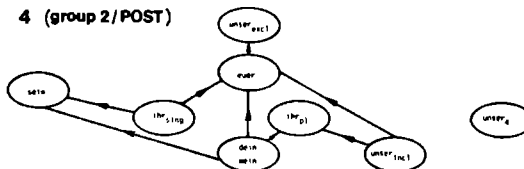
7 (group 4/PRE)



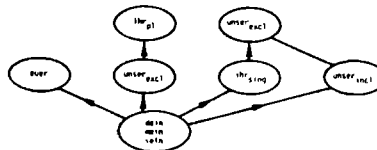
2 (group 1/POST)



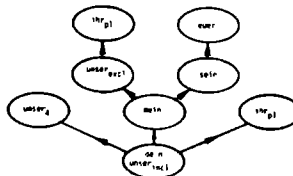
4 (group 2/POST)



6 (group 3/POST)



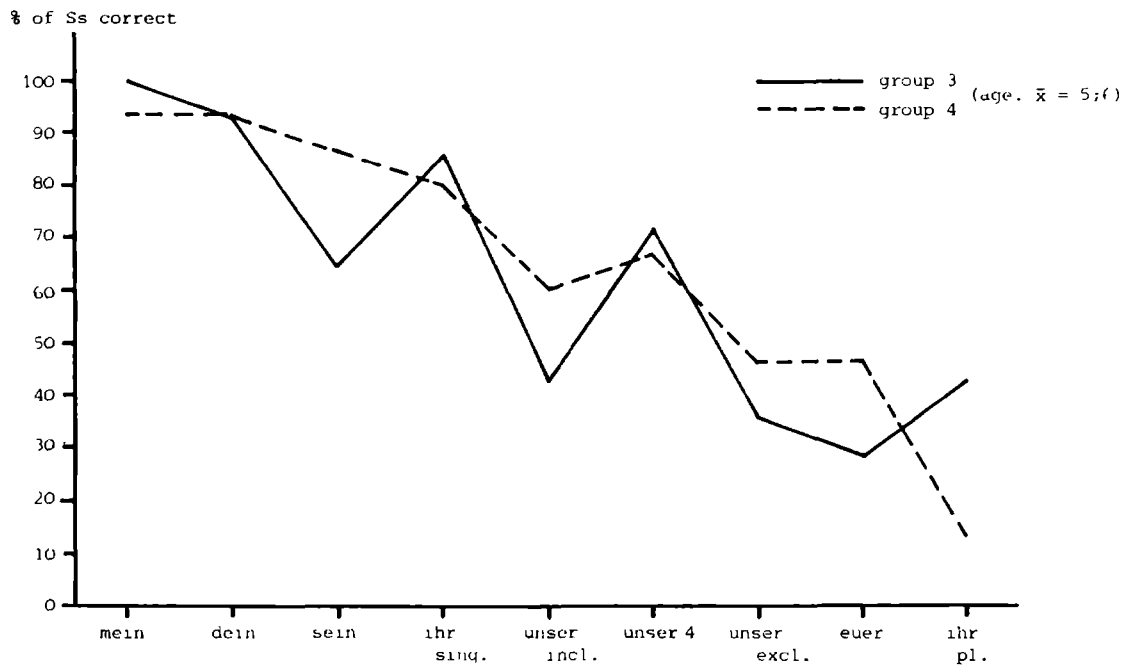
8 (group 4/POST)



Presentation order effects

In order to check whether correct performance was influenced by the order of presentation we present Figure 8, which shows the correct performances in PRE for the oldest experimental group 3 (performance before awareness), and for the control group 4 (awareness before performance) which had the same age as the children in group 3.

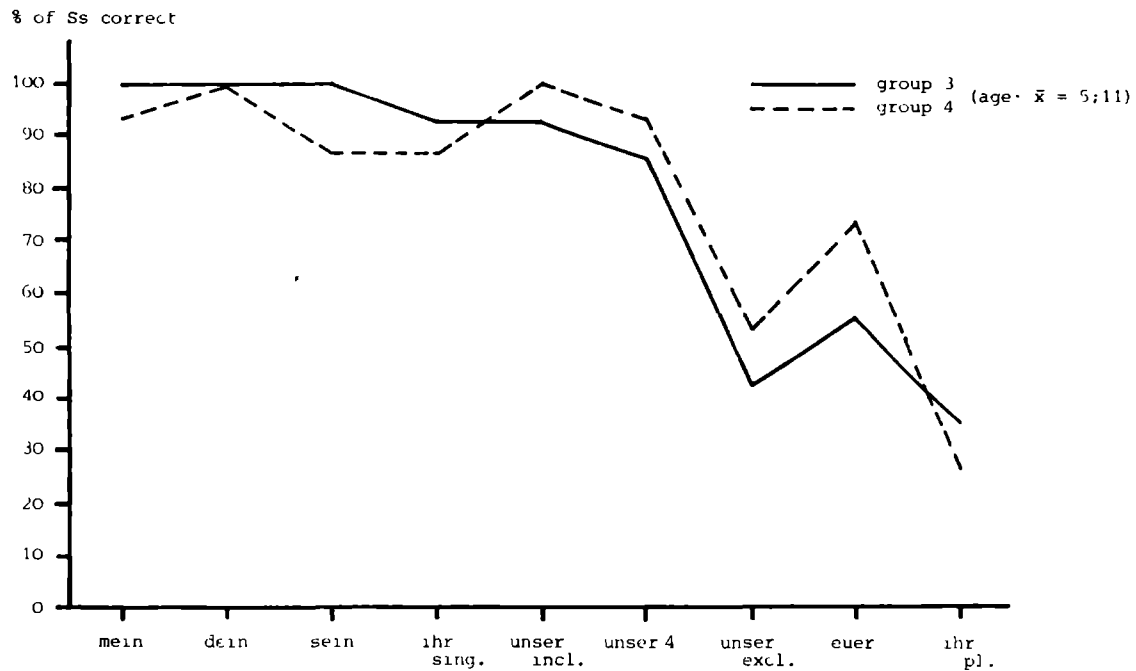
Fig. 8: Average correct performance of the oldest age group and the control group in PRE



In PRE, presentation order effects with respect to performance are not apparent because none of the differences (tested by χ^2 for two independent samples) turned out to be significant.

Figure 9 shows the comparison of correct performances for group 3 and group 4 in POST.

Fig. 9: Average correct performance of the oldest age group and the control group in POST



Although Figure 9 suggests a better performance of group 3 for singular pronouns and a worse performance for plural pronouns (except for "ihr_{pl.}") none of these differences are significant. In sum, we may conclude that the orders of presentation (performance before awareness versus awareness before performance) has no major impact on the number and type of correct responses in the performance task of "shifting reference" (and the same holds for incorrect responses).

Item order effects

The succession of possessive pronouns was randomly varied in all first tests (PRE) and in the second tests (POST) five months later, with the restriction that all SS got the same item order in POST as in PRE. Item order variation was checked for several critical items in all groups, so, for instance, for "sein" before "ihr_{sing.}", "ihr_{sing.}" before "sein". In the present experiment, we came to the conclusion that correct usage of possessive pronouns is not noticeably dependent on item order.

With respect to incorrect responses, we did not obtain any significant results for item order effects, with one exception; SS who have to master "euer" before "mein" or "dein" make significantly* more mistakes for "euer" in substituting "dein" ($\alpha = .05$) than SS who get "mein" or "dein" before "euer".

6.2.1.2 Correct Performance Scores as Related to Predictions

Section 2. (Linguistic analysis of German possessive pronouns) and section 3. (General predictions on the order of acquisition for understanding) were devoted to deriving expectations with respect to the order of acquisition of possessive pronouns. This was done from different linguistic points of view: morphophonological, syntactic, semantic, and various deictic characteristics. These different points of view, however, did not converge on a single developmental pattern, but rather conflicted in various respects. Table 10 in section 3.4 summarized the various predictions. Here, we will successively discuss the predictions for each of these points

* In fact, only frequently incorrect items could turn out to be significant. When the smallest expected frequency was smaller than five, Fisher's Exact Probability Test was applied.

of view in order to establish which one(s), if any, of these developmental patterns in fact arise in the data.

Morphophonological characteristics

According to Table 10, one would expect "euer", "mein", "dein", and "sein" to precede all the other five pronouns. Also, one would expect the two forms of "ihr" to come last.

There are at least three exceptions in the data. Firstly, "euer" comes far later than predicted (see Fig. 1). In fact, in almost all tests it does not precede but rather follows "unser_{incl.}", "unser₄", and "ihr_{sing.}". It is also less developed than "unser_{excl.}" for the youngest age group (cf. Fig. 2 and Fig. 3). But "euer" seems to "take over" again with respect to "unser_{excl.}" in the older age groups, which is apparent in the PRE to POST changes for groups 2, 3 and 4 (cf. Fig. 5, Fig. 6, and Fig. 7).

Secondly, "ihr_{sing.}" is generally earlier than predicted on morphophonological grounds. The most evident difference is that its acquisition does not generally coincide with the acquisition of "ihr_{pl.}" which is morphophonologically identical. Performance on "ihr_{sing.}" is always better than on "unser_{excl.}", "euer", and "ihr_{pl.}" (cf. also the item trees).

Thirdly, the order of acquisition of "sein" and "unser_{incl.}" is not generally as predicted. In group 1 (PRE and POST, cf. Fig. 4), in group 2 (POST, cf. Fig. 5), and in group 4 (POST, cf. Fig. 7) children performed better on "unser_{incl.}" than on "sein" (cf. also item trees 1, 2, 4 and 8).

In summary, the only pronouns clearly reflecting an order of acquisition in correspondence with the predictions are "mein" and "dein", which are early, and "ihr_{pl.}" which is generally late. However, the relatively early acquisition of "ihr_{sing.}" argues against a morphophonological explanation of the latter, and the early occurrence of "mein" and "dein" is predicted as well from other points of view (semantic, variable reference, and the proximal-nonproximal contrast). A morphophonological prediction is, therefore, definitely insufficient.

Syntactic characteristics

The predictions based on syntactic characteristics (cf. Table 10) suggest that the possessive pronouns "sein", "ihr_{sing.}", and "ihr_{pl.}" should be acquired before the ones which involve speaker and/or addressee ("mein", "dein", "unser_{incl.}", "unser_{excl.}", "unser₄", and "euer"). At least

in four cases these expectations are not met by our observations. Firstly, Table 10 shows late acquisition for "mein" and "dein". This prediction is wrong since "mein" and "dein" are hardly ever acquired later than any of the other pronouns (cf. all figures and item trees). In almost all tests, the 3rd person pronouns "sein", "ihr_{sing.}", and "ihr_{pl.}" follow "mein" and "dein".

Secondly, the prediction suggests a precedence of "sein" and "ihr_{sing.}" before "unser_{incl.}". This is not always the case (cf. Fig. 1). In some tests, "unser_{incl.}" is even acquired before "sein" and "ihr_{sing.}". So, for instance, in group 1 (PRE and POST, cf. Fig. 4), in group 2 (POST, cf. Fig. 3), and in group 4 (POST, cf. Fig. 7).

Thirdly, the expectation that "sein" and "ihr_{sing.}" are always acquired before "unser₄" cannot be confirmed (cf. Fig. 1). In group 1 (PRE and POST, cf. Fig. 4) and in group 4 (cf. Fig. 7) "unser₄" even precedes "sein" and "ihr_{sing.}" in group 2 (POST, cf. Fig. 3) and in group 3 (PRE, cf. Fig. 2) "unser₄" is better than "sein" (although not better than "ihr_{sing.}").

Fourthly, the relatively early acquisition of "ihr_{pl.}", as predicted on syntactic grounds, has to be rejected with respect to our data. Although it does, in fact, follow "sein" and "ihr_{sing.}" it does generally not follow the other six pronouns, with two exceptions: in group 1 (PRE, cf. Fig. 4) "euer" is worse, and in group 3 (PRE, cf. Fig. 6) "euer" and "unser_{excl.}" are worse than the plural 3rd person pronoun "ihr_{pl.}".

In summary, except for the late acquisition of "unser_{excl.}" and "euer" and the precedence of the singular 3rd person pronouns "sein" and "ihr_{sing.}" before the plural 3rd person pronoun "ihr_{pl.}", none of the predictions based on syntactic characteristics can be fully confirmed. The confirmed predictions can, moreover, be due to other than syntactic factors (cf. the semantic, and the proximal-nonproximal contrast predictions). In short, a syntactic explanation is not attractive, since incorrect predictions are often made and correct predictions can also be explained by other prognoses.

Semantic characteristics

Table 10 shows us that on semantic grounds "mein", "dein" and "unser_{incl.}" are to be expected early, and "ihr_{sing.}", "euer", and "ihr_{pl.}" comparatively late. The predictions of the SFH (Semantic Feature Hypothesis) are rather specific and precise which allows for a finer check-up with respect to our observations.

Although at first glance predictions based on semantic characteristics

seem to be generally valid, one major and three minor exceptions can be observed. The clearest exception concerns the prediction that "unser_{excl.}" should be acquired before "ihr_{sing.}", "euer", and "ihr_{pl.}". "Ihr_{sing.}" is in all older groups earlier than "unser_{excl.}" (cf. group 2 in Fig. 5, group 3 in Fig. 6, and group 4 in Fig. 7). The pronoun "euer" is in some tests ahead of "unser_{excl.}" (cf. group 2/POST in Fig. 5, group 3/PRE in Fig. 6, and group 4/POST in Fig. 7). "Ihr_{pl.}" is in one test better than "unser_{excl.}" (group 3/PRE cf. Fig. 2).

Three other exceptions are less salient. Firstly, according to the SFH "mein" should precede all other pronouns. There is only one clear exception to this prediction: "dein" is better than "mein" in younger subjects and the control group (cf. group 1 in Fig. 4, cf. group 2/PRE in Fig. 5, and group 4/POST in Fig. 7). Secondly, "dein" and "unser_{incl.}" are expected to come before "sein" and "ihr_{sing.}". However, group 2 (PRE, cf. Fig. 5), group 3 (PRE and POST, cf. Fig. 6), and group 4 (PRE, cf. Fig. 7) show that the singular 3rd person pronouns are earlier than "unser_{incl.}". Thirdly, the order of acquisition of "sein" and "ihr_{sing.}" is not generally as predicted. In group 2 (POST, cf. Fig. 5) and in group 3 (PRE, cf. Fig. 6) "sein" is later acquired than "ihr_{sing.}" (cf. also item trees 4 and 5).

In summary, the predictions which are based on semantic characteristics are generally in correspondence with our data. The pronouns "mein", "dein", and "unser_{incl.}" are, in fact, early acquired, 3rd person singular pronouns follow, and "euer" and "ihr_{pl.}" are late. There is only one major restriction: "euer" is generally later than predicted on semantic grounds. A semantic prediction (as provided by our version of the SFH) has, therefore, considerable predictive power, although it is not completely sufficient.

Deictic characteristics (variable reference)

In Table 10, the expectations based on deictic characteristics (variable reference) indicate that "dein" should be first and the singular and plural 3rd person pronouns "sein", "ihr_{sing.}" and "ihr_{pl.}" last. The pronoun "dein" should be followed by "unser_{incl.}", "unser_{incl.}" by "euer", "euer" by "mein", "mein" by "unser_{excl.}", and "unser_{excl.}" by the three 3rd person pronouns.

There are at least four exceptions to this in the data. Firstly, "dein" is not always as predicted prior to all other pronouns. In group 3 (PRE, cf. Fig. 6) "mein" seems to "take over" "dein". Secondly, "unser_{incl.}"

should, according to Table 10, precede all other pronouns, except for "dein". This is in general not the case for "mein", "sein", and "ihr_{sing.}": "unser_{incl.}" is worse than "mein" in group 1 (POST, cf. Fig. 4), in group 2 (PRE, cf. Fig. 5), in group 3 (cf. Fig. 6), and in group 4 (PRE, cf. Fig. 7). "Unser_{incl.}" is also later acquired than "sein" in group 2 (PRE, cf. Fig. 5), in group 3 (cf. Fig. 6), and in group 4 (cf. Fig. 7), and than "ihr_{sing.}" in group 2 (PRE, cf. Fig. 5), group 3 (PRE, cf. Fig. 6), and in group 4 (PRE, cf. Fig. 7). Thirdly, as to the "variable reference" predictions, "euer" should come before all other pronouns, except for "dein" and "unser_{incl.}". This expectation is apparently false. In all tests, "mein", "sein", and "unser₄" precede "euer" (cf. all figures and item trees). In general, "ihr_{sing.}" is earlier than "euer" - with the exception of one test where these two pronouns are equally well mastered (cf. Fig. 4, Fig. 5, Fig. 6, and Fig. 7). Also, in group 2 (PRE, cf. Fig. 5) and in group 3 (PRE, cf. Fig. 6) "unser_{excl.}" precedes "euer". Fourthly, the predictions suggest that "unser_{excl.}" comes before "sein" and "ihr_{sing.}". The data show the opposite relationship for group 2 (cf. Fig. 5), for group 3 (cf. Fig. 6), and for group 4 (cf. Fig. 7). The hypothesis that the sex-identical pronoun (i.e. "ihr_{sing.}" by girls, "sein" by boys) should be acquired first, cannot be decided on the basis of our data but does not seem to be fully valid since we have a balanced subject pool in group 3 (cf. 6.1.1) which exhibited a better performance for "ihr_{sing.}" in PRE but for "sein" in POST (cf. Fig. 6).

In summary, although "dein" and "unser_{incl.}" are early acquired and "ihr_{pl.}" late we had a number of objections with respect to the acceptance of the predictions based on variable reference. The correct predictions are also held by explanations from other points of view (semantic and the proximal-nonproximal contrast). A "variable reference" prediction is, therefore, not very convincing for the acquisition of possessive pronouns; the "good parts" are, moreover, equally well explained by other theoretical factors.

Deictic characteristics (shifting reference)

According to Table 10, the expectation is that "unser_{incl.}" precedes all other pronouns, and that "unser_{excl.}" follows all other items. Inbetween one would expect to find first the 3rd person pronouns ("sein", "ihr_{sing.}", and "ihr_{pl.}"), thereafter "dein", then "euer", and finally "mein".

Our data argue against these assumptions in at least five cases. Firstly, "unser_{incl.}" which should be ahead of all other pronouns is generally preceded by "mein" and "dein" (cf. Fig. 1; group 1, cf. Fig. 4; group 2/PRE, cf. Fig. 5; group 3, cf. Fig. 6; group 4/PRE, cf. Fig. 7). Secondly, one would expect that the 3rd person pronouns "sein", "ihr_{sing.}" and "ihr_{pl.}" are prior to "dein" and "mein". This is, however, never the case (cf. group 1 in Fig. 4; cf. group 2 in Fig. 5; cf. group 3 in Fig. 6; cf. group 4 in Fig. 7). Thirdly, "euer" is expected to come before "mein" and "unser_{excl.}". The pronoun "mein" is apparently clearly earlier acquired than "euer" (cf. all figures and item trees). "Unser_{excl.}" does in our data not always follow "euer" (cf. group 1, group 2, and group 3 in Fig. 2; and group 1/POST in Fig. 4, also group 4/PRE in Fig. 7). Fourthly, "ihr_{pl.}" is never, as predicted, earlier than "mein" and "dein". It is also not always prior to "euer" and "unser_{excl.}", i.e. "euer" is better than "ihr_{pl.}" in group 2/PRE (cf. Fig. 5), in group 4/PRE (cf. Fig. 7), and in all POST-tests (cf. Fig. 3, and Fig. 7), and "unser_{excl.}" is generally better than "ihr_{pl.}" (except for group 3/PRE, cf. Fig. 6). Fifthly, Table 10 suggests that the understanding of "dein" should be better than the understanding of "mein". This prediction does not hold for older children (group 2/POST, cf. Fig. 5; group 3, cf. Fig. 6, and group 4/PRE, cf. Fig. 7).

In summary, none of the pronouns in our tests reflects clearly the orders of acquisition in correspondence with the predictions derived by the "shifting reference" factor. It is, thus, reasonable to conclude that "shifting reference" characteristics are definitely "out" as an explanation for the automatic acquisition of possessive pronouns.

Deictic characteristics (proximal-nonproximal contrast)

The last prediction for the order of acquisition is based on the proximal-nonproximal contrast (cf. Table 10). Here, it is assumed that "dein" comes first, then "unser_{incl.}", "mein", "euer", "unser_{excl.}", and finally the 3rd person pronouns "sein", "ihr_{sing.}", and "ihr_{pl.}".

Although the early acquisition of "dein", "unser_{incl.}", and "mein" and the late acquisition of "ihr_{pl.}" seem to conform to the predictions, we found four exceptions. Firstly, a minor exception is that "dein" is not always - as predicted - prior to all other pronouns (cf. group 3/PRE in Fig. 6 where "mein" precedes "dein"). Secondly, another minor exception is that "unser_{incl.}" is - in contrast to the expectation - hardly ever earlier

acquired than "mein" (only in group 4/POST, cf. Fig. 7). Thirdly, and somewhat more severely, "euer" does not - as expected - always come before "unser_{excl.}" (cf. group 1, group 2, and group 3 in Fig. 2; and group 1/POST in Fig. 4, as well as group 4/PRE in Fig. 7). Fourthly, and most severely, the prediction for the singular 3rd person pronouns "sein" and "ihr_{sing.}" is in most cases wrong. Although "sein" and "ihr_{sing.}" do, in fact, precede "ihr_{pl.}" and follow "dein" and "mein", they never follow "euer" (cf. all figures). The pronouns "sein" and "ihr_{sing.}" do also not always follow "unser_{incl.}" (cf. group 2/PRE in Fig. 5; cf. group 3 in Fig. 6; and cf. group 4/PRE in Fig. 7) and "unser_{excl.}" (cf. all figures).

In summary, despite some correct predictions for the early pronouns "dein", "unser_{incl.}", and "mein" and for the late pronoun "ihr_{pl.}" we had some disconfirmations in our data, of which the late acquisition for "sein" and "ihr_{sing.}" is most prominent. The correct predictions are, in part, also given by the SFH. But, predictions based on the proximal-nonproximal contrast contain - despite of their insufficiencies - some explanative potential with respect to the immediate speaker/addressee dyad and more distant persons.

6.2.1.3 Incorrect Performance as Related to the Semantic Feature Hypothesis (SFH)

Out of the six predictions for correct pronoun performance (cf. Table 10), only the Semantic Feature Hypothesis makes specific hypotheses on children's mistakes (cf. the second ontogenetic principle in 3.2). But before we consider the SFH-predictions let us first look at the data.

A list of the most frequent mistakes out of all incorrect responses ("typical mistakes") over all age groups in both tests is given in Table 19.

Table 19: Typical Mistakes from all Performance Tests

test items	"mein"		"dein"	"sein"			"ihr"				"unser"			"euer"
absolute frequencies of all mistakes	14		6	37			94				91			69
"typical mistakes"	unser _{excl.}	unser _{incl.}	euer	dein	euer	sein	dein	unser ₄	unser _{excl.}	euer	mein	ihr _{pl.}	dein	unser ₄
percentages of "typical mistakes" out of all mistakes	50%	29%	50%	41%	19%	16%	15%	14%	12%	26%	25%	23%	45%	19%

Since the children had more possibilities to make mistakes when asked for "unser" and "ihr" (three questions for "unser", two questions for "ihr") we received higher absolute frequencies of all mistakes for these two pronouns. The fact that "ihr" was more often incorrectly identified than "unser" can be explained by the chance for a wrong "ihr"-answer: $p = .78$ (the chance for a wrong "unser"-answer is $p = .67$).

Binomial tests revealed four significant mistakes which are relevant to the second ontogenetic principle of the SFH:

1. Group 1 in the first test frequently interpreted "unser" as mein. This occurred significantly more often than any other mistaken interpretation for "unser" ($p = .013$).
2. Group 1 interpreted in PRE and group 2 in POST the pronoun "sein" as dein. The chance for dein is $1/8$, and in both groups it was picked out five times out of eight mistakes. When this mistake is compared with all other mistakes which were made we get a significant difference ($p = .0012$).
3. In the first test of group 3 "sein" was not only interpreted as dein but also as euer. In comparison with all other mistakes this latter mistake (euer for "sein") occurred significantly more frequent ($p = .015$).
4. The most frequent incorrect interpretation of "euer" was dein. Significant differences for this mistake in comparison to all other mistakes were found in group 1/POST ($p = .016$), in group 2/PRE ($p = 1/7 \times 10^6$), in group 2/POST ($p = .016$), and in group 3/PRE ($p = .005$).

Some further relevant findings are:

5. In one case there is a significant cross-sectional decrease (i.e. over the age groups) in PRE in number of mistakes, namely for "euer". Initially it is often interpreted as dein, but this misinterpretation is less in older children ($\chi^2 = 6.44$, $df = 2$, $p < .05$).
6. If, as one would expect on the basis of the SFH, the child makes "typical mistakes" rather than "random" ones, one would expect children who make mistakes on the same pronoun in both PRE and POST to have a tendency of making the same mistake in both cases. There is, however, no indication whatsoever in the data to support this.
7. Another finding concerns the two singular gender items "ihr_{sing.}" and "sein". It could be expected that children who cannot yet differentiate between the two sexes would either point out any other present (for instance, euer) or would mix up the two pronouns for the two dolls (for

- instance, "sein" for the female doll and "ihr" for the male doll). The error analysis meets this expectation only partially. It is true that the most frequent mistake for "ihr" is sein (cf. Table 19) but the opposite has not been observed (only one ihr-substitution for "sein").
8. Finally, there is a relevant finding in the mistakes for "sein" and "ihr_{sing.}". It appears from the pattern of results that mistakes of the interpretation of these pronouns is not due to the absence of the "gender" feature. It hardly ever happens that children who make mistakes for these pronouns, but who interpret them as referring to either themselves or the experimenter, refer to the interlocutor of the wrong sex (36 cases of "correct sex" mistakes versus 3 of "wrong sex" mistakes).

When we compare these results with the predictions derived from the second ontogenetic principle (cf. Diagram 1) we can see that the mein-interpretation for "unser" (1), the dein-interpretation for "sein" (2), and the euer-interpretation for "dein" (4) are correctly hypothesized. As to the euer-interpretation for "sein" (3) we observed that "euer" has been taken for dein, and that this is an indirect confirmation of the SFH. The fact that "ihr" is frequently misinterpreted as sein, but "sein" not as ihr (7) is a further support for the semantic predictions. It is also interesting to see that the "gender" feature of "sein" and "ihr_{sing.}" is apparently correctly "transferred" to the preceding pronouns "mein" and "dein" (8). This is another indirect confirmation for the SFH.

The less frequent misinterpretation dein for "euer" in older children is due to the fact that older subjects make generally less errors with "euer" (5). The observation that there is no tendency to make the same mistake in PRE and POST for a given pronoun (6) has not been predicted by SFH but can be explained by a possible acquisition of feature parts during the time between the two tests. If, for instance, a child mistook unser_{incl.} for "euer" in PRE he might have noticed after the first test that unser implies the speaker. He, therefore, could have chosen sein for "euer" in the second test. Thus, our data do not imply a direct disconfirmation of the second ontogenetic principle of the SFH.

6.2.1.4 Conclusions with Respect to Performance Tests as Related to Predictions

In 6.2.1.2 we discussed various predictions with respect to our data. We saw that none of the six different points of view (morphophonological

characteristics, syntactic characteristics, semantic characteristics, "variable reference" characteristics, "shifting reference" characteristics, and "proximal-nonproximal contrast" characteristics) suffice for a full explanation of the results in "shifting reference". Some of the predictions are probably not very powerful. These are those which are based on morpho-phonological characteristics, syntactic characteristics, "variable reference" characteristics, and "shifting reference" characteristics. Two predictions are, however, most likely relevant: the SFH-predictions and the predictions which are based on the "proximal-nonproximal contrast" (see also section 3.5). We should note here that these confirmations are related to our version of the SFH (including the complexity ordering, i.e. on the basis of our markedness analysis of German possessive pronouns) and to our version of the "proximal-nonproximal contrast". Thus, a combination of semantic and deictic (proximal) features might come close with respect to a powerful prediction for pronoun acquisition. However, some unexplained issues (such as the relative stability for "unser_{excl.}", the conflict between "unser_{incl.}" and singular 3rd person pronouns, and the gender attribution to the interlocutors) remain which require a careful further analysis, since apparently other factors are involved as well in children's pronoun acquisition.

6.2.1.5 Other Influential Factors in the Performance Tests

At this point, we felt the necessity to thoroughly inspect all data again, in order to find out what potential further factors might have been at work in children's performances, and whether any alternative interpretations would suggest themselves. It turned out that there are at least four factors which are not or insufficiently accounted for by the different predictions, but which appear to be relevant for a full understanding of the children's behavior in these tasks.

The first factor is the concentration on the dyad of the interlocutors. This can be supported by two observations (one on correct performance and one on mistakes). Firstly, the singular pronouns of the speaker/addressee dyad ("dein" and "mein") occur early (cf. Fig. 4) and are generally better mastered by all children than other pronouns (cf. Fig. 1). Moreover, the plural pronoun "unser_{incl.}" which comprises both speaker and addressee occurs also relatively early (cf. Fig. 4). The possessive pronoun "dein" is more frequently correct than "mein" in our tests, with the exception of the oldest children of group 3 in PRE (cf. Fig. 2) and the ones in group 2

and group 3 in POST (cf. Fig. 3) who understand "mein" either better than "dein" or equally well. The results of the younger children on these two pronouns can be explained by the nature of the tasks: we investigated the child's comprehension, not his production. The early precedence of "dein" over "mein" (cf. Fig. 4 and Fig. 5) which is neither supported by the SFH (predictions of the SFH are the same for production and comprehension) nor by the predictions based on the proximal-nonproximal contrast (there the pronoun "dein" should precede all other pronouns in all age groups, not only in the youngest age groups) agrees with findings of a recently published study with English-speaking children from 1;6 to 2;6 by Charney (1980) (cf. also Sharpless, 1974). The results of Charney's study on the acquisition of personal pronouns indicated that children were "initially aware of speech roles, but only when they themselves occupied those roles" (Charney, 1980, p. 509). The frequently correct responses of "dein" and "mein" and the relatively good performance of "user_{incl.}" can be interpreted as a confirmation of an "economy principle": performance is best for those pronouns which must be learned in dialogue and which cannot be easily substituted by names or other referring expressions (e.g. the plural 'speaker pronoun' "user_{excl.}" can be replaced by the decomposed form "mein and X"). Secondly, the analysis of mistakes reveals that many mistakes refer to members of the speaker/addressee dyad (cf. Table 19 in 6.2.1.3). The frequency of interlocutor substitutions can be only partially explained by the second ontogenetic principle of the SFH (cf. Diagram 1 in 3.2). For instance, according to this principle, the pronoun "ihr" should be interpreted either as sein (this holds for an incorrect interpretation of either "ihr_{sing.}" or "ihr_{pl.}") or as euer (for "ihr_{pl.}"). However, we observed a nearly equal number of dein-substitutions (15% of "typical mistakes") as of sein-substitutions (16% of "typical mistakes", cf. Table 19) for "ihr". The concentration on the dyad of the interlocutors in the mistakes for "sein" and "ihr_{sing.}" has been also observed by other researchers (cf. Baron & Kaiser, 1975; Volbers, 1978).

The second factor is the preservation of the "gender" feature in the mistakes for 3rd person pronouns (cf. 6.2.1.3, relevant finding 8.). This preservation of the "gender" feature in the incorrect interpretation of "sein" and "ihr" as dein or mein is not predicted by the second ontogenetic principle of the SFH (cf. 3.2). Although children showed uncertainty with respect to the pronoun identifications for the two dolls during E's prompts for "sein" and "ihr" (children looked alternately at the dolls and near-

ly one third asked: "which one do you mean?"), natural gender is not the most prevalent problem in 3rd person pronouns. (The preservation of the "gender" feature in the mistakes of 3rd person dative pronouns is also discussed in Volbers, 1978, p. 129; and the comparably early mastery of the gender distinction in 3rd person pronouns also in Scholes, 1981). Moreover, we also observed in the pre-experimental phase that natural gender attributions for the dolls were not a source of trouble because names of the male and the female doll were correct (cf. 6.1.6). We thus assume that the natural gender problem in (possessive) pronouns is a linguistic one (and not a cognitive one).

The third factor is the "developmental focussing". Between four and five years there seems to arise a conflict in the acquisition between pronouns which relate to a 3rd person participant and plural pronouns; for the five year olds it is resolved in favour of the better performance for pronouns which relate to a 3rd person (cf. Figs. 2 and 3). This can be seen in the development of the pronoun "sein" which is not marked by a steady amelioration. In the first cross-sectional comparison (PRE) group 3 (\bar{X} = 5;6 years) performs worse than group 2 (\bar{X} = 4;10) (cf. Fig. 2). In the second cross-sectional comparison (POST) there is a clear improvement for group 3 with respect to group 2 (cf. Fig. 3). The deterioration of group 2 from PRE to POST for "sein" (cf. Fig. 5) coincides with an intraindividual improvement for "unser_{incl.}" in this age group. We also found that the youngest children in PRE perform much (though not yet significantly) better on "unser_{incl.}" than the oldest children (cf. Fig. 2), i.e. the developmental order in the first test is reversed. Correct performance of "unser_{incl.}" of the youngest children in PRE is a precursor of understanding "sein" correctly (cf. item tree 1 in Bart & Krus's 'item tree analyses'). However, for the oldest children in POST correct performance of "sein" is a precursor of understanding "unser_{incl.}" correctly (cf. item tree 6). It might be that these two items are prototypical for a conflict between 3rd person and plural pronouns in four- and five year olds. Although one could argue from an inspection of Figures 2 and 3 that "ihr_{sing.}", which is also a 3rd person pronoun, is not in such a conflict with "unser_{incl.}" as "sein" in the cross-sectional comparison, the longitudinal, intraindividual analyses revealed mixed types of development (deteriorations and improvements) from PRE to POST, despite general improvements for the groups. This holds especially for group 2. Thus, it is likely that children between four and

five years "work" simultaneously on pronouns for a 3rd person and on plural pronouns.

The fourth factor is the inclusion of nonverbal communication in pronoun acquisition. The comparatively poor overall performance for "unser_{excl.}"* (cf. Fig. 1, Fig. 2, and Fig. 3) can be interpreted as an experimental artifact (cf. also the independency of this item in the item trees 2 and 3). In a "natural" communication situation the speaker would look at the person who is included in the "unser_{excl.}" pronoun and would thus give an additional nonverbal clue. In the experiment E only looked at S (cf. 6.1.6). This explanation could also hold for some of the incorrect interlocutor-identifications for singular 3rd person pronouns. The experimenter's eye-contact with the child might be the reason for the developmental precedence of the two inclusive "unser" pronouns before the exclusive "unser" pronoun (in the analysis of children's preferences for "unser", i.e. of the first accurate "unser" identification with respect to the three "unser" possibilities, the order is as follows: "unser_{incl.}", "unser₄", and "unser_{excl.}").

6.2.1.6 Summary of the Results of the Performance Tests

Children's acquisition of possessive pronouns is most likely influenced by a combination of semantic and deictic (proximal) features. The predictions of the Semantic Feature Hypothesis (SFH) and those which are based on the "proximal-nonproximal contrast" are clearly more powerful than those based on morphophonological, syntactic, "variable reference", and "shifting reference" characteristics. Still, at least four other factors are involved in pronoun acquisition: the child's concentration on the dyad of the interlocutors, his preservation of the "gender" feature, his "developmental focussing", and his inclusion of nonverbal clues. The child's dyadic concentration can be explained by the need for unambiguous reference and is probably rooted in our culture in early mother-child dialogues where

* In a control study with 15 adults (one third psycholinguists) the same experimental set-up and procedure as with the children was used. To our surprise we found only 40% correct answers (with fast repairs or short hesitations with less than one minute) when E asked which other present E could call "unser", thus intending "unser_{excl.}".

speech roles are learned first. His preservation of the "gender" feature is probably due to an early distinction of male and female persons. The "developmental focussing" shows children's conflict in the acquisition of pronouns which relate to a 3rd person participant and plural pronouns where a 3rd person is involved. It might be that they "work" on this problem because of the necessity to go beyond the dyadic communication situation. Children's dependency on nonverbal communication in pronoun acquisition stresses the importance of nonverbal factors in language development.

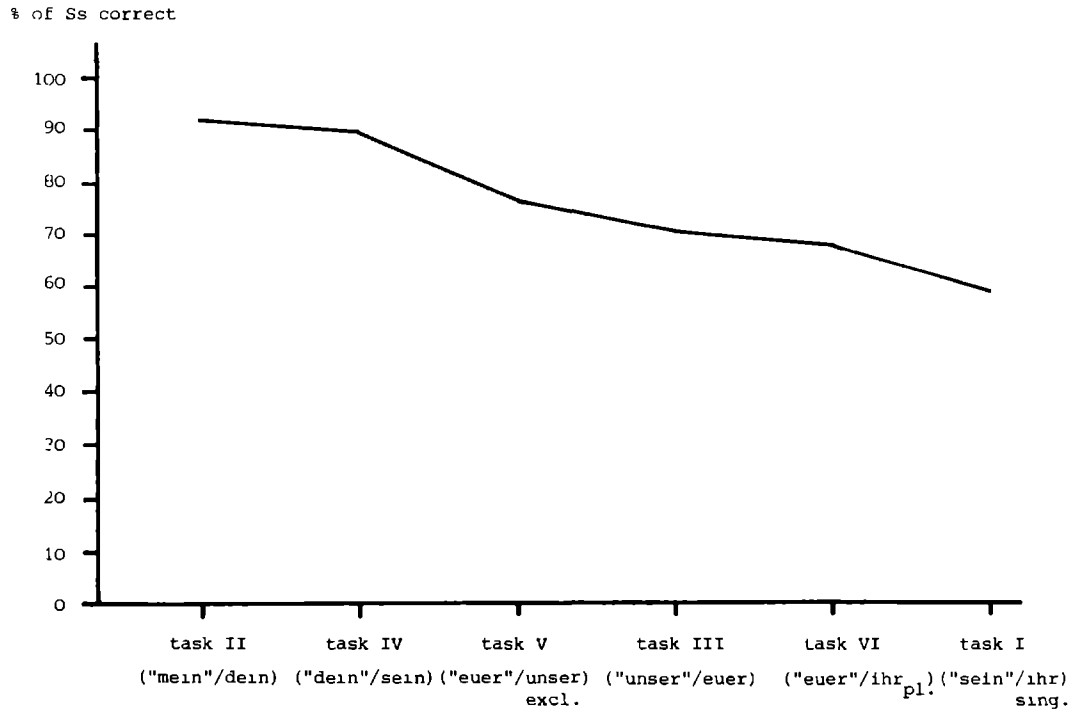
6.2.2 Awareness Tests

6.2.2.1 General Results of the Awareness Tests

Error detections

Before we relate our awareness results to our theoretical questions let us first present the general picture of all correct error detection scores (mean values of PRE and POST for the three experimental groups and the control group), cf. Fig. 10:

Fig. 10: Average correct error detections of all children at all age levels in PRE and POST



Three major findings are apparent from this figure:

1. Awareness tasks in which the addressee is involved (but not together with another person) are mastered best. The "mein"/dein error detection (task II) was excellent (92%). Nearly equally good is the "dein"/sein error detection (task IV) with 90%.
2. Awareness tasks in which the addressee and another person are involved are mastered next: task V ("euer"/unser_{exc}.) with 77%, task III ("unser"/euer) with 71%, and task VI ("euer"/ihr_{pl}.) with 68%.
3. The least number of error detections (59%) are observed for task I ("sein"/ihr_{sing}.) in which the child had to distinguish natural gender in singular 3rd person pronouns.

Figure 10 shows generally a dominance of awareness tasks in which only the addressee is involved (task II and task IV). As to the other four error detection tasks, we can see that errors in plural pronoun contrasts in which the addressee is involved (task V, task III, and task VI) are better detected than singular pronoun contrasts in which another person is involved (task I).

We now want to look at correct error detections in PRE and POST of the four groups separately (comments on the following figures will follow in later sections).

Figures 11 and 12 show the error detection results for the three experimental groups taken together, and for PRE and POST respectively.

Fig. 11: Average correct error detections of children at the three age levels in PRE

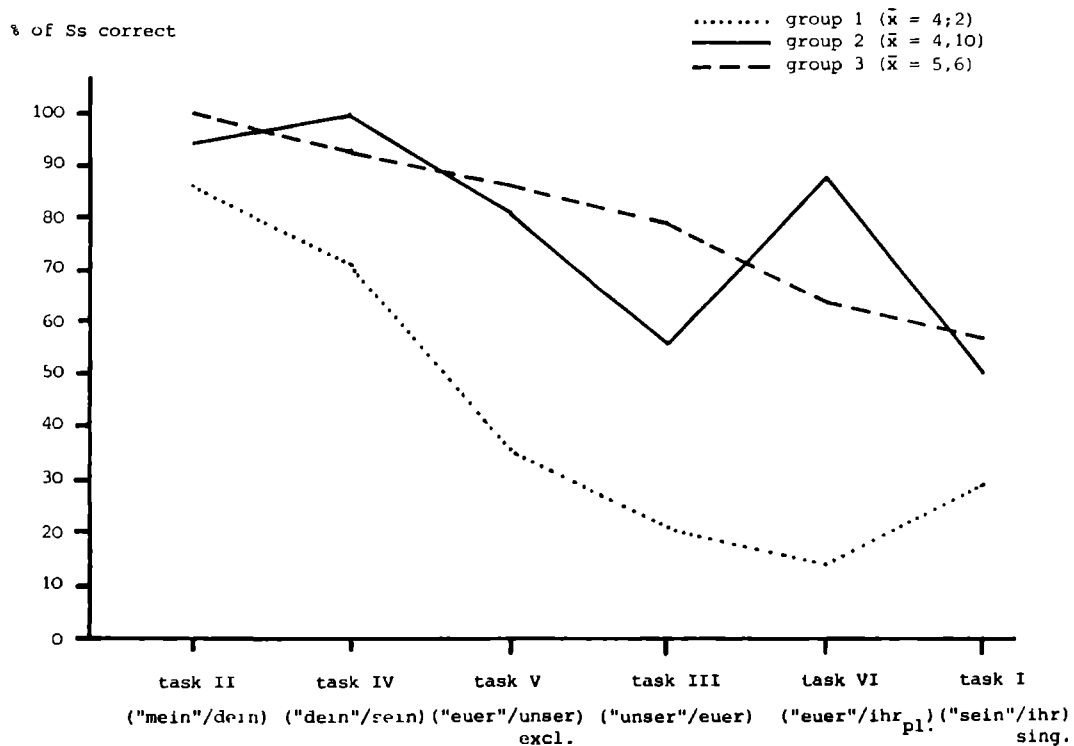


Fig. 12: Average correct error detections of children at the three age levels in Post

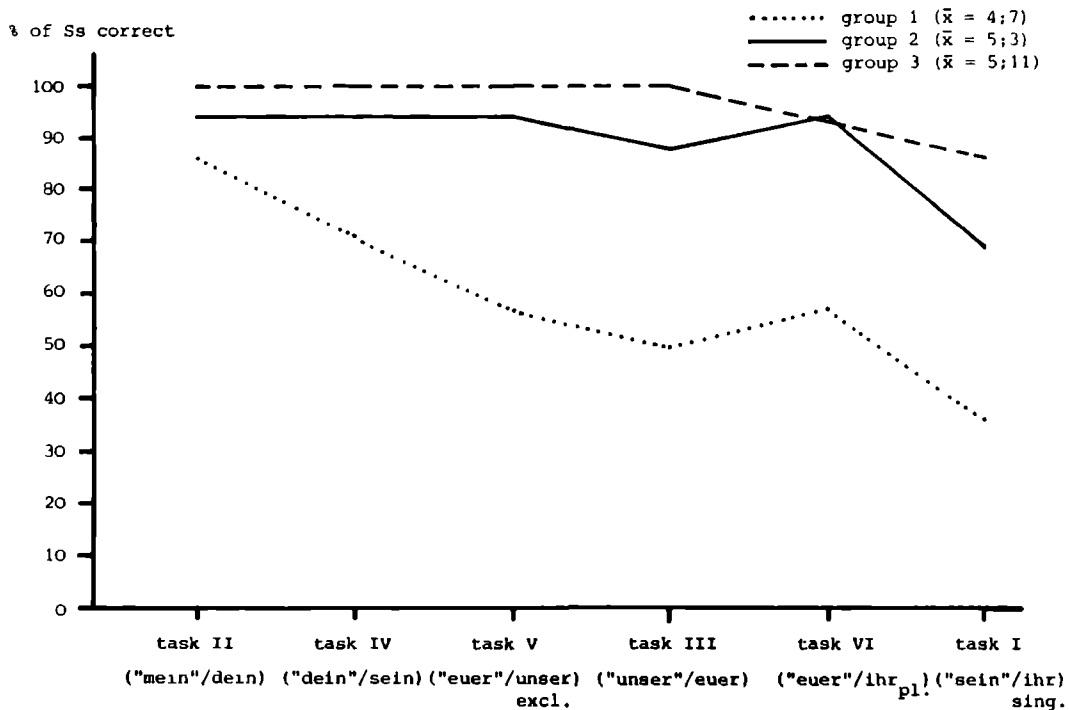


Fig. 13: Average correct error detections of the youngest age group in PRE and POST

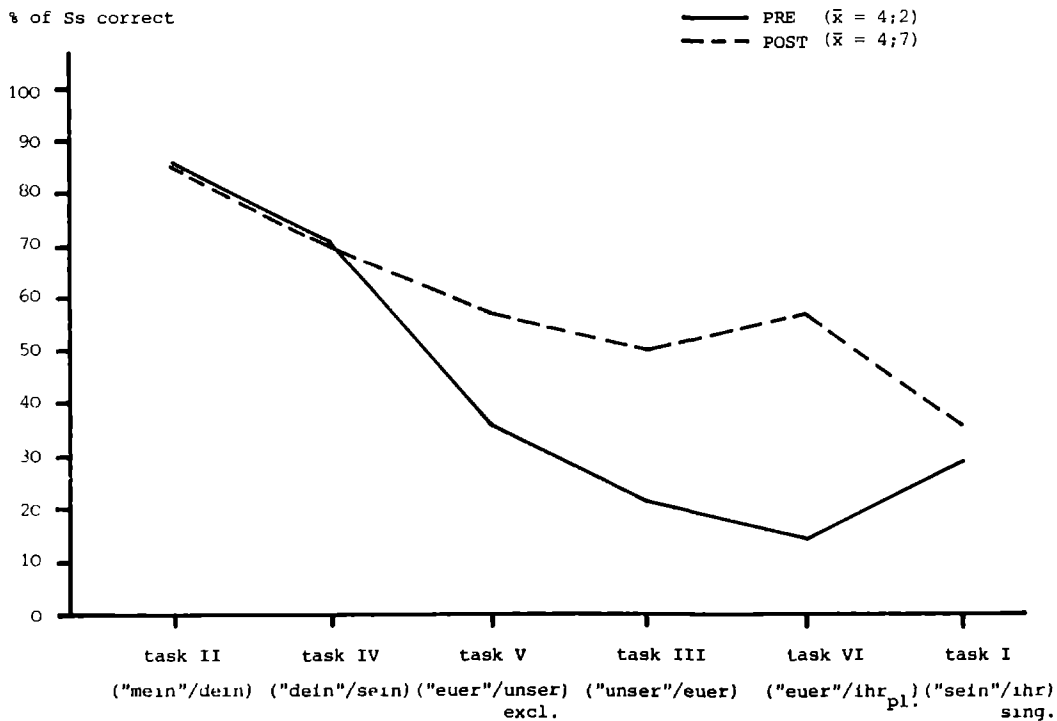


Fig. 14: Average correct error detections of the middle age group
in PRE and POST

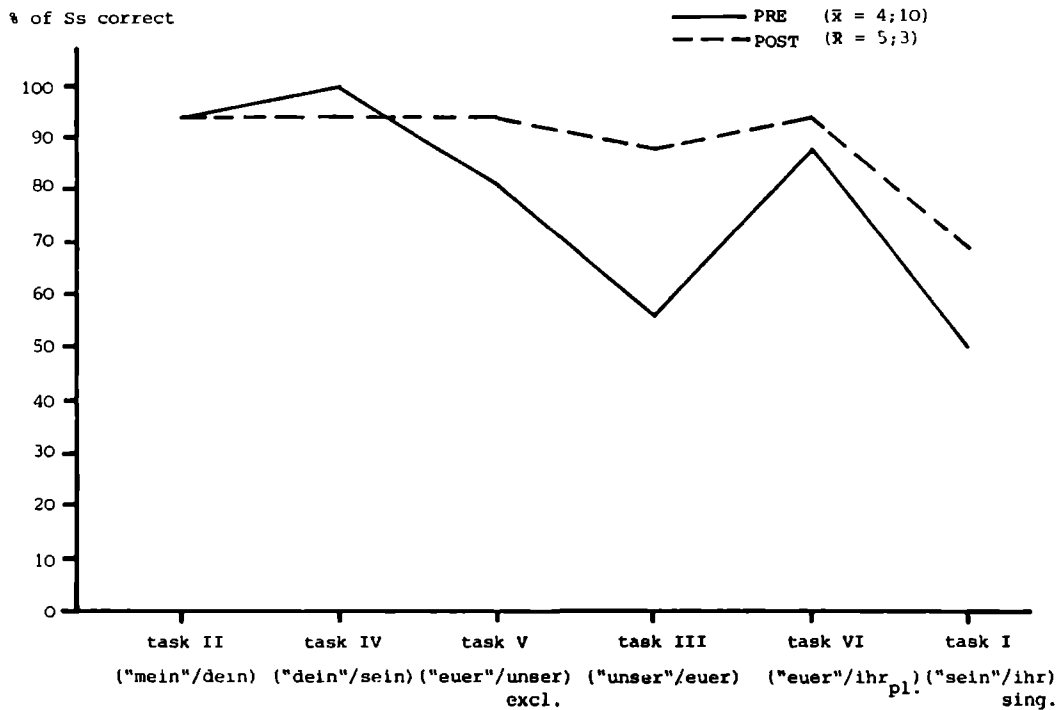


Fig. 15: Average correct error detections of the oldest age group
in PRE and POST

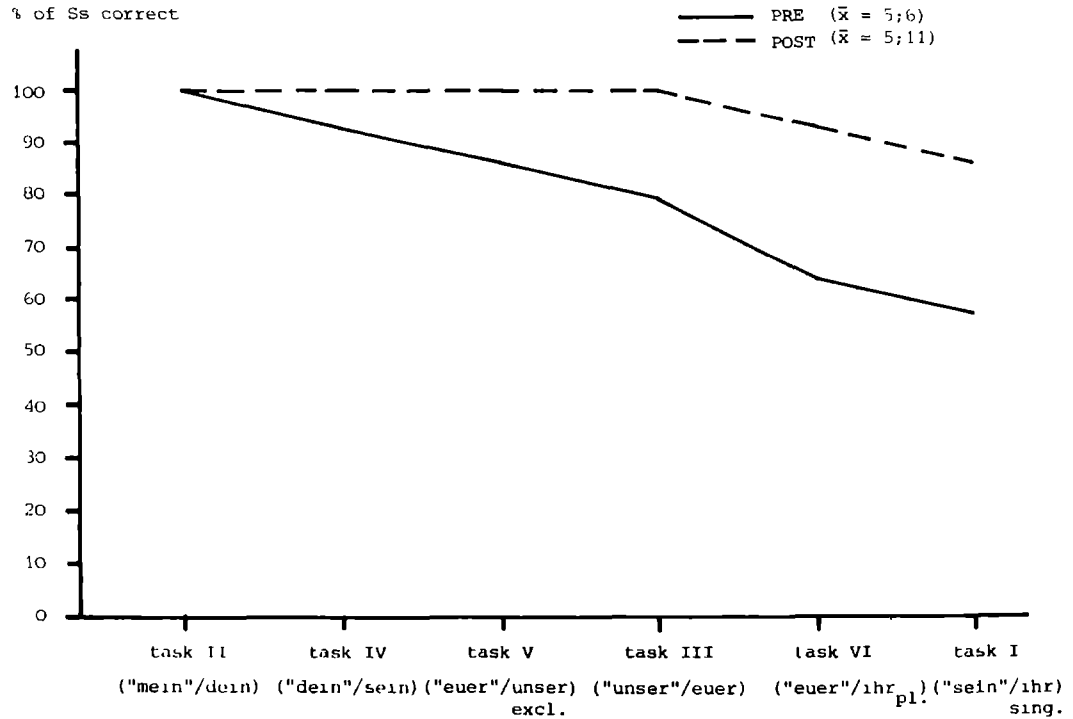
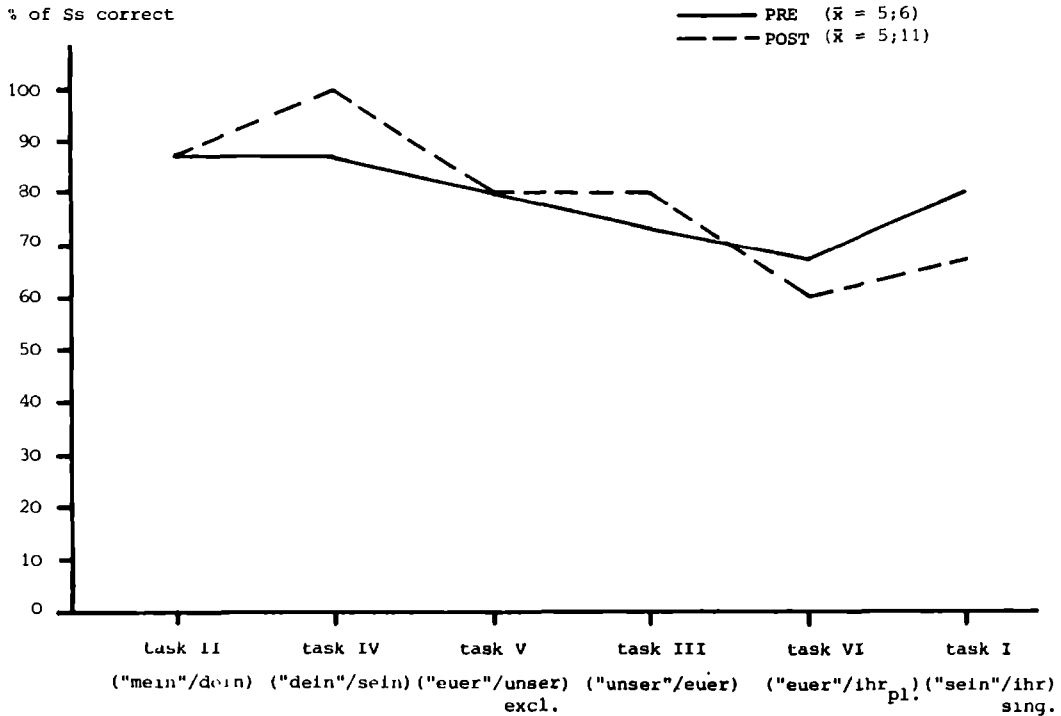


Fig. 16: Average correct error detections of the control group
in PRE and POST



Error corrections

If we disregard different kinds of error correction (e.g. "names", substitutions, cf. 6.2) we observe nearly as many corrections (= pronoun changes) as error detections. In general, we found that Ss who can detect an error do also give some kind of possessive pronoun correction (*mutatis mutandis*: Ss who cannot detect an error do not change the given possessive pronoun). Thus, presentation of figures seems to be redundant. This result is not surprising in view of task requirements. There are, however, slightly more subjects who can detect an error and who do not give a possessive pronoun correction than Ss who do correct but cannot detect.

In order to illustrate qualitatively different pronoun changes at different ages to the same question three excerpts of the transcriptions* will be given. All three are examples of PRE which show pronoun changes in task III ("unser"/euer).

Task III ("unser"/euer)

S7 in group 1/PRE; 4;4; female

V1: "Kann ich sagen, das ist unser
Geschenk?"
(Verweis auf p 8**)

Vp: "Das ist meiner."

V1: "Das ist...ist...ist
mein.***Hmhm. Wieso ist denn
das dein Geschenk?"

Vp: "Weil ich das wollte."

V1: "Weil du das wolltest. Und dann
kann ich jetzt nicht sagen,
das ist unser Geschenk?"

E: "Can I say, this is our
present?"
(Reference to p 8)

S: "This is mine." (the child
uses here a wrong morpho-
phonological form for the
possessive indicating that
the present is masc. The
present (das Geschenk) is
in German of neuter gender)

E: "This is...is...is mine.
(E corrects S). Hum. Why is
this your present?"

S: "Because I wanted this."

E: "Because you wanted this.
And it is now not possible
for me to say, this is our
present?"

*The English translations are often not quite to the point since some utterances cannot be translated literally.

** Protocols of nonverbal comments were taken by the research assistant whenever they were relevant. They have been added in the transcriptions.

*** Actually, E's comment here is somewhat confusing but seemed "natural" in the interview situation. However, such confusing answers were infrequent.

Vp: "M'm" (Kopfschütteln der Vp)
(...)

S: "No." (S shakes her head)
(continuation of
dialogue)

Task III ("unser"/euer)

S 33 in group 2/PRE; 5;0; female

V1: "Kann ich sagen, das ist unser
Geschenk?"
(Verweis auf p 8)

E: "Can I say, this is our
present?"
(Reference to p 8)

Vp: "Nein"

S: "No"

V1: "Nein?"

E: "No?"

Vp zeigt auf männliche Puppe und
auf sich.

S points at the male doll
and herself.

V1: "Kann ich da nicht sagen, das
ist unser Geschenk?"

E: "I cannot say, this is
our present?"

Vp: "Nein, das ist von uns beiden.
Peter und ich".

S: "No, it is from the two
of us. Peter and I."

V1: "Peter und ..."

E: "Peter and ..."

Vp unterbricht V1: "Peter und
Regine. Ich sag das nämlich,
weil mein Bruder so heißt."

S interrupts E: "Peter and
Regine. I say that
because my brother is
so called."

V1: "Du Regine, ehm - wie muß
ich denn zu dem Geschenk
sagen, das ist ...?"

E: "Listen Regine, hum -
how do I have to say
for this present, this
is ...?"

Vp: "Unsres."

S: "Ours."

V1: "Unsres?"

E: "Ours?"

Vp: "Peter und Regine."

S: "Peter and Regine."

V1: "Peters und Regines muß ich
sagen. Hmhm .. Kann ich auch
sagen, das ist euer Geschenk?"

E: "I have to say Peter's
and Regine's. Humhum ..
Can I also say, this is
your (pl.) present?"

Vp: "Ja."

S: "Yes."

Vl: "Das kann ich auch sagen."
(...)

E: "I can say this, too."
(...)

Task III ("unser"/euer)

S 43 in group 3/PRE; 5;8; female

Vl: "Kann ich sagen, das ist unser
Geschenk, das rosa?"
(Verweis auf p 8)

E: "Can I say, this is our
present, the pink one?"
(Reference to p 8)

Vp zeigt auf p 9 (= unser₄)

S points at p 9 (= our₄)

Vl: "Und das hier?"
(Verweis auf p 8)

E: "And this here?"
(Reference to p 8)

Vp: "Ist von ... hmm ..."
(zeigt auf sich und männliche
Puppe)

S: "Is from ... hm ..."
(points at herself and
male doll)

Vl: "Also, das ist von ... ?"

E: "So, this is from ...?"

Vp: "Von Frank und ...?"

S: "From Frank and ...?"

Vl: "Dir das Geschenk. Wie kann
ich noch zu dem Geschenk
sagen, das ist ...?"

E: "From you the present.
How else can I say for
this present, this is
...?"

- Sehr lange Pause -

- Long Silence -

Vl: "Wie würdest du zu dem Geschenk
sagen, das ist ...?"

E: "How would you say for
this present, this is
...?"

Vp: "Von uns zwei das Geschenk."

S: "From us two the pres-
ent."

Vl: "Ja, das hab ich aber gesagt:
das ist von uns das Geschenk.
Das ist unser Geschenk, hab ich
gesagt. Kann ich das sagen?"

E: "Yes, that's what I just
said: This is the present
from us. This is our
present, I said. Can I
say this?"

Vp: "Das ist ja nicht von uns beiden
(Verweis auf Vp and V1), sondern
von uns beiden." (Verweis auf Vp
und männliche Puppe)

S: "Well, this is not from
us two (reference to S
and E), but from us two."
(Reference to S and male
doll)

V1: "Ach so, wie muß ich da sagen,
bei dem rosa Geschenk?"

E: "Oh! I see. How do I
have to say, for this
pink present?"

Vp: "Das ist euer Geschenk."

S: "This is your (pl.)
present."

V1: "Prima, ganz, ganz prima."
(...)

E: "Good, very, very good."
(...)

These three examples show us three different kinds of reactions to the same question. The youngest child in group 1 yields the incorrect pronoun "meiner" (mine) which shows an exclusion of another person (the male doll). The girl in group 2 "substitutes" names (Peter and Regine) for the pronoun "unsres" which is inappropriate from her point of view. The oldest child in group 3 is the only one of the three girls who takes the perspective of the experimenter. Interestingly, we discovered age-dependent strategies in children's pronoun corrections which we will discuss with respect to theoretical considerations in 6.2.2.3.

Our texts revealed not only "name substitutions" (cf. 6.2) but also other kinds of substitutions. Table 20 lists six categories of substitutions. These are:

1. Name substitutions: Here, only proper names were counted (e.g. "Karin und Regine"), also in genitive cases (e.g. "Regines"/Regine's) or as possessive attributes (e.g. "von Regine"; für Regine/of; for Regine).
2. Dative possessive pronoun relationships: Here, only possessive pronoun relationships (e.g. "von uns"/of us) which substituted the possessive pronouns (for "unser"/our) were counted.
3. "Decomposed" pronouns: "Decomposed" forms imply only pronouns, such as "my and your" instead of "our".
4. Grammatically "dubious" pronouns: An extra category was found because some grammatically "dubious" forms, such as "Thomas sein Geschenk"

(Thomas his present) occurred frequently (although the combination of a proper name plus a pronoun can be often heard in dialects or in colloquial conversations, Standard High German allows only for the pronoun or for the proper name).

5. Word innovations: Only recurring cases of innovation were counted in order to distinguish them from mere speech errors.
6. Rest category: Here we list substitutions such as colours (of the present), numbers (of the present), "negations" (like: "not his"), and substitutions which did not imply possessive pronouns, but which are reference markers (e.g. demonstratives).

(Note that Table 20 does not comprise: changes to the correct pronoun, such as "dein" in task II, incorrect pronoun changes, such as "dein" instead of "ihr", which are either due to "linguistic errors" or memory problems, and "egocentric" pronouns which are only correct from the child's perspective but not from E's perspective, such as "mein" in task II.)

Tab 20 Substitutions in all "shifting reference" awareness tasks (N in PRE = 59 + N in POST = 59)

tasks	names	possessive pronoun relationships	substitutions			
			"decomposed" pronouns	grammatically "dubious" pronouns	word innovations	rest category
I utterance "sein" reference ihr sing	27	"von ihr"(2x)		"ihres G "(5x) "sie G "(1x) "x sein G "(2x) "die sein G "(1x) "von sie das G "(1x) "sie sein G "(1x) "sie dein G "(1x)	"umhänzlich"(1x)	"die Frau G "(2x) colour(1x) "nicht seins"(1x) "von die"(1x) "die G "(1x)
II utterance "mein" reference dein	7	"von mir"(11x) für mich(1x) von dir"(1x)		"ihres G "(2x) "meiner G "(1x) "du G "(1x)	"meinde"(1x)	number(2x) "nicht meins"(1x)
III utterance "unser" reference euer	6	"von uns beiden"(1x) von uns(1x) "von uns zusammen"(1x)	"von dir und ihm"(1x)	seins und mir seins"(1x) von Junge und mich"(1x) von x und mich"(1x) "uns zwei das G "(1x)	dien"(1x) "eueres (1x)	"nicht dein G "(1x) number(1x) "von die zwei"(1x)
IV utterance "dein" reference sein	47	"von ihm (7x)		"x sein G "(13x) "ihm G "(1x) "von ihm G "(1x) "von dem seins G "(1x)	"se - je"(1x)	"von dem"(5x) "dem Jungen G "(3x) nicht meins"(2x) der G "(2x) "von x"(1x)
V utterance "euer" reference unser excl	3	"von euch beiden (3x) "von euch"(1x) "von euch zwei"(1x)	"ihr und dein (1x)	"ihres G "(1x) "meins und x seins"(1x) "von x und dich"(1x) "eueres G "(1x)	eueres"(1x)	colour(3x) "von den Frau"(2x) number(1x)
VI utterance "euer" reference ihr pl	46		"sein und ihr (2x) "von ihm und von ihr (1x)	"x sein und x sein G "(1x) "ihres G "(1x) "er und sie G "(1x)	"sie - mal"(1x)	"von den/die beiden"(8x) "von dem und von der"(2x) "von die und von die"(2x) "von den x ei Puppen"(2x) "die beiden G "(1x) rest(5x)*
VII utterance "dein" reference dein		"von mir"(1x)				
VIII utterance "unser" reference unser excl	1		"von dir und ihr"(1x)	"von sie und dir"(1x) "ihr seins und x s"(1x)		number(1x) "von beiden"(1x) "deins und die"(1x) "von die und von dir"(1x)
IX utterance "mein" reference uns r incl	1	"von uns beiden"(17x) "von uns zwei"(1x) "von uns alle beide"(1x) "für uns beide"(1x) "für uns zwei"(1x)	"von dir und mir"(7x)	"uns beides G "(2x) unser beides G "(2x)		number(1x) "eine Hälfte"(1x) "alle beide"(1x)
X utterance "euer" reference unser d		"von uns allen"(14x) "von uns allen vieren"(12x) "von uns allen vier(en)"(5x) "für uns zusammen"(1x)	"mein und dein"(4x)	"wir vier G (1x) "unseres G "(1x) "unsere vier G "(1x) "unser vier das G "(1x) uns vier G "(1x)		"von allen"(5x) "von allen vieren"(2x) "unser vierer G "(1x) "von allen zusammen"(1x) "für die ganzen vier"(1x)

*rest VI (rest category) of grammatically "dubious" forms of the other rest variations of task VI

G = Geschlecht (present)
x = Name

Table 20 indicates that most "name substitutions" were found when reference was made to the dolls. The fact that task I embodies comparatively less names (27) than task IV (47) can be explained by the difference of task requirements: in task I pronouns for the two dolls had to be distinguished, in task IV the child had to delimit himself from the male doll.

We also discovered some name substitutions in the three error detection tasks II, III, and V which required a speaker/addressee shift. As for dative possessive pronoun relationships, most of these were observed for the two "ambiguous" tasks IX and X. All of these possessive attributions are specifications which particularize the number of participants. In task II ("mein"/dein) eleven Ss evaded the difficult speaker/addressee shift ("dein" would be appropriate) and substitute instead of "mein" (which is only correct from the child's perspective) the attribution "von mir" (of me).

Most "decomposed" pronouns occur for task IV ("mein"/unser_{incl.}). Out of the six tasks where "decomposed" pronouns were possible (III, V, VI, VII, IX and X), this is the only task where "decomposed" pronouns are more appropriate than names plus pronouns or names only (speakers and addressees do not refer to themselves by names).

The most frequent use of a grammatically "dubious" pronoun was "X' sein Geschenk" (X' his present) in task IV ("dein"/sein). Thirteen children used the combination of a proper name plus the correct gender pronoun "sein". Five Ss did not say "ihr Geschenk" (her present) in task I but "ihres Geschenk" (herses present) thus showing that they did not discriminate between possessive pronouns in an attributive function and pronouns in a predicative function (which have an additional morpheme). A few children did not master the difference between possessive and personal pronouns (e.g. "sie Geschenk" (she present) or "du Geschenk" (you present)), others produced dative pronouns (e.g. "ihm Geschenk" (him present)), and one child gave a plural possessive pronoun ("unsere ^{*}vier Geschenke") which has to go hand in hand with a plural noun.

Except for the strange word innovation "ummenazich" of a three-year old girl, all given word innovations show morphophonological similarities

* A translation is impossible because the plural possessive pronouns are not marked in English (Engl.: "our"/"our", German: "unsere"/"unsere").

to the supposedly intended pronouns. "Meinde" could be a contamination of "mein" and "dein". Children's struggle in finding the correct pronoun is theoretically interesting and will be discussed in 6.2.2.3 where we will also present transcripts of such word struggle.

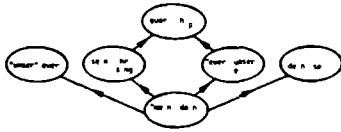
As to the rest category, we must differentiate between colour nominations (e.g. "the orange present"), number nominations (e.g. "number three"), x-by-default strategies ("not x"), changes of the definite article (e.g. "der Geschenk" for the present of the male doll; note that in German "Geschenk" is of neuter gender ("das Geschenk"), "der Geschenk" is an incorrect male gender attribution). So far for a general overview of qualitative pronoun changes in our data (theoretically interesting observations will be taken up in 6.2.2.3).

Bart & Krus's item tree analyses for correct error detections

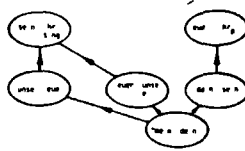
The item tree analyses of correct error detections for the four groups in PRE and POST reflect orderings in children's mastery of the six error detection tasks. Item trees 9, 10, 11, 12, 13, 14, 15, and 16 show hierarchies of error detection tasks at a tolerance level of 0%. Here again, error detection tasks which are above the notation "->" are preceded by all other error detection tasks below that sign. The "independent" error detection task (i.e. task V "uer"/user_{excl.} in item tree 12) is neither preceded nor related to other error detection tasks in that item tree.

ITEM TREES OF CORRECT ERROR DETECTIONS

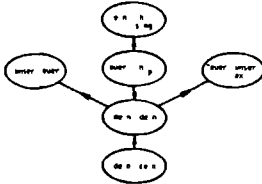
9 (group 1/PRE)



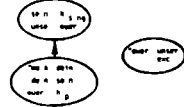
10 (group 1/POST)



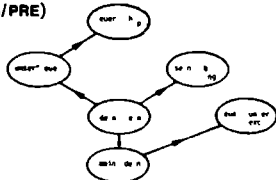
11 (group 2/PRE)



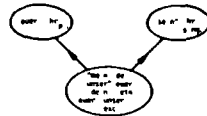
12 (group 2/POST)



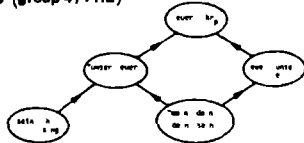
13 (group 3/PRE)



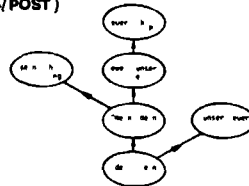
14 (group 3/POST)



15 (group 4/PRE)



16 (group 4/POST)

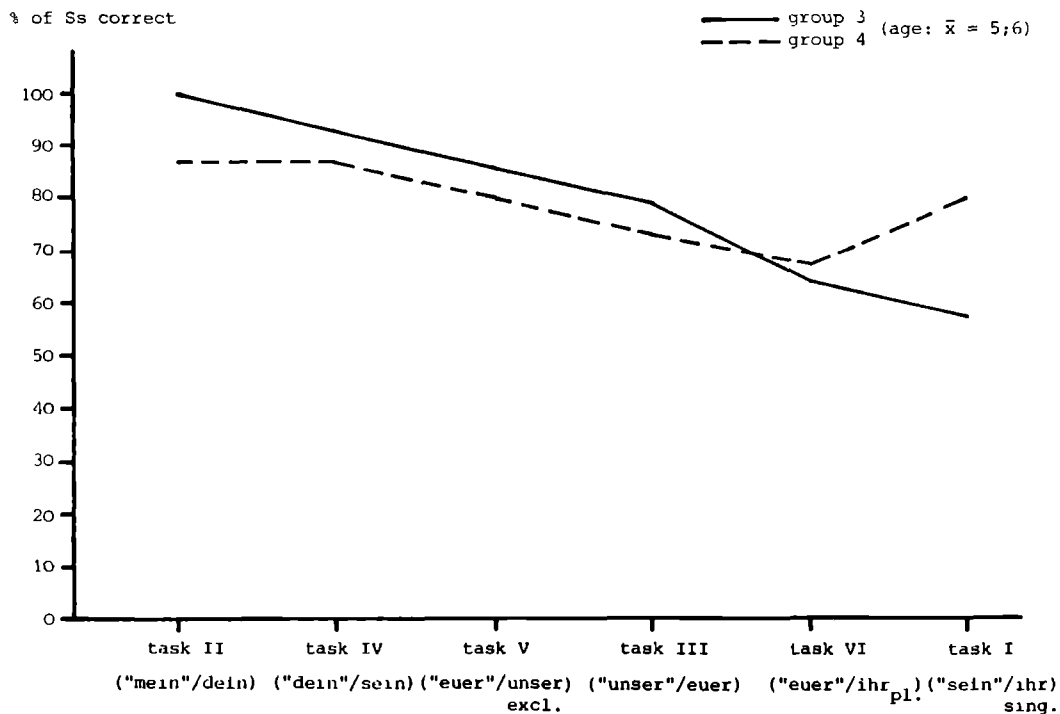


Bart & Krus's item tree analyses for pronoun changes will not be presented here since error detections and pronoun corrections go usually hand in hand. As to "qualitatively" different pronoun changes (e.g. name substitutions, pronouns which indicate the child's ability to take E's perspective, etc.), item tree analyses are not attractive because of different task requirements (e.g. awareness tasks which require perspective-taking vs. tasks without such a demand).

Presentation order effects

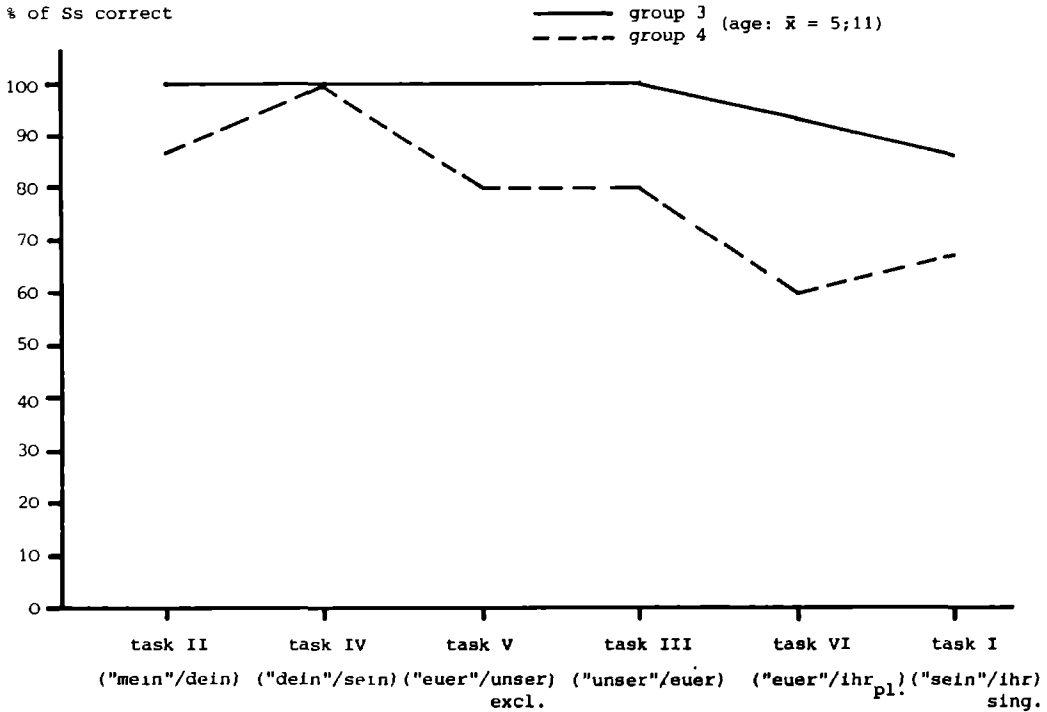
In order to see whether error detections were influenced by the order of presentation we present Fig. 17 which displays correct error detections in PRE for the oldest experimental group 3 (performance before awareness) and the control group 4 (awareness before performance) which had the same age as the children in group 3.

Fig. 17: Average correct error detections of the oldest age group and the control group in PRE



In PRE, error detections of group 3 are slightly better than those of group 4, except for task VI ("euer"/ihr_{pl.}) and task I ("sein"/ihr_{sing.}). Figure 18 depicts the comparison of correct error detections for group 3 and group 4 in POST.

Fig. 18: Average correct error detections of the oldest age group and the control group in POST



This comparison shows again an excess of group 3 over group 4, except for task IV ("dein"/sein) where both groups detected the error equally well.

As to pronoun changes, we found in the three error detection tasks which require perspective-taking (tasks II, III and V) differences between PRE and POST in group 3 and group 4 in the ability to shift perspective. In PRE, the "control" children yield slightly more pronouns which indicate the awareness of such a shift in all three tasks than the "experimental" children. The fact that the reverse is true for POST (Ss who got performance before awareness can considerably more often take E's point of view) calls for an interpretation (which will be given in 6.2.2.3).

Item order effects

Although all metalinguistic tasks were presented in random order we wanted to check for item order effects in PRE and POST. If, for instance, task V ("euer"/_{excl.}unser) was presented before task III ("unser"/euer) we had to compare task III before task V with respect to differences for these two tasks in error detection and change of possessive pronoun, and vice versa (task V before task III). These time-consuming analyses yielded all the same results: no significant findings for the item order effects, i.e. the position of a metalinguistic task in the series of tasks does not influence results on error detection and (correct) pronoun change.

6.2.2.2 Awareness Results as Related to Hypotheses

Section 4 (general assumptions on linguistic awareness) was devoted to deriving hypotheses on the role of linguistic awareness in language acquisition. In 5. (general predictions on the role of linguistic awareness with respect to the present research) we specified our predictions which were summarized in 5.6 (synopsis of the predictions which relate to the role of linguistic awareness in language acquisition).

In H_A 1a we proposed on the basis of Claparède's observations that:
 H_A 1a: Metalinguistic abilities (error detections, corrections, and explanations) arise more likely in case of a mismatch between sentence content and communicative intent within a given utterance than in case of a correspondence between these two within an utterance.

Since the subsequently following hypothesis H_A 1b is also derived

from Claparède's observation and can be also tested for the same awareness tasks in study A, we will repeat it here as well:

H_A 1b: Metalinguistic abilities (error detections, corrections, and explanations) arise more likely in case of a mismatch between verbal utterance and nonverbal reference in a task that in case of a correspondence between these two.

Task VII ("dein"/dein) and task VIII ("unser"/unser_{excl.}), the two "correct" tasks, functioned as testing-ground for Claparède's suggestion that awareness for "incorrect" precedes awareness for "correct" (cf. 6.1.5). In task VII all children accepted E's utterance and did not comment on it, i.e. they gave neither corrections nor explanations. This result indicates that awareness for "correct" singular tasks is far behind awareness for "incorrect" singular tasks (cf. 6.2.2.1: children detected and corrected errors in the singular "incorrect" tasks II, IV, and I) and that the Claparède predictions can be confirmed.

In task VIII we observed many children in all three experimental groups and the control group who "detected an error" in this "correct" task. We observed non-acceptance ("no, you cannot say 'unser' present" when E pointed at the present of E and the female doll) most frequently in group 2, in PRE and POST. One third of the subjects in this group do not only say "no" but change also the "correct" pronoun into an "egocentric" one ("euer") in the first test. In POST even half of the children want to change "unser" into "euer". When we take all four groups together in PRE and POST, we can see that one fifth (21%) "detect and correct an error" in the "correct" task VIII. Thus, children show "egocentric" awareness in the "correct" plural task VIII ("unser"/unser_{excl.}). Although children display more often awareness in the "incorrect" plural awareness tasks V, III, VI (i.e. more than half of the children detect and correct errors in these tasks, cf. Figure 10 and 6.2.2.1) than in the "correct" plural awareness task VIII we can only partially confirm H_A 1a and H_A 1b. Apparently there is an additional factor involved. It seems to be important for the child whether something is the same or different from the child's egocentric point of view. We will return to this in 6.2.2.3.

Our next hypotheses H_A2 and H_A3 relate to the question if we can assume one general metalinguistic ability. We will first repeat the hypothesis which concerns the relationships among different metalinguistic

abilities within a test.

H_A2: Metalinguistic abilities (error detections, corrections, and explanations) are at one point of time rather more interdependent than contrasting.

Since we did not evaluate children's explanations in Study A because of coding difficulties (cf. 6.2), we will relate this hypothesis only to error detections and corrections of the six awareness tasks.

Although quantitative pronoun changes agree with this hypothesis (error detections and pronoun corrections go hand in hand if we disregard the kind of pronoun correction) this does not hold for "qualitative" pronoun changes: error detections do not go hand in hand with appropriate corrections. The child knows that something has to be corrected when an error is detected but often does not have the means for appropriate corrections. We also observed that older children even know that they do not know what has to be corrected ("I know this is wrong but I don't know what I should say"). We will come back to the child's struggle in finding the correct pronoun (cf. 6.2.2.3).

Hypothesis H_A3 concerns the differential development of different metalinguistic abilities with age:

H_A3: The cross-sectional and longitudinal development of metalinguistic abilities (error detections, corrections, and explanations) with age is ordered according to "strain" in reflective ability: first are error detections, then corrections, and finally explanations.

. This hypothesis has to be rejected for error detections and quantitative pronoun changes in the six error detection tasks: error detection and any kind of pronoun change go generally hand in hand. However, if we look at qualitative aspects of pronoun changes, this hypothesis can be accepted, for both cross-sectional and longitudinal data. Error detections precede inter- and intraindividually appropriate corrections (an appropriate correction for the three "shift" affected tasks II, III, and V is a pronoun which indicates perspective-taking, for task I "ihr", for task IV "sein", and for task VI "ihr").

The conclusion with respect to our hypotheses H_A 1a, H_A 1b, H_A2 and H_A3 is: none of these predictions can be fully confirmed although H_A 1a and H_A 1b can be - at least partially - accepted. Thus, we feel the need to look very carefully into our data for other underlying factors.

6.2.2.3 Other Influential Factors in the Child's Metalinguistic Abilities

There are at least five factors which are not accounted for by our predictions but which may shed some light on children's metalinguistic abilities.

These factors are: the enhancement of awareness through metalinguistic experience, the saliency of dyadic interaction, the change of egocentricity in younger children to perspective-taking in older children, children's striving for internal coherence, and the developmental change in the adherence to conversational maxims.

The first factor is the enhancement of awareness through metalinguistic experience. The enhancement of error detections in POST through error detections in PRE (especially with respect to the plural awareness tasks: task V "euer"/_{excl.}user, task III "user"/euer, and task VI "euer"/_{pl.}ih) can be seen in the three experimental groups (cf. 6.2.2.1, Fig. 13, Fig. 14, and Fig. 15) but not in the control group 4 which got awareness before performance (cf. Fig. 16). This enhancement becomes also evident from Fig. 17 and Fig. 18 in which presentation order effects are apparent the "experimental" children of group 3 detect in POST errors generally better than the "control" children of group 4 (cf. presentation order effects in 6.2.2.1).

Enhancement of "qualitative" pronoun changes in POST through "qualitative" pronoun changes in PRE can also be observed in Table 21 which shows "correct" pronoun changes (which require perspective-taking from the child) in task II ("mein"/dein), task V ("euer"/_{excl.}user), and task III ("user"/euer). In task II the "correct" answer of the child is dein, in task V user, and in task III euer.

The effect of awareness experience is even stronger in case of performance experience. Table 21 indicates that the control group 4 yields slightly more pronouns in PRE which are the result of the child's ability to take E's perspective than the experimental group 3. In POST, we can see that children who got performance before awareness (= experimental group 3) can take E's point of view considerably more often than children who got awareness before performance (= control group 4) (cf. also presentation order effects in 6.2.2.1).

Table 21: Children's Ability to Take E's Point of View in Task II, Task V, and Task III (PRE and POST)

	Task II ("mein"/dein)		Task V ("euer"/ <u>unser</u> _{excl.})		Task III ("unser"/euer)	
	PRE	POST	PRE	POST	PRE	POST
group 1 (N=14)	14%	21%	7%	0%	0%	7%
group 2 (N=16)	13%	50%	13%	31%	0%	25%
group 3 (N=14)	14%	79%	29%	79%	7%	79%
group 4 (N=15)	33%	60%	27%	40%	7%	40%

It is obvious that there are training effects for awareness in all age groups. This is quite different from what we found for performance (cf. 6.2.1). Apparently, the child quickly "grasps" the notion of detecting and correcting linguistic errors, and once "grasped" it tends to be a rather permanent addition to his cognitive abilities. If this is generally true for metalinguistic abilities of children in the age range studied, there is less reason to expect a fixed developmental progression for different metalinguistic abilities. It would largely depend on the child's early or late involvement with "awareness-raising" situations for the different metalinguistic abilities which ones will be developed early, and which ones will be relatively late. It could be that a situation in which performance and awareness are required gives more rise to later awareness than a situation in which only awareness is necessary (cf. the differences of error detections and corrections between experimental group 3 and control group 4).

These considerations would also argue against postulating one metalinguistic capacity as was discussed in 6.2.2.2.

This assumption might not only hold for error detections and corrections in "incorrect" tasks but also for linguistic awareness in "correct" tasks which are "incorrect" from the child's egocentric point of view, such as task VIII "unser"/unser_{excl.} (cf. the Claparède-expectations H_A 1a and H_A 1b in 6.2.2.2). We observed in PRE one third of the children in group 2 rejecting E's "unser" in task VIII and change it into an "egocentric" pronoun ("euer" or "dein and X"), and in POST one half of the

children. It seems that metalinguistic abilities rely on an "awareness-raising" situation: it is just a matter of having been involved with it, or exposed to it at some early stage.

The second factor is the saliency of dyadic interactive features. Error detections for task II ("mein"/dein) in which the child had to distinguish between speaker and addressee are early and generally better than for all other awareness tasks (cf. Fig. 10, Fig. 11, Fig. 12, and Fig. 16). Relatively good is also the task in which the addressee (i.e. the child) is involved (task IV "dein"/sein) and the speaker and addressee related plural tasks (task III "unser"/euer and task V "euer"/unser_{excl.}) (cf. Fig. 10). The least number of error detections were found for the two awareness tasks in which an incorrect pronoun had to be corrected into a 3rd person pronoun (task VI "euer"/ihr_{pl.} and task I "sein"/ihr_{sing.}) (cf. the general results in 6.2.2.1).

We also found that singular pronoun corrections precede plural ones. Most correct pronoun changes (in the two tests of the four groups: 36%) were given in task II ("mein"/dein) in which the child had to discriminate the perspectives of speaker and addressee, the least (only 2% in the two tests of the four groups) in task VI ("euer"/ihr_{pl.}). In this task VI the correct pronoun is "ihr_{pl.}" which is not only a plural pronoun but also a pronoun in which neither speaker nor addressee are involved.

Clearly, the saliency of dyadic factors in error detections and corrections relates to our findings in the performance tasks where we observed a concentration on the dyad of the interlocutors (cf. section 6.2.1.5, the first influential factor in the acquisition of pronouns).

The third factor is the change from egocentricity in younger children to perspective-taking in older children. Qualitative pronoun changes in task II ("mein"/dein), task V ("euer"/unser_{excl.}), and task III ("unser"/euer) shed a light on developmental processes in children's self-reflections and social cognitions.

Selman and his co-workers (Selman & Byrne, 1974; Selman & Jacquette, 1978; Selman, 1981; Selman, Lavin & Brion-Meisels, 1982; Selman, 1982) elaborated a "logical" analysis of developmental levels of perspective-taking and reflective interpersonal understanding which we will adopt for the classification of our data.

Three developmental levels and stages of Selman's analysis are relevant

for our findings, i.e. for qualitative pronoun changes in task II, V, and III. All three levels of perspective-taking relate to a differentiation between Ego and Alter in middle childhood and relate more to meta-behavior than to automatic skills.

Level 0 (egocentric or undifferentiated perspectives)

The child does not yet clearly (in our research: linguistically) distinguish between his own perspective and that of another person although he might notice differences between his own experiences (in our research: between his own utterances) and those of another person. According to Selman, we can observe Level 0 between four and six years (Selman, 1982; Selman, 1981: "roughly ages 3 to 7").

An example from our data would be a child's answer "Yes, because this is from me" to E's recurrent question: "Can I say this is my present?" in task II whereby E points at the present of the child. With respect to the question how E has to say to S's present the child says: "my present".

In task V ("euer"/unser_{excl.}) a child at Level 0 says to E's question: "Can I say this is "euer" (your_{pl.}) present?" (whereby E points at the present of E and the female doll): "Yes, because this is "euer" (your_{pl.}) present". E's question: "How do I have to say?" is answered with: "Euer" (your_{pl.}) present".

In task III ("unser"/euer) E asks: "Can I say this is our present?" whereby E points at the present of the child and the male doll. A child at Level 0 answers: "Yes, because this is our present". E's question: "How do I have to say?" is answered with "Our present".

Level 1 (subjective or differentiated perspectives)

At this level the child begins to understand that the same "objective" extrinsically perceivable event can be seen subjectively by another person in the same way (as the child sees it) or differently (discrepancy between the perspective of the child and another person). Selman (1981, p. 250) writes: "Of particular importance, the child at Level 1 is newly concerned with the uniqueness of the covert, psychological life of each person.". According to him, the "social-informational role taking" at Level 1 can be observed between six and eight years (Selman, 1982; Selman, 1981: "roughly ages 4 to 9").

Different from Selman et al.'s classification we feel the need for a further subclassification of Level 1 because of a qualitative difference

in our data. Selman et al.'s level comprise our Level 1a and Level 1b.

Level 1a (subjective or differentiated perspective without person identification)

Unlike at Level 1b, the child at Level 1a does not (yet) identify himself as an individual with specific attributes (in our research: the child's name).

An example from our data would be the child's answer "No, it is my present!" to task II ("mein"/dein). At Level 1a we observed that after E's repetition of "my present" (E: "That's what I just said: It is my present. How do I have to say?") the children became highly upset and screamed: "No, you cannot say 'my present'. It is my, my, my, my present. It is "von mir" (of me, cf. Table 20)". This triumphant exclamation ("of me" was apparently a way out of a difficult and problematic situation) was also repeated by E: "O.k., then I say, it is of me" whereupon children were pretty puzzled and said that they did not know how E had to say to S's present ("I don't know how you have to say to my present").

In task V ("euer"/unser_{excl.}) a child at Level 1a would say with respect to E's question: "Can I say this is "euer" (your_{pl.}) present?" "No, it is "euer" (your_{pl.}) present". When E asked: "How do I have to say?" the child would either repeat: "Euer" (your_{pl.}) present", or use a subjective ("egocentric") decomposed form such as "Dein (your_{sing.}) and Susi's (name of the female doll) present".

In task III ("unser"/euer) a child at Level 1a would answer: "No, it is unser (our) present". When E asked: "How do I have to say?" the child would say: "Unser (our) present" or yield a subjective ("egocentric") decomposed form such as "Mein (my) and Peter's (name of the male doll) present".

Level 1b (subjective or differentiated perspectives with person identification)

Level 1b differs from Level 1a only insofar that the child identifies himself as an individual with a specific attribute: his name.* Identifi-

* Note that names function normally as orientation markers (Habermas, 1981, II: "Wegweiser") in unfamiliar situations (e.g. at the begin of a telephone conversation).

cation took place after a first trial of S: "No, my present" in task II ("mein"/dein) and E's repetition of "my present". As to E's question how E had to say the child suggested, for instance: "Annette's present" (the child's name is Annette). This name identification is interesting because E could not claim S's present (E's name is Karin). In using his name the child avoided variable reference (which are a characteristic of pronouns) but offered one of the invariable characteristics of his own identity (it would be interesting to see what would happen if E and S had the same first name - would these children offer other invariable distinctive marks?). Children's name substitutions suggest that they have - at least rudimentarily - a conception of their own individuality although they might not yet have a conception of their variable speech role in a communication situation.

For a classification at Level 1b in task V ("euer"/_{excl.}unser) the child had to give E's name and either the name or a "demonstrative article" (e.g. "von Karin und der das Geschenk" - of Karin and of this* the present).

In task III ("unser"/euer) the child substituted his name and the male doll's name or a demonstrative article at Level 1b.

Level 2 (self-reflective or reciprocal perspectives)

At this level the child is able to "decenter" (in the Piagetian sense) and to take the perspective of another person which enables him to take his self as both subject and object of (inner) experience. Here "... children are able to take a second-person perspective, which leads to an awareness of a new form of reciprocity, a reciprocity of thought and feelings rather than a reciprocity of action" (Selman, 1981, p. 250/251). According to Selman, Level 2 can be observed between eight and ten years (Selman, 1982; Selman, 1981: "roughly ages 6 to 12").

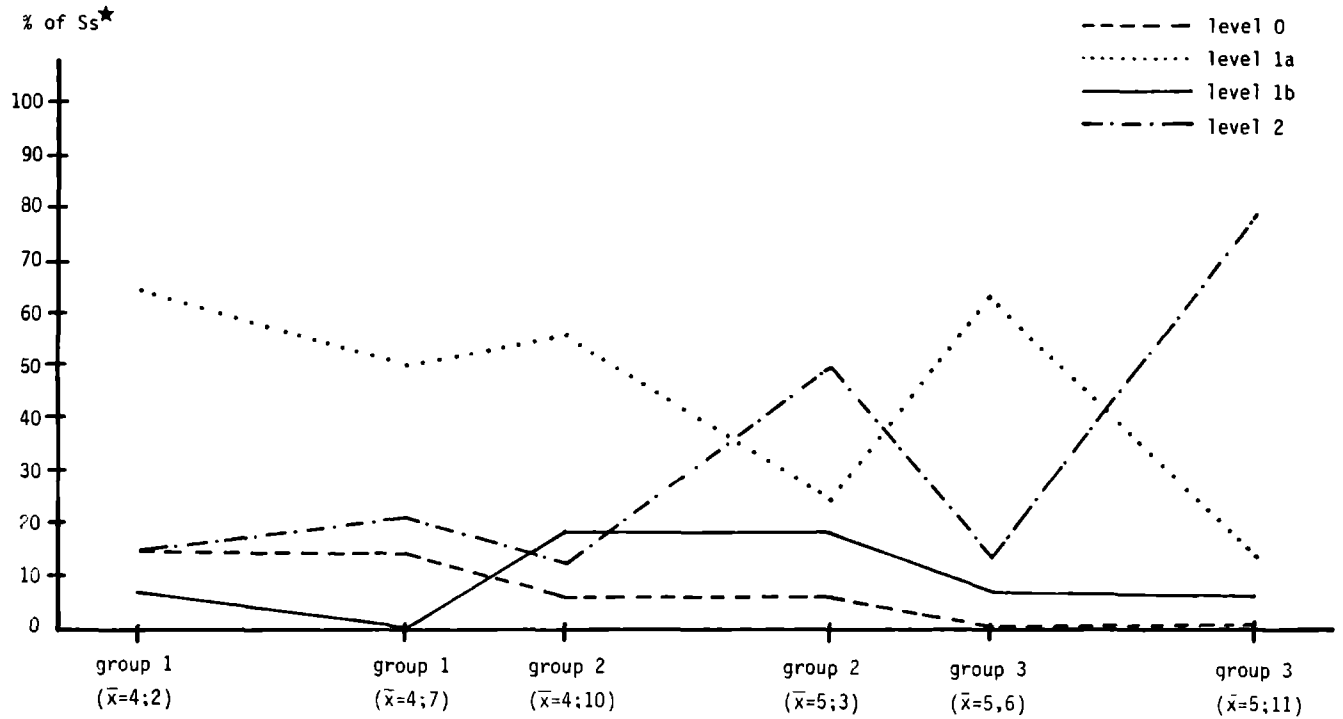
An example of Level 2 is the child's answer ""dein" (your_{sing.}) present" for the child's own present to E's question: "How do I have to say for this present?" in task II ("mein"/dein) where E points at S's present.

* This translation is not quite correct because English does not have "demonstrative articles" like in "of the the present". Note also that children gave only three times two names (cf. Table 20).

Another example for a classification at Level 2 where the child had to "decenter" and take E's perspective is in task V ("euer"/_{excl.} unser) the child's answer: "unser (our) present" for the present of E and the female doll. The child could also give a decomposed form, such as "mein (my) and Susi's present".

In task III ("unser"/euer) the child at Level 2 yields either "euer (your_{pl.}) present" for the present of the child and the male doll ("euer" is E's perspective) or a decomposed form, such as "dein (your_{sing.}) and Peter's present". Let us now look at these four partially overlapping but discernible levels of perspective-taking (levels 0, 1a, 1b, and 2) in task II ("mein"/dein), task V ("euer"/_{excl.} unser) and task III ("unser"/euer) (cf. Figures 19, 20, 21).

Fig. 19: Developmental levels of perspective taking in task II ("mein"/dein)



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Note that a few subjects gave either a wrong answer or said "I don't know" in task II, task V, and task III. These subjects cannot be found on any of the four levels. This explains why we do not always have 100% of Ss when Ss of the four levels are taken together.

Fig. 20: Developmental levels of perspective taking in task V ("euer"/"unser excl.)

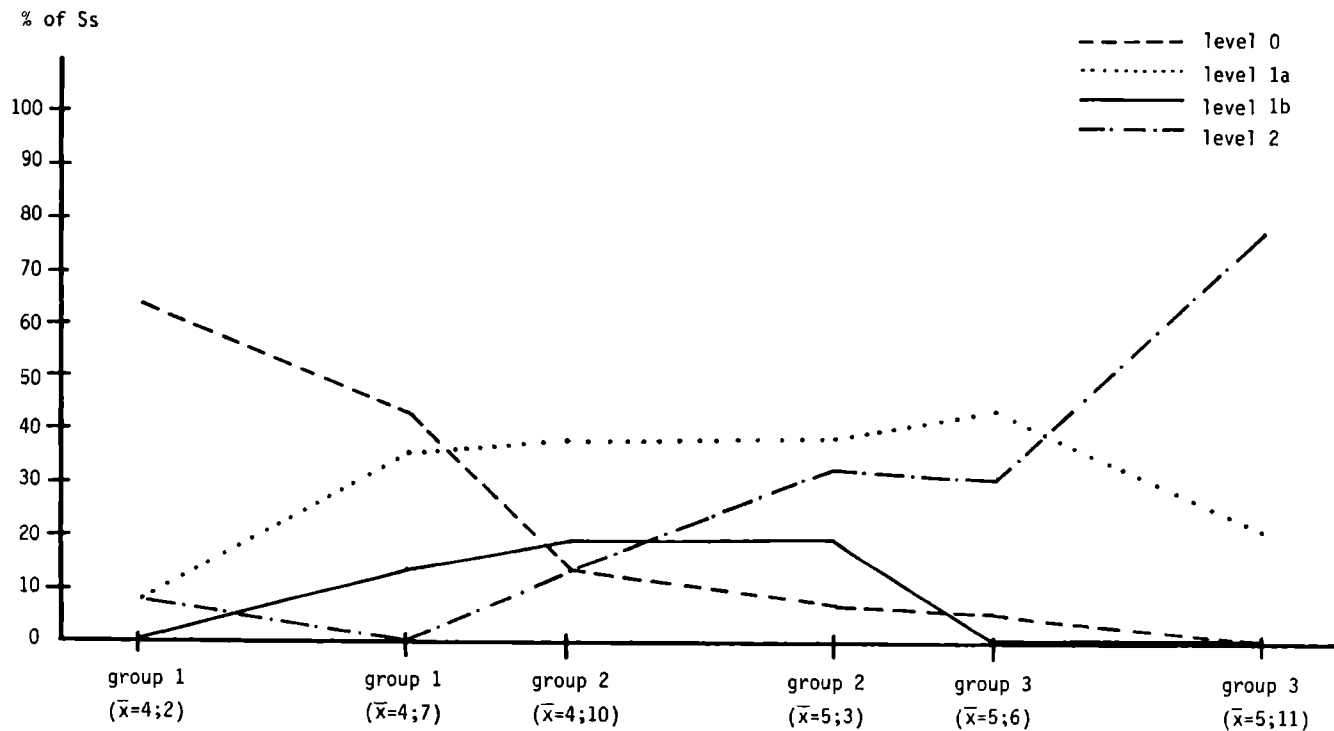
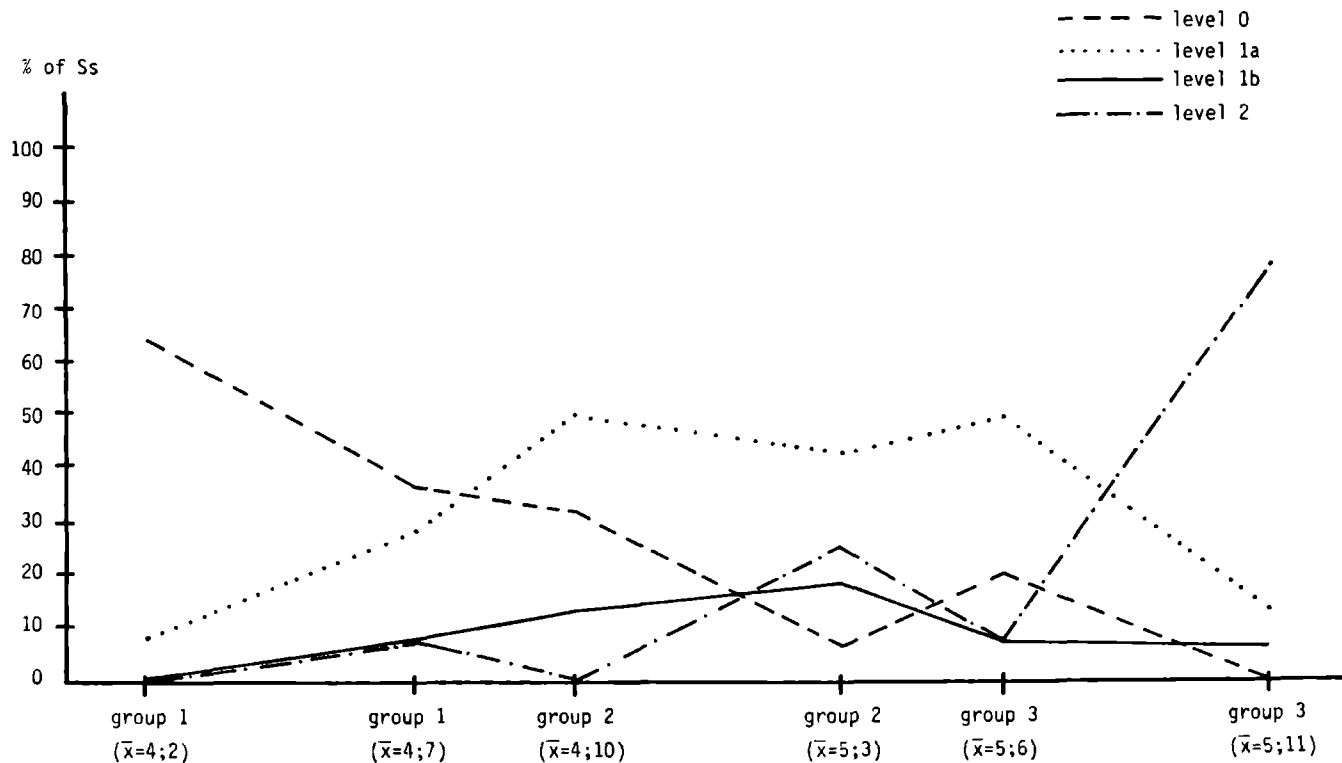


Fig. 21: Developmental levels of perspective taking in task III ("unser"/euer)



Discussion of Figure 19: Except for one child in group 2 (in PRE and POST) who could not decide clearly whether "mein" would be also appropriate for E (but knew that it was not E's present), we observed the undifferentiated perspective (Level 0) only in two very young children: a boy of 3;9 and a girl of 4;3 (this girl is the only bilingual child in all experiments: the kindergarten teacher told us that the girl and her family speak usually German at home although her mother would sometimes address her in Dutch). However, these two children detected and corrected errors when incorrect names were used. From these data, we may assume that Level 0-performance in this task holds in general for children before the age of four years.

The subjective or differentiated perspective without person identification (Level 1a) occurs frequently between four and six years. The decrease of egocentric "mein"-answers (Level 1a) in all POST-tests goes hand in hand with children's ability to take E's perspective (Level 2). Intra-individual, longitudinal comparisons reveal that 44% of the children in the three experimental groups who yielded the egocentric pronoun "mein" in PRE could take E's perspective ("dein") in POST: one child in group 1, five children in group 2, and six children in group 3 (note that two children who were on Level 1a in PRE switched to Level 1b in POST). Clearly Level 1a decreases in task II before school age. The decrease of the egocentric pronoun "mein" in POST can be explained by the enhancement of awareness through metalinguistic experience (cf. our first factor in 6.2.2.3).

Name substitutions (Level 1b) occur most often in group 2, i.e. between four-and-a-half and five-and-a-half years. In this age span children can conceive invariable attributes of their own identity. However, the curvilinear occurrence of name substitutions at around age five has to be seen in the light of the task requirement (prompts for pronouns, i.e. for variable speech roles). Name substitutions probably functioned in this experiment as a way out of a difficult situation: the egocentric "mein" seemed already inappropriate and the child could not yet take E's perspective ("dein"). There is an interesting parallel in the spontaneous language use of very young children: they sometimes use names for self-reference (e.g. Matthew for "I") or reference of another person (e.g. Bain - the last name of a father - for "you") when they still reverse pronouns (e.g. "I" for "you", "you" for "I", cf. 3.5) (cf. the protocols of Bohn, 1914; Stern & Stern, 1928; Bain, 1936; Chiat, 1982). Apparently,

name substitutions are a means to disambiguate unclear reference in both awareness and performance situations.

The self-reflective or reciprocal perspective (Level 2) increases over age in task II. Perspective-taking can already be observed in the youngest age group: one child in group 1 (PRE) is 3;9 and another one 4;3. We already pointed out that awareness in POST might have been enhanced by metalinguistic experience in PRE (cf. our first factor in 6.2.2.3): half of the children in group 2 and 79% of the children of group 3 can take E's perspective in POST. Since this Level 2 may be relevant for a theory of awareness we will discuss it after the inspection of task V ("euer"/_{excl.}) and task III ("unser"/euer).

Discussion of Figure 20: Figure 20 indicates that Level 0 is most frequent in the youngest age group and relatively seldom in the older two groups (cf. also children's error detections in Fig. 11 and Fig. 12). It is remarkable that children who are at Level 0 in task V ("euer"/_{excl.}) are on Level 1a in task II ("mein"/dein) - except for two children who are at Level 0 in both of these tasks (cf. the discussion of Fig. 19).

Thus, we might conclude that children who are already at Level 1a with singular pronouns (in task II where E refers to the child's own present) are still at Level 0 with plural pronouns (in task V where E refers to part of E's own present). At the age of four years children are still at Level 0 with respect to plural pronouns in tasks which require a speaker/addressee shift.

In task V, Level 1a shows a curvilinear course of development. Most of the children who are at Level 1a in task V are also at Level 1a in task II. This suggests that for both singular and plural pronoun tasks the subjective or differentiated perspective (without person identification) is between four-and-a-half years of age and six years. Name substitutions (Level 1b) around the age of five years are also frequent for plural pronouns which require a speaker/addressee shift.

Level 2 (self-reflective or reciprocal perspective) increases also for plural pronouns over age. The longitudinal, intraindividual data of group 2 and group 3 indicate that most changes from PRE to POST are those from Level 1a to Level 2. The comparison of task II ("mein"/dein) with task V ("euer"/_{excl.}) reveals that taking E's perspective in task II goes hand in hand with taking E's perspective in task V. There are more

children who can take E's perspective in the singular speaker/addressee shift (task II) but cannot do this in the plural task V (9 children) than children who changed the pronoun correctly in task V but not in task II (3 children).

This leads us to the conclusion that the speaker/addressee shift in singular contrasts is somewhat easier than in plural contrasts. It is around school age or shortly before when speaker addressee/shifts develop most clearly. Do these findings hold also for task III ("user"/euer)?

Discussion of Figure 21: Task V and the homologous task III show a similar developmental decrease of Level 0. Most of the older children who are still at Level 0 in task III ("user"/euer) are at Levels 1a or 1b in task V ("euer"/user_{excl.}) and task II ("mein"/dein).

This finding suggests that we should not only discriminate between singular and plural speaker/addressee shifts with respect to a developmental decrease of Level 0 but also between plural speaker/addressee shifts in which an incorrect reference to the speaker (and another person) is made (task V "euer"/user_{excl.}) and plural speaker/addressee shifts in which an incorrect reference to the addressee (and another person) is made (task III "user"/euer). The former (task V) shows a slightly but not significantly earlier developmental decrease of Level 0 than the latter (task III).

Since at Level 0 the most apparent developmental differences are between plural speaker/addressee shifts with an incorrect reference to the speaker and those with incorrect reference to the addressee, we might also expect at Level 0 developmental differences between singular speaker/addressee shifts with an incorrect reference to speaker and singular speaker/addressee shifts with an incorrect reference to the addressee. In case of a parallel between singular and plural speaker/addressee shifts with respect to an incorrect point of reference, we should find a slightly earlier decrease of Level 0 for a task in which E points to E's present and asks S: "Can I say this is your present?" (we did not use such a task in our experiment) than for task II ("mein"/dein). If we would get such a result (i.e. "no"-answers should be earlier in a "dein"/mein contrast than in a "mein"/dein contrast) from young children (they should be younger than the ones in our experiment) we could strengthen the outcome of the plural speaker/addressee shifts: it is harder to become aware of

speaker/addressee shifts (i.e. to differentiate between speaker and addressee) in which an incorrect reference is made to the addressee than in those with an incorrect reference to the speaker. This means for language comprehension (but not for language production) that it is easier to become aware of one's own perspective than of that of another person.

Level 1a and Level 1b in task III show similar curvilinear developments as in task V. Level 1a is more frequent than Level 1b, i.e. we observe more "egocentric" pronouns than name substitutions.

Level 2 increases also in task III over age. When we compare task III with task V we can see that most children who master the speaker/addressee shift in one task master it also in other tasks.

In fact, most of the oldest children can take E's perspective in the second awareness test. Our three tasks which involve a speaker/addressee shift show clearly that - despite slight differences in the time of onset - the age between five-and-a-half and six years is a turning point for the ability to take the perspective of another person. Although differences between singular and plural tasks seem to exist, "egocentric" pronouns decrease (slightly) over age in the second awareness test. Substitutions (Level 1b) are an intermediate stage in the transition from Level 0 and Level 1a to Level 2.

What does this mean for a theory of development of awareness? Cognitive/communicative egocentrism and perspective-taking in child development (for recent reviews, cf. Ford, 1979; Edelstein & Keller, 1982; Geulen, 1982) are based on the differentiation between Ego and Alter.* Theories on private or egocentric speech are formulated by Piaget (1926), Mead (1934), Vygotsky (1962), and Flavell (Flavell, 1966; Flavell et al., 1968). These four theories make similar and different assumptions with respect to the developmental course and the functions of this phenomenon (for an overview, cf. Kohlberg et al., 1968). For instance, Piaget proposes a straight age decline of egocentric speech which is replaced by social

*The differentiation between Ego and Alter goes back to the German philosopher G.F.W. Hegel whose ideas have influenced theoretical notions on perspective-taking, so, for instance, also those of Mead (cf. Joas, 1980; Geulen, 1982).

speech whereas Vygotsky and Mead propose a curvilinear development. Vygotsky (1962, p. 132) argues that egocentric speech goes underground as thought: "... egocentric speech disappears at school age, when inner speech begins to develop ...". Although a thorough discussion of these controversial issues is beyond the scope of the present research we will base our ideas on two of these theories: Vygotsky's developmental theory and Mead's communication theory since they help to understand the start of self-reflective awareness at Level 2.

Mead adopted the dialectic notions "I" and "Me" as technical terms in social psychology. He stresses that the subjective self ("I") can take itself as an object ("Me"). This self-representation ("Me") holds for all kinds of activities (speaking, remembering, etc.). Linguistic skills ("I" language) or memory skills ("I" memory) can be taken as objects for reflection (metalinguistic skills, i.e. "Me"-language, or meta-memory skills, i.e. "Me"-memory).

There is no basic difference between "Me" activities of oneself or of another person. This point is clearly expressed by Vygotsky: "We are aware of ourselves in that we are aware of others; and in an analogous manner, we are aware of others because in our relationship to ourselves we are the same as others in their relationship to us. I am aware of myself only to the extent that I am as another for myself, i.e. only to the extent that I can perceive anew my own responses as new stimuli." (Vygotsky, 1924/1979, p. 29/30; cf. also Vygotsky, 1978). In our view, perspective-taking and self-reflective awareness (which are inseparably and intrinsically linked) require a mental step-back from subjective self ("I") and the ability to conceive an objective other of self ("Me"). Egocentric speech as a "phenomenon of the transition from intersychic to intrapsychic functioning" (Vygotsky, 1962, p. 133) could be conceived as a harbinger of internal communication and self-reflective awareness.

We believe that the movement from egocentric speech to perspective-taking and self-reflective awareness is reflected in the shift from subjective self (when the word "I" or "me" equals genuine self-experience) to the differentiation and integration of subjective self and objective self. The main developmental force for this differentiation and integration of "I" and "Me" is social interaction. Language has a double function: on the one hand, the word for an object is not the object but could be replaced by any other word (i.e. the object would be still there even if another

word was used), and on the other hand, the word for an object is "part of the object" by social conventions of language use.

This double function of language becomes evident in personal pronouns. The subjective self ("I") cannot be shared with another person because of its holistic property whereas the objective self ("Me") can be shared (everybody can say "I"). Personal pronouns are a clue to the understanding of self-representation.* Our data show that the development of self-reflective awareness is a gradual process where one level of self-representation (or perspective-taking) replaces another.

The "Me"-language is the material for the acquisition of other types of self-representation (e.g. representation of "my body", "my memory", "my emotions").

Although egocentricity and perspective-taking are crucial factors in the development of linguistic awareness, two further influential factors seem to be important: children's striving for internal coherence and the developmental change in their adherence to conversational maxims.

The first one of these, our fourth factor, which is involved in children's metalinguistic abilities is their striving for internal coherence of linguistic units. Intralinguistic coordination and integration is one possible function of linguistic awareness (cf. our discussion in section 4.2). Our data show that children "work on linguistic 'objects'" and that "language is a problem-space per se for small children" (Karmiloff-Smith, 1979b, p. 236). This can be seen in children's "word innovations" and their use of "grammatically dubious pronouns" (cf. Table 20).

Let us present two examples from the transcripts which show children's struggle for the correct pronoun.

* Habermas (1981, p. 531) writes: "So bietet die Analyse der Bedeutung, nicht zwar des referentiellen, aber des performativen Gebrauchs des Ausdrucks "Ich", innerhalb des Systems der Personalpronomina, einen aussichtsreichen Schlüssel zur Problematik des Selbstbewußtseins", cf. also Habermas, 1971, p. 193 and 194.

Task IV ("dein"/sein)

S2 in group 4 (control group)/PRE; 5;6; female

- V1: "Kann ich sagen, das ist dein Geschenk?"
(Verweis auf p₄ = sein)
- Vp: "Nein."
- V1: "Sondern?"
- Vp: "Weil's Michael ... vor Michael liegt."
- V1: "Und dann muß ich sagen, das ist ...?"
- Vp: "Se ... or je? - Hm...hm?"
- V1 lacht: "Wie heißt das? Se, or je?"
- Vp: "Nein."
- V1: "Das ist ...?"
- Pause -
- Vp überlegt: "Um... hach ..."
- V1: "Wie heißt das Wort noch mal?"
- Vp denkt lange nach: "Wie?"
- V1: "Wie heißt denn das Wort noch mal, das ...?"
- Vp: "Je ...se...je ...?"
- V1 lacht: "Wie? Wie heißt das Wort?"
- Vp stöhnt.
- V1: "Sag's mal ganz laut!"
- Vp: "Erst mal überlegen, wie's heißt."
- E: "Can I say, this is your (sing.) present?"
(Reference to p₄ = his)
- S: "No."
- E: "But?"
- S: "Because it Michael ... before Michael is."
- E: "And then I have to say, this is ...?"
- S: "Se ...or je? - Hm...hm?"
- E laughs: "How is it called? Se, or je?"
- S: "No."
- E: "This is ...?"
- Silence -
- S reflects: "Hm... gee ..."
- E: "How is this word called?"
- S thinks for a long time:
"How?"
- E: "How is the word called, this ...?"
- S: "Je ...se...je ...?"
- E laughs: "How? How is the word called?"
- S sighs.
- E: "Say it really loud!"
- S: "I have first to think about how it is called."

V1: "Gut, dann überleg mal!"
Vp: "Hm, Michael, der ist nämlich schon neun und in der Schule."

(Protokollantin diskutiert leise mit V1, ob Vp die Höflichkeitsform "Ihr" meint.)

V1: "Das ist ...?" (Verweis auf p₄).

Vp: "Se ...hen, nee. Nee (lustig verzweifelt.) Hä? ... Wie?"

(V1 zu Protokollantin: "Schreib mal auf: Sejehn.")

Vp: "Nein, jetzt sagst du's falsch!"

V1: "Soll ich dir mal sagen, wie es richtig heißt?"

Vp: "Ja."

V1: "Kann ich sagen, das ist sein Geschenk?"

Vp (befreit): "Jaaa."

- allgemeines Lachen -

E: "Ok, think about it!"
S: "Hm, Michael, he is namely already nine years old and goes to school."

(Research assistant discusses with E in a low voice whether S wants to use the V-form "Ihr".)

E: "This is ...?" (Reference to p₄).

S: "Se ...hen, no. No (joyously desperate). He? ...How?"

(E to research assistant: "Write down: Sejehn.")

S: "No, now you say it wrong!"

E: "Shall I tell you, how it is correctly called?"

S: "Yes."

E: "Can I say, this is "sein" (his) present?"

S (relieved): "Yeah."

- All laugh -

Task II ("sein"/ihr_{sing.})

S7 in group 4 (control group)/PRE; 5;8; female

V1: "Kann ich sagen, das ist sein Geschenk?" (Verweis auf p₃ = ihr_{sing.})

Vp: "Nein."

V1: "Warum nicht?"

E: "Can I say, this is his present? (Reference to p₃ = her)

S: "No."

E: "Why not?"

Vp: "Weil das ein Mädchen ist."	S: "Because this is a girl."
V1: "Richtig, und da muß ich sagen, das ist ...?"	E: "Precisely, and then I have to say, this is ...?"
Vp: "Ehm, sie ... dein Geschenk."	S: "Hum, she ... your present."
V1: "Hm?"	E: "What?"
Vp: "Die ... sie dein Geschenk."	S: "The (female demonstrative or definite article) ... she your present."
(...)	(...)

In the first example (S2) the child starts out with "se .. or je" (for "sein"), corrects herself ("je ...se ...je"), and yields finally "se-hen" which comes closer to the correct pronoun "sein". In the second example (S7) the child has difficulties in finding the correct pronoun "ihr_{sing.}" (= her) and uses first "sie ... dein" (she ... your) and later "die ... sie dein" (the female demonstrative or definite article "the" and "... she your") although natural gender can already be correctly explained. These difficulties may be due to the clash between syntactic and natural gender of "ein Mädchen"/a girl (as to this problem, cf. Lang, 1977, p. 43). Use of personal pronouns instead of possessive pronouns has been also observed in other children, so, for instance "sie sein" (she his) for 'her', "sie" (she) for 'her', "du" (you_{sing.}) for 'your_{sing.}', "ihm" (him) for 'his', "er und sie" (he and she) for 'their', and "wir" (we) for 'our' (cf. Table 20).

We already pointed out that most word innovations (except for the strange word "ummenazich") show morphophonological similarities to supposedly intended pronouns ("meinde" as a contamination of "mein" and "dein") (cf. 6.2.2.1). The word innovation "dien" for "euer" (your_{pl.}) is probably derived from "dein" (your_{sing.}), and "eueres" from "euer" (your_{pl.}). One little boy, who knew that "euer" (your_{pl.}) was inappropriate in task V ("euer"/unser_{excl.}) and tried out different forms, such as "ihres" (hers or theirs, "ihr" is plurifunctional in German, cf. 2.1) for the female doll and the female speaker, came up with "eugeres". He seemed to be quite happy with this new word since it was different from "eures", so he stressed (correct is the pronoun "unser" which requires perspective-

taking). The word innovation "sie-mal" has to be decomposed in "sie" (she) and "mal" ('times', like in 5 times 7) for an understanding of the child's substitution for "ihr_{pl.}" (their).

These examples show that the struggle for intralinguistic organization is an important factor in children's metalinguistic processing.

Our fifth, and last factor in the development of metalinguistic abilities is the adherence to conversational maxims. In 6.1.5 we stated that the two ambiguous tasks, task IX ("mein"/*unser_{incl.}*) and task X ("euer"/*unser₄*) are a good testing ground for the two Gricean maxims of quantity and quality. If the child follows the Gricean maxim of quantity ("Make your contribution as informative as is required for the current purposes of the exchange" and "Do not make your contribution more informative than is required", cf. Grice, 1975, p. 45) he should affirm E's question: "Can I say this is my present?" in task IX, where E points at the present of all four participants (S, E, and the two dolls) although he knows that another pronoun would be more appropriate when prompted. If the child follows Grice's quality maxim ("Try to make your contribution one that is true") he should deny both questions and correct "mein" (my) into "unser" (our) in task IX, respectively "euer" (*your_{pl.}*) into "unser" (our) in task X, i.e. he should deny E's questions and give corrections which include the speaker.

Our data show that the youngest children in group 1 follow in task IX ("mein"/*unser_{incl.}*) the maxim of quantity because they affirm E's question (group 1: 64% in PRE, 57% in POST, as opposed to 'yes'-answers in group 2: 31% in PRE, 19% in POST, and group 4: 20% in PRE, 13% in POST) although they know that both E and S own the present. Explanations which reflect awareness of "quality" and which follow "no"-answers in task IX are more often observed in older children (group 2, group 3, and group 4). Let us give two examples from the transcripts.

Task IX ("mein"/*unser_{incl.}*)
S40 in group 2/POST; 4;7; female

V1: "Kann ich sagen, das ist mein
Geschenk?" (Verweis auf p5 =
unser_{incl.}.)

E: "Can I say, this is my
present?" (Reference to
p5 = *our_{incl.}*.)

Vp: "Eine Hälfte."

S: "One half."

V1 (lacht); "Gut, wie muß ich sagen?"

E (laughs): "Ok. How do I have to say?"

Vp: "Da das (zeigt auf p1 = V1's Geschenk) ist ein Ganzes von dir."

S: "The one there (points to p1 = E's present) is a whole one of you."

(...)

(...)

Task IX ("mein"/unser_{incl.})

S6 in group 4 (control group)/POST; 5;8; female

V1: "Dann möcht' ich jetzt noch von dir wissen: Kann ich sagen, das ist mein Geschenk?" (Verweis auf p5)

E: "Now, I also want to know from you: Can I say, this is my present?" (Reference to p5)

Vp: "M'm."

S: "No."

V1: "Wie muß ich sagen?"

E: "How do I have to say?"

Vp: "Das ist von uns beiden das Geschenk."

S: "This is the present of us two."

V1: "Ganz prima. Und warum kann ich nicht sagen: das ist mein Geschenk?"

E: "Very well. And why can't I say: this is my present?"

Vp: "Weil es uns beiden das gehört, und dann will einer das Stück haben und der andere das." (zeigt zuerst auf die linke Geschenkhälfte, dann auf die rechte)

S: "Because it belongs to the two of us, and then one wants this piece and the other one this." (points first to the left half of the present then to the right half)

V1 (lacht): "Welches Stück willst du denn haben?"

E (laughs): "Which piece would you like?"

Vp: "Gar keins."

S: "None at all."

V1: "Weil, ich mein ... du hast vorhin gezeigt, das Stück auf der rechten Seite gehört dir und das auf der linken gehört mir. Damit wir uns nicht zanken, sagen wir lieber: das ist unser Geschenk, ne."

(...)

E: "Because, I mean ... you pointed before, this piece on the right side belongs to you and that on the left side to me. Since we don't want to fight, we rather say: this is our present, ok."

(...)

In task X ("euer"/ $unser_4$) we found a similar trend: the youngest children in group 1 say more often "yes" to E's question (and offer "our" or "of all four" when asked for an alternative) than the older children in groups 2, 3, and 4. On the other hand, these older children deny E's question and say often spontaneously that the present of the four participants is "of all four", "of us four", or "our four".

This reflects a growing awareness of the maxim of quality in older children. Still, there is in general unclarity about the developmental status of Gricean maxims, and metalinguistic questions are needed in order to study them.

6.2.2.4 Summary of the Results of the Awareness Tests

None of our predictions on linguistic awareness could be fully confirmed.

Claparède's difference hypothesis (it is easier to become aware of differences than of similarities) seems to hold with certain reservations: it matters whether something is the same or different from the child's egocentric point of view (and not just from an adult's point of view).

Different metalinguistic abilities do not develop in the same way. If the quality of pronoun corrections is considered, we can see that linguistic judgments (i.e. error detections) precede appropriate corrections.

Other influential factors seem to be at work in children's acquisition of metalinguistic abilities: the enhancement through metalinguistic experience, the saliency of dyadic interaction, the change of egocentricity in younger children to perspective-taking in older children, children's striving for internal coherence, and the developmental change in the adherence to conversational maxims.

The enhancement of awareness through metalinguistic experience argues against postulating one metalinguistic capacity. Apparently, metalinguistic abilities rely on an "awareness-raising" situation at an early stage.

The saliency of dyadic factors in error detections and corrections relates to our findings in children's performance where a concentration on the dyad of the interlocutors has been observed. This stresses the importance of speaker and addressee in both awareness and performance.

Our data show that in the developmental change from egocentricity to perspective-taking four partially overlapping but discernible levels can be distinguished which shed a light on children's self-reflections and social cognitions. Despite of slight differences among individual children and singular/plural tasks with respect to the time of onset, the age between five-and-a-half and six years seems to be a turning point for perspective-taking and self-reflective awareness.

Children's striving for intralinguistic coherence can be seen in their struggle to find the correct pronoun. Karmiloff-Smith's point that "language is a problem space per se" is also apparent from our data.

The conversational implicature "Try to make your contribution one that is true" (the Gricean maxim of quality) is better understood by older children than by younger children. This might reflect a growing awareness of the cooperative principle.

Clearly, our assumptions and findings on the development of linguistic awareness need further theoretical and empirical evaluation.

6.2.3 The Relationship between Performance and Awareness

6.2.3.1 General Results of the Relationship between Performance and Awareness

Performance and error detections

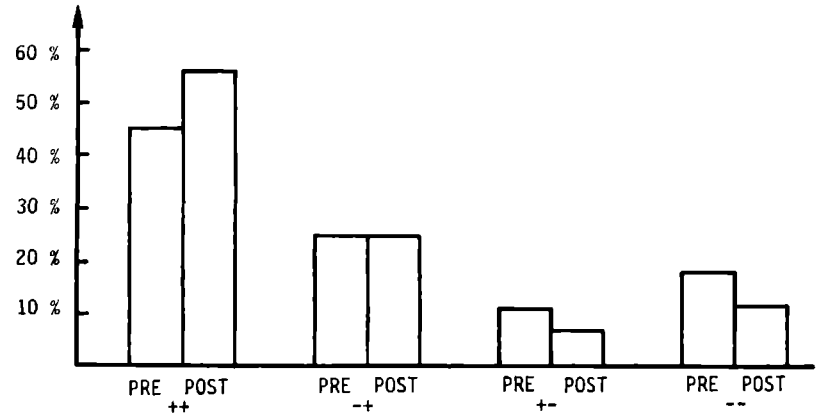
We first want to give a short overview of the relationships between performance and error detections (the relationships between performance and corrections will not be presented because of the large variety in our data). Our comparisons for the four groups in PRE and POST distinguish among four possible relationships: correct performance and correct error detections (++), incorrect performance but correct error detections (-+), correct performance but incorrect error detections (+-), and incorrect

performance and incorrect error detections (--).

These comparisons relate to intraindividual item relations, i.e. to performance and error detections of one child in one task. They are summed over the seven pronouns "mein", "dein", "sein", "ihr_{sing.}", "unser_{excl.}", "euer", and "ihr_{pl.}" in the performance tests which match either "utterance" or "reference" pronouns in the awareness tests (e.g. in task II the "utterance" pronoun is "mein" and the "reference" pronoun "dein") and the six error detection tasks in the awareness tests (task II "mein"/dein, task IV "dein"/sein, task V "euer"/unser_{excl.}, task III "unser"/ihr_{sing.}). Figure 22 shows the four relationships for PRE and POST.

Fig. 22: General within-test relations between performance and error detections for PRE and POST

percentages of children over all tasks



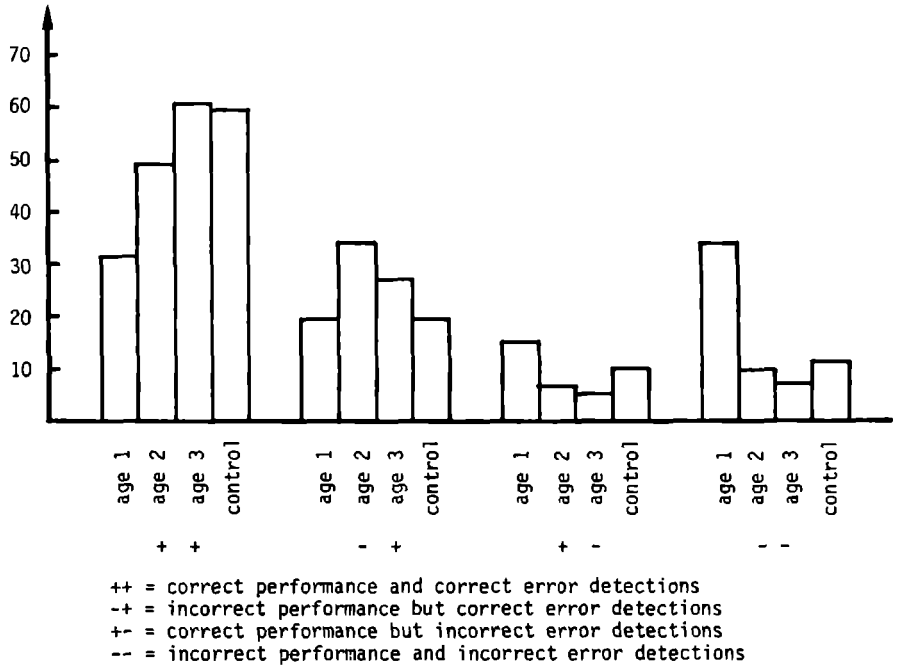
++ = correct performance and correct error detections
--+ = incorrect performance but correct error detections
+- = correct performance but incorrect error detections
-- = incorrect performance and incorrect error detections

Figure 22 demonstrates that about half of all children are correct in both performance and in error detections. There are more children who cannot yet perform correctly but who can detect an error than children who can perform correctly but who cannot yet detect an error. In PRE incorrect performance and incorrect detections are more frequent than in POST.

Figure 23 exhibits the four relationships for the three experimental groups (age 1, age 2, and age 3) and the control group.

Fig. 23: Within-test relations between performance and error detections for the Four Groups (PRE and POST)

percentages of children over all tasks (PRE and POST)



In the youngest group (age 1) 35% of the children can either not perform correctly or detect an error or both. In group 2, group 3, and group 4 most subjects are correct in both performance and error detections. In all four groups there are more children who show incorrect performance but correct error detections than children with correct performance but incorrect error detections. These findings will be discussed in 6.2.3.2.

Presentation order effects

Figure 23 indicates that the experimental group 3 is generally slightly better in error detections than the control group 4: children from group 3 show more often incorrect performance but correct error detections than group 4 whereas the "control children" of group 4 show more often correct performance but incorrect error detections (compare also the performance results in Figure 8 and Figure 9 with the results on error detections in Figure 17 and Figure 18). The relatively better results in error detections of group 3 could be due to a momentary enhancement by immediately preceding performance.

6.2.3.2 Within-Test Relations between Performance and Awareness as Related to Theoretical Expectations

In 5.6 (synopsis of the predictions which relate to the role of linguistic awareness in language acquisition) we formulated three hypotheses with respect to the within-test relations between performance and awareness.

In the first one (H_{A4}) we expected that awareness can be observed although children do not yet perform correctly. This assumption can be confirmed for error detections by looking at Figure 22 and Figure 23 which show a relatively high percentage of children who can detect errors correctly but who cannot yet perform correctly. There are even children who change an incorrect pronoun correctly and can explain why the incorrect pronoun is inappropriate although their performance is insufficient. However, such children were rare (4 children) and we found them only in POST. It is noteworthy that their performance in PRE had been at least partially correct, i.e. either the "utterance" pronoun* or the "reference"

* E.g. in the awareness task I ("sein"/ihr_{sing}) the "utterance" pronoun in the performance test is "sein" and the "reference" pronoun is "ihr_{sing}".

pronoun had been mastered in the first test.

For instance, subject 33, a girl who was 5:0 in PRE and 5;5 in POST mastered "ihr_{sing.}" and "sein" in the first performance test (PRE), detected the error in task I ("sein"/ihr_{sing.})/PRE but could not yet correct appropriately (she substituted the name of the female doll). In POST, her performance deteriorated for "ihr_{sing.}" and "sein" although she was able to detect, correct, and explain the error in task I ("sein"/ihr_{sing.}).

(...)

(...)

Vp: "Sein Geschenk geht nicht."

S: "His present does not work."

Vl: "Sein Geschenk geht nicht. Und
wieso geht 'n sein Geschenk
nicht?"

E: "His present does not work.
And why doesn't his present
work?"

Vp: "Wegen das sich nicht anhört
wie 'n Junge."

S: "Because this doesn't sound
like a boy."

Vl: "Aha, ja gut - Und bei Mädchen
muß man sagen?"

E: "I see, ok. - And for girls
I have to say?"

Vp: "Das ist ihr Geschenk."

S: "This is her present."

Another girl who only knew the utterance pronoun "sein" in the first performance test (but could neither detect nor correct the error in task I in PRE) did not master "sein" and "ihr_{sing.}" in POST. Although this child detected and corrected the mistake in task I ("no, it is her present") her explanation was contradictory.

(...)

(...)

Vl: "Warum muß ich denn sagen:
ihr Geschenk?"

E: "Why do I have to say:
her present?"

Vp: "Weil es sein Geschenk ist."

S: "Because it is his present."

Thus, we conclude that error detections are possible without correct performance but corrections and explanations are less likely without correct performance. If at a later stage corrections and explanations are given but the directly preceding performance is bad, there has been at least partially correct performance at an earlier stage.

In our second hypothesis relating to within-test relations between performance and awareness (H_{A5}) we assumed that performance precedes error detections and corrections. Our results show that this hypothesis holds only for singular pronouns in the comparison of performance and error detections. For instance, there are more children who are able to perform correctly in the 3rd person singular pronoun tasks ("sein" and "ihr_{sing.}") but cannot detect the error in task I ("sein"/ihr_{sing.}) than children who cannot perform correctly on "sein" and "ihr_{sing.}" but can detect the gender error in task I (significant difference between +- and -+: $\chi^2 = 38.24$, $df = 1$, $p < .001$).

However, for all comparisons of performance and error detections with plural pronouns (i.e. when pronouns of the plural awareness tasks III, V, and VI are analyzed) we have to reject H_{A5} . The (-+) relationship is in PRE more frequent than the (++) relationship. This means that error detections of plural pronouns precede correct performance of plural pronouns.

This result has to be seen with respect to (semantic) features. For correct performance one needs all features to be mastered. For correct error detections one needs at least one of the contrasting features involved. This difference between performance and awareness should therefore not hold for corrections. And, in fact, children who cannot correct a pronoun appropriately generally master the pronoun in the performance test (note that the four children who displayed correct error detections but not correct performance in POST mastered at least one pronoun correctly in the first performance test).

In our third hypothesis with respect to within-test relations between performance and awareness (H_{A6}) we assumed that it is harder to become aware of early acquired pronouns than of later acquired pronouns. Our data show that this is only sometimes the case.

For instance, "mein" (my) and "dein" (your_{sing.}) are the earliest pronouns in all performance tests (cf. Fig. 1). The "mein"/dein contrast (task I) reveals that error detections are also early (cf. Fig. 10). However, the speaker/addressee shift and perspective-taking are still difficult and only older children can yield the appropriate pronoun "dein" (cf. Fig. 19).

Or, plural pronouns (such as "euer"/your_{pl.}) are late in the performance tests. Thus, awareness for plural tasks should be early. However, error detections for plural awareness tasks (such as task V "euer"/user_{excl.})

are later than error detections for the "mein"/dein contrast (which should be relatively late because "mein" and "dein" are acquired early) but earlier than error detections for the "sein"/ihr_{sing.} contrast (which should be later than error detections for plural awareness tasks because "sein" and "ihr_{sing.}" are acquired earlier than plural pronouns, such as "euer") (cf. Fig. 10 and Fig. 19).

It seems that these results are due to another cause, namely the one mentioned before: what matters for detection is whether there is at least one of the contrastive features mastered, and not whether the pronoun as a whole is (i.e. all features of the pronoun).

For pronoun correction, it is important to distinguish between pronouns which are affected by the speaker/addressee shift and those which are not (cf. 6.2.2.3, our third factor). The developmental growth of pronoun performance and pronoun corrections seems to be more concordant for pronouns which are not affected by the speaker/addressee shift than for pronouns which are affected.

This completes the analysis of within-test relations as far as required by the theoretical analyses in section 5.1 to 5.6. Let us summarize the main findings:

- error detections are possible without correct performance but this is less likely for corrections and explanations,
- error detections can precede correct performance because only contrasting (and not all) features are required for correct error detections,
- corrections do in general not precede correct performance because all features are required for appropriate corrections, and
- the developmental growth of performance and corrections seems to be more concordant for pronouns which are not affected by the speaker/addressee shift than for pronouns which are affected.

6.2.3.3 Longitudinal Relations between Awareness and Performance

Let us first repeat our main hypothesis (H_A7) as stated in 5.6 (cf. also section 1 and section 5). We said:

Children who show metalinguistic abilities in the first test but whose automatic performance is not yet appropriate will improve their automatic performance in the second test to a larger degree than those children who are neither aware nor perform correctly in the first test.

It is only because of this hypothesis that a longitudinal correlative study had to be set up (early awareness may be instrumental or facilitative for later performance).

In 6.2 we described the analyses of our data with respect to longitudinal relations between awareness and performance in order to find an answer for our main hypothesis. Children's performance scores and awareness scores in PRE were dichotomized because we wanted to compare children with low performance and low awareness in PRE (00) with children who show low performance but high awareness in PRE (01) with respect to differences in absolute performance scores in POST of these two groups of children (PRE 00 versus PRE 01).

The dichotomization of a few performance and awareness scores in PRE caused problems because there were cases where children's score was exactly the median for their groups. Example: For a group where the median detection score was 3, two or less correct error detections had to be classified as "0" (worse than average), and four or more correct error detections as "1" (better than average), but without further criteria one cannot decide whether a child with three correct error detections should be classified as "0" or as "1". In such a case we checked the protocols for the classification of performance scores and the protocols and transcripts for the classification of the awareness scores: were there any clear indications which favoured either classification? In case of very hesitant and inconsistent answers we decided for a "0"-classification. Since this criterion (long hesitations and inconsistencies) was still insufficient for our scores, we assigned the child randomly to a "0" or "1" score. These decisions were made before the inspection of the performance scores in POST, i.e. without knowing whether performance in POST was better (or worse or the same) than in PRE.

A post-hoc examination of our "blind" dichotomizations showed that a Type I error (H_0^* will be rejected falsely) can be excluded but that a Type II error (H_0 is accepted when, in fact, it is false) is possible.

* H_0 : There is no difference of absolute performance scores in POST of (00)-children and (01)-children.

H_1 : (01)-children have higher absolute performance scores in POST than (00)-children.

In 6.2 we described our final step of these analyses. Let us shortly summarize it again: Two tests (error detection and correction) for each group (and thereafter, for all four groups together) were carried out. The first test analyzes differences in means (= M) of performance in POST for "00_{ed}"*-children ("00_{ed}" = children with "low performance" and "low error detections" in PRE) and "01_{ed}"-children ("01_{ed}" = children with "low performance" but "high error detections" in PRE).

The second test analyzes differences in means (= M) of performance in POST for "00_{pp}"*-children ("00_{pp}" = children with "low performance" and "low possessive pronoun corrections" in PRE) and "01_{pp}"-children with "low performance" but "high possessive pronoun corrections" in PRE).

For both of these tests we applied t-tests (prior to the t-tests we checked for equal variances of the two types of independent observations).

These two tests are performed because we are interested in the question whether early error detections and/or corrections can be predictive for later performance.

We now want to look at our results with respect to our main hypothesis (Table 22):

Table 22. Differences in Performance/POST Scores between Non-aware Children and Early Aware Children (Error Detections and Corrections)

	<u>error detections</u> significant differences between "00 _{ed} " and "01 _{ed} " in performance/ POST	<u>corrections</u> significant differences between "00 _{pp} " and "01 _{pp} " in performance/ POST
Group 1	no ($M_{00_{ed}} = 3.7/M_{01_{ed}} = 5.$)	no ($M_{00_{pp}} = 4.3/M_{01_{pp}} = 4.5$)
Group 2	yes ($M_{00_{ed}} = 4.8/M_{01_{ed}} = 8.$) ($p < .005/4.56 > t_{(0.95,5)} = 2.015$)	yes ($M_{00_{pp}} = 5./M_{01_{pp}} = 7.7$) ($p < 0.25/2.7 > t_{(0.95,6)} = 1.943$)
Group 3	no ($M_{00_{ed}} = 6.8/M_{01_{ed}} = 7.3$)	no ($M_{00_{pp}} = 7./M_{01_{pp}} = 7.$)
Group 4	no ($M_{00_{ed}} = 6.8/M_{01_{ed}} = 7.5$)	not yet ($M_{00_{pp}} = 6./M_{01_{pp}} = 8.$) ($2.12 < t_{(0.95,4)} = 2.132$)
All four groups together	yes ($M_{00_{ed}} = 5.6/M_{01_{ed}} = 6.9$) ($p < .025/2.17 > t_{(0.95,27)} = 1.703$)	yes ($M_{00_{pp}} = 5.5/M_{01_{pp}} = 7.$) ($p < .01/2.6 > t_{(0.95,27)} = 1.703$)

*"ed" stands for "error detection".

**"pp" stands for "possessive pronoun correction".

Table 22 shows us that in general those children who are aware but cannot yet perform correctly in the first test show better performance in the second test than children who can neither perform correctly nor are aware in the first test.

The youngest children of group 1 who have "high awareness" (with respect to error detections and corrections) but "low performance" in the first test show clearly (but not significantly) better performance in the second test than children of this group with "low awareness" and "low performance" in the first test.

Children of group 2 who have "high awareness" (with respect to error detections and corrections) but "low performance" in the first test show significantly better performance ($p < .025$) in the second test than children of this group with "low awareness" and "low performance" in the first test.

The oldest children of group 3 who have "high error detections" but "low performance" in PRE show clearly better performance in POST than children of this group with "low error detections" and "low performance" in PRE. There is no difference between the oldest children with "low performance" and "low corrections" in PRE and the oldest children with "low performance" but "high corrections" in PRE in the performance of the second test. "Control" children who have "high awareness" (with respect to error detections and corrections) but "low performance" in PRE display clearly (but not significantly) better performance in the second test than children of this group with "low awareness" and "low performance" in PRE.

When all four groups are taken together the difference between "00"-children and "01"-children is significant for error detections ($p < .025$) and for corrections ($p < .01$). However, when group 1, group 3, and group 4 are taken together the difference between "00"-children and "01"-children is not significant for error detections, but only for corrections ($p < .05$). These results indicate that early awareness (error detections and corrections) may be instrumental or facilitative for later performance. This holds more for children in group 2 (who are aware but cannot yet perform correctly) than for children in group 1 (who are often not yet aware) and children in group 3 (who are often already quite good in performance). This means that we cannot reject our main hypothesis. It seems that linguistic awareness can function as a feedback mechanism or correction device in the acquisition of possessive pronouns. The generally better performance in POST of children who show early awareness is not necessarily due to

these children's use of a "deliberate control". It could be that the effect of awareness rather lies "in a generalized differentiation of the cognitive structure which is then in a position to respond to various different demands by activating a variety of specific heuristic processes, instead of always applying the same one standard procedure to all situations, as it had tended to be before" (Dörner, 1979, p. 104).^{*} Thus, it could be that a "system for awareness" ... "is applying its heuristic techniques to the record of its own heuristic processes. This means that it does not observe itself directly but only indirectly, in that it analyzes the records of its own activity." (Dörner, 1979, p. 106; cf. also Nisbett & DeCamp Wilson, 1977).

In our last hypothesis (H_{A8}), which also relates to longitudinal relations between awareness and performance (in Study A) we assumed that early language performance is stronger correlated with later language performance than early reflective abilities.

In order to test this hypothesis we used Kendall's partial rank correlation coefficients for partial correlations between awareness in PRE and performance in POST (partialling out the effect of performance in PRE) and for partial correlations between performance in PRE and performance in POST (partialling out the effect of awareness in PRE). This was done in two tests (error detections and corrections). For each of the four groups and for the four groups together both tests were carried out.

In a first step we determined three correlations: The first one is the correlation between performance in POST (= $perf_2 = x$; "x" is based on the number of correct pronouns in POST, i.e. from 0 to 9^{**}) and awareness in PRE (i.e. in our first test: error detections in PRE = $ed_1 = y_1$; in the second

^{*} In three experiments with adults Dörner (1979) could show that "self reflection leads to a substantial improvement in problem solving ability." (p. 102). However, it is noteworthy that the awareness tasks were qualitatively different from ours: Ss had to report their own thinking during the problem-solving process.

^{**} There were nine pronouns in the performance test. We ranked our observations on the x variable from 1 to N (N is the number of subjects in a group). Our computations had to be corrected for ties (cf. Siegel, 1956, p. 217) because some Ss had the same scores.

test: corrections in PRE = $pp_1 = y_2$; "y" is based on the number of correct error detections or correct changes of possessive pronouns in the six error detection tasks, i.e. from 0 to 6). The second one is the correlation between performance in POST (= $perf_2 = x$) and performance in PRE (= $perf_1 = z$; "z" is based on the number of correct pronouns in PRE, i.e. from 0 to 9). The third correlation computed is between awareness in PRE (i.e. in our first test = $ed_1 = y_1$; in our second test = $pp_1 = y_2$) and performance in PRE (= $perf_1 = z$).

For each group we had three correlations in each test, for error detections T_{xy1} , T_{y1z} , and T_{xz} , and for corrections T_{xy2} , T_{y2z} , and T_{xz} (note that the correlation between performance in POST and performance in PRE, i.e. T_{xz} , is the same in both tests).

In a second step, we determined for the first test (error detections) the correlation between performance in POST and error detections in PRE, partialling out performance in PRE ($T_{xy1.z}$), and the correlation between performance in POST and performance in PRE, partialling out error detections in PRE ($T_{xz.y1}$). Similarly, for our second test (pronoun corrections) the correlation between performance in POST and corrections in PRE, partialling out performance in PRE ($T_{xy2.z}$), was determined as well as the correlation between performance in POST and performance in PRE, partialling out corrections in PRE ($T_{xz.y2}$). These four partial correlations ($T_{xy1.z}$ as compared to $T_{xz.y1}$; $T_{xy2.z}$ as compared to $T_{xz.y2}$) were analyzed for each of the four groups and for all four groups together. Let us now look at the results (Table 23):

Table 23: Partial Correlations between Early Awareness and Later Performance and between Early Performance and Later Performance

	Awareness: Error Detections		Awareness: Corrections	
	$T_{xy1.z}^*$	$T_{xz.y1}$	$T_{xy2.z}$	$T_{xz.y2}$
	partial correlations between performance in POST and error detections in PRE, partialling out performance in PRE	partial correlations between performance in POST and performance in PRE, partialling out error detections in PRE	partial correlations between performance in POST and corrections in PRE, partialling out performance in PRE	partial correlations between performance in POST and performance in PRE, partialling out corrections in PRE
Group 1 (N=14)	.26	.25	.30	.16
Group 2 (N=16)	.68	-.25	.32	-.17
Group 3 (N=14)	.31	.29	-.01	.29
Group 4 (N=15)	.26	.06	.42	-.06
All four groups together	.46	.10	.34	.14

* Note that tests of the significance for $T_{xy.z}$ and $T_{xz.y}$ are not possible because the observations are not independent.

Table 23 indicates generally that performance in POST is stronger correlated with awareness in PRE than with performance in PRE (with one exception: in group 3 corrections in PRE are not correlated with performance in POST but performance in PRE is correlated with performance in POST). This means that we have to reject our hypothesis that early language performance is stronger correlated with later language performance than early reflective abilities for the tasks under concern. It seems that in general early awareness is more predictive for later performance than early performance. This holds more for error detections than for corrections. A possible reason for the one exception, the stronger predictive power of performance in PRE for performance in POST than of corrections in PRE for group 3, could be the children's inability to master the speaker/addressee shift in the perspective-taking tasks II, V, and III in PRE (cf. Table 21, Fig. 19, Fig. 20 and Fig. 21).^{*} Maybe, this inability to yield the appropriate pronoun "weakened" the correlation between performance in POST and corrections in PRE.

The generally stronger correlations between awareness in PRE and performance in POST than those between performance in PRE and performance in POST can be due to the fact that we used deictic terms as our study material. Pronouns are variable in their referential function. It may be that - to some degree - awareness is necessary for correct identification of pronouns within a communication situation. This might be more so for pronouns which are even less "fixed" than the self-referring "I" (or "my") or the other-directed "you_{sing.}" (or "your"), i.e. for 3rd person pronouns and plural pronouns which involve at least one 3rd person. This may be a reason for their relatively late acquisition. Could it be that this factor (variable terms require to some degree a metalinguistic step-back) holds also as an explanation for the relatively late acquisition of kinship terms (i.e. of relational nouns, cf. Piaget, 1928; Danziger, 1957; Haviland & Clark, 1974; Deutsch, 1979), of deictic verbs (cf. Clark & Garnica, 1974) or of verbs (like "promise", "ask", and "tell") which relate to speaker and addressee (cf. C. Chomsky, 1969)?

^{*}Note that the control group 4 mastered the speaker/addressee shift in the perspective-taking task II in the first test better than the experimental group 3 (cf. Table 21).

From our data it appears that we should not underestimate linguistic awareness as a possible facilitation in language acquisition although we should be cautious not to overgeneralize our findings. It might well be that the role of linguistic awareness in language development is only important for variable terms or that still other factors (e.g. nonverbal ones) are involved.

After our analyses on the longitudinal relations between awareness and performance we want to consider a last question: Is linguistic performance in PRE predictive for linguistic awareness in POST? For this, the procedure of our analyses was very similar to the one for our main hypothesis. We compared the absolute awareness scores (error detections and corrections) in POST of children with "high performance" but "low awareness" (low error detections and corrections) in PRE with absolute awareness scores in POST of children with "low performance" and "low awareness" in PRE. None of these comparisons proved to be significant (the original data can be inspected). This means that early performance is not predictive for later awareness.

Let us summarize our findings before we turn to Study B on "natural and syntactic gender" which might either confirm or falsify our assumptions from Study A:

- our data suggest that, in fact, early linguistic awareness may be "instrumental" or "facilitative" for later performance,
- early awareness seems to be in general more predictive for later performance than early performance, and
- early performance is not predictive for later awareness, i.e. the acquisition of primary linguistic skills is not a sufficient condition for the development of linguistic awareness. Let us now turn to Study B.

7. STUDY B: "NATURAL AND SYNTACTIC GENDER"

7.1 Method of Study B

In the experiment on "natural and syntactic gender" (= Study B) we will compare natural gender which has clear extralinguistic/semantic reference with syntactic gender which has a more morphophonological/syntagmatic base (Study A focussed more on deictic aspects.). This Study B has been set up in order to explore "the role of non-linguistic conceptual factors versus purely linguistic ones in the acquisition of metalinguistic abilities (Böhme & Levelt, 1979, p. 2).

Both natural and syntactic gender become only relevant for the 3rd person singular in German possessive pronouns. Natural gender indicates the male or female sex of animates. Syntactic gender which refers also to inanimates can be differentiated for masculine, feminine, and neuter gender. In Study B we will only investigate the gender of the possessor which is expressed by the free morpheme in German possessive pronouns (cf. section 2). Since the morphophonological form for the masculine possessor cannot be distinguished from the one for the neuter possessor, it will be interesting to see which possessor will be chosen first in the performance test and whether the child masters two functions of one and the same form.

The general outline of the study of "natural and syntactic gender" is the same as the one of the study on "shifting reference". There are four groups which get performance and awareness tests at two points of time (PRE and POST). The main points of interest are: firstly, the child's understanding of natural and syntactic gender in possessive pronouns (performance), secondly, his detections, corrections, and explanations of errors with respect to natural and syntactic gender (metalinguistic abilities), and thirdly, the relationship between metalinguistic abilities and performance (especially the longitudinal, intraindividual relation between awareness in the first test and performance in the second test).

Each child has to answer performance and awareness questions for two different tasks: one task which tests the child's understanding and awareness of natural gender (= "sexus"), and another task which tests his understanding and awareness of syntactic gender (= "genus"). The children in Study B are not the same as the ones in Study A but there are just as in Study A three age groups which get performance before awareness and one additional group (the control group 4) in which the children are of the

same age as those in the oldest experimental group, and where awareness precedes performance. The experiment on "natural and syntactic gender" involves a PRE- and POST-comparison covering a time interval of five months between the two testings.

7.1.1 Subjects and Research Design of Study B

In the first test (PRE) a total of 64 children were involved, 38 girls and 26 boys, i.e. as in Study A the girls were somewhat overrepresented. Here again, the data of three children were discarded because two of them had moved away after PRE and one was sick in POST. Thus, there were 61 children in four groups: In group 1 were the 16 youngest children, half of them boys and half of them girls, ranging from 3;3 years to 4;5 years of age (mean age: 3;11). Group 2 contained 13 children (two children were discarded in this group), five girls and eight boys, from 4;6 to 5;1 years of age (mean age: 4;9). In group 3, 18 children were tested, fourteen girls, but only four boys, ranging from 5;2 to 5;11 (mean age: 5;5). In group 4, the control group (awareness before performance) were 14 children, eight girls and six boys, ranging from 5;0 to 5,10 (average: 5;5).

When these four groups were tested in POST, they were exactly five months older: group 1 (4;4), group 2 (5;2), group 3 (5;10), and group 4 (5;10). Pilot studies had indicated that gender was still a major problem in these age groups (cf. also the results of the study on "shifting reference").

All children were native speakers of German and came from the same kindergartens as the children in Study A. Everything we reported for the children in Study A holds also for the children in Study B, except that there was a selection criterion for the children in Study B: they had to be familiar with the basic colours (red, green, blue, yellow, black, and white). The research design for the study on "natural and syntactic gender" was for both tests (PRE and POST) the same one as in "shifting reference" (cf. Table 15 and Table 16), except for the number of subjects and their mean age. PRE of Study B was also administered in May and June 1978, POST in October and November 1978 (exactly five months later).

7.1.2 Experimental Set-up of Study B

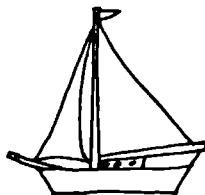
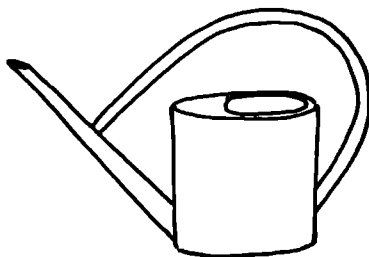
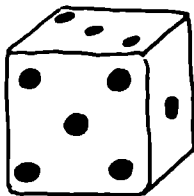
In Study B each child had to do one task on natural gender and one

task on syntactic gender. The order was chosen randomly: 29 children got natural gender (= "sexus") before syntactic gender (= "genus"), 32 children the inverse order (genus before sexus). In the sexus-task three animates were seated on a table of a kindergarten room: a male doll, a female doll, and a pig without specific sex. The left-to-right ordering of the three figures was varied from child to child.

Before the sexus-task began names had to be given to the male doll (e.g. der Peter) and to the female doll (e.g. die Tina) (notice that proper names in colloquialism can carry articles in German). The pig was well-known through German television (das Schweinchen Dick). "Der Peter" had a red scarf around his neck, "die Tina" had a green scarf, and "das Schweinchen Dick" a yellow scarf.



In the genus-task three objects were placed on the table. Here, too, the order of the objects varied. These objects were a black dice (der schwarze Würfel), a yellow watering-can (die gelbe Gießkanne), and a blue mini-boat (das blaue Boot/Bötchen, respectively das blaue Schiff/chen) (the diminutive "-chen" goes in German together with the neuter article). The dice and the watering-can were relatively big so that the child would not use the suffix "-chen" (or "-lein") for these objects.



7.1.3 Performance Tasks of Study B

The performance tasks in Study B were completion tasks which tested the children's comprehension of 3rd person singular possessive pronouns. The experimenter asked the child in the natural gender experiment:

- I. "Ihre Schleife ist ...?" (Her scarf is ...?)* and
- II. "Seine Schleife ist ...?" (His scarf is ...?).

The questions were always in that order. Although the pronoun "ihre" can refer to either the female doll or the pig by conceiving it as a female animal we expected that in spontaneous understanding correct reference would be primarily made to the female doll (if the pig was also conceived as female this could be indicated by the children in a spontaneous second reference). The pronoun "seine" can refer to either the male doll or the pig (either by conceiving it as a male animal or by the neuter article: das Schweinchen Dick). Despite the possible multiple pronoun functions the child was not prompted for a second time because we wanted to know whether the child showed plurifunctional usage spontaneously.

In the syntactic gender task E asked:

1. "Ihre Farbe ist ...?" (Her colour is ...?)* and
2. "Seine Farbe ist ...?" (His colour is ...?).

There was also no change of questions. The possessive pronoun "ihre" can only refer to the feminine gender of the watering-can (die Gießkanne) whereas "seine" can refer to either the masculine gender of the dice (der Würfel) or the neuter gender of the boat (das Boot). The child was not prompted a second time when asked for "seine Farbe".

Some children got the sexus task before the genus task, others genus before sexus. This holds for the experimental and the control children. There was, however, the same order for PRE and for POST. Our motivation for the inclusion of the pig in the sexus task was the child's gender attribution to this animate. Would the child react to it in the performance tasks? And if not, would the child comment on it in some way?

* Note that in the natural gender task the possessors are the male doll, the female doll, and the pig, and the possession is a scarf. In the syntactic gender task "the possessors" are the dice, the watering-can, and the boat, "the possession" is the colour of these objects. Although it seems somehow inappropriate to use the terms "possessors" and "possession" in genus there seems to be in general an inappropriacy with respect to "possessive relationships" of objects.

7.1.4 Awareness Tasks of Study B

Here again, standardized questions were used for error detections, but exploratory interview questions for corrections and explanations of errors (if the child's answers indicated denial or if they were hesitant or contradictory).

There were altogether ten awareness questions in Study B: four questions on "natural gender", four questions on "syntactic gender", and two "conflict" questions (these are questions in which there is a conflict between natural and syntactic gender).

The four awareness questions on natural gender in which the possessive pronoun and the colour were emphasized are:

- I. E looked at the child and asked: "Can I say, "seine" (his) scarf is green?", thus mistaking the pronoun deliberately. For a correction the child had two choices in this task: the correction of the possessive pronoun (his) or of the predicative adjective (green). For a correct explanation the child had to show awareness of the relationship between the possessive pronoun(s) and sex of the doll(s).
- II. E looked at the child and asked: "Can I say, "ihre" (her) scarf is yellow?". The child's acceptance of this utterance would have been only coded as a correct answer if there was an indication that he or she thought that the pig could be only a female pig. But no such case could be found. Therefore, the acceptance of "ihre" in this task was coded as non-detection. Again, the possessive pronoun (her) or the predicative adjective (yellow) could be corrected. However, if the child changed the predicative into "red" but did not change the possessive pronoun (her to his) the correction would be wrong. For an explanation to be correct the child should refer to the sex of the pig (if the child conceived the pig as male) or the neuter gender of the pig (das Schweinchen), or in case of a colour change (green), to the sex of the female doll.
- III. This awareness task consisted of two parts which implied both correct statements:
 - a. E looked at the child and asked: "Can I say, "seine" (his) scarf is yellow? (this task will be also called "filler task IIIa"), and
 - b. E looked at the child and asked: "Can I say, "seine" (his) scarf is red?" ("filler task IIIb").

(his) or the predicative adjective into "yellow" (the watering-can is of feminine gender). For a correct explanation the child had to indicate the syntagmatic collocation between possessive pronoun and syntactic gender (which becomes evident by the article and also in the personal pronoun).

2. E looked at the child and asked: "Can I say, "seine" (his) colour is yellow?", thus mistaking the pronoun deliberately. The possessive pronoun "seine" could be corrected into "ihre" (her). There were two possibilities for a correction of the predicative adjective: "seine" can go together with the black dice (der schwarze Würfel) or the blue boat (das blaue Boot / Schiff). For a correct explanation, cf. task 1.
3. Like in III. this awareness task consisted of two parts which implied correct statements:
 - a. E looked at the child and asked: "Can I say, "seine" (his) colour is black?" ("filler task 3a"), and
 - b. E looked at the child and asked: "Can I say, "seine" (his) colour is blue?" ("filler task 3b").

Here, too, either 3a or 3b could be discarded if relevant information had been given earlier. The children were often prompted for an explanation, both in case of acceptance and of rejection (we will see in the results that a number of children wanted to refer "seine" to one object only).

4. E looked at the child and asked: "Can I say, "ihre" (her) colour is black?", thus mistaking the pronoun deliberately. Again, the child could change the possessive pronoun into "seine" or the predicative adjective into "yellow". For a correct explanation, cf. task 1.

After these four questions (which were administered in the following order: 1, 2, 3a, 3b, and 4) the "syntactic gender conflict" question was given:

5. E looked at the child and said: "The boat is now called Susanne (= a female German name). What do I have to say now: "ihre" (her) or "seine" (his) colour?". For half of the children "seine" was given before "ihre". The motivation for this conflict task was the investigation of the child's preference of either (female) natural gender ("ihre") or of (neuter) syntactic gender ("seine"). The child had to explain his or her choice.

Half of the children got I, II, IIIa, IIIb, IV, and V (the "natural gender awareness tasks") before 1, 2, 3a, 3b, 4, and 5 (the "syntactic gender awareness tasks"), the other half the inverse order (syntactic gender awareness tasks before natural gender awareness tasks).

7.1.5 Experimental Procedures and Instructions of Study B

In the experiment on "natural and syntactic gender" each child was tested individually in one session (one test) which lasted approximately 20 minutes. The sessions took place in a quiet kindergarten room. The children were escorted by the experimenter and were seated next to her. "Companions" were allowed to the children (cf. 6.1.6).

After the introduction of the female research assistant Veronika who took notes but did not participate in the "games", instructions were given. For the first performance tests (PRE) in the three experimental groups instructions (which include definite article and colour checkings) were as follows:

"You see this boy, this girl-doll ("Mädchenpuppe"; note that "Mädchen" is despite the female sex of neuter gender - therefore, we had to use the feminine syntactic gender "die Puppe" for the female doll; this was not the case for the boy), and this pig, right? (Most children knew "Schweinchen Dick" by German television). This is "das Schweinchen Dick". You know that its name is "Dick" because it is so fat (this was done in order to exclude connotations with the - in Germany unusual - male name "Dick"). How do you want to call the boy? (Child says, for instance, "Peter"). Ok this is "der Peter". How do you want to call this girl-doll? (Child says, for instance, "Tina"). Ok, this is "die Tina".

Now, who is this (E points at the pig)? (If the children did not say "das Schweinchen Dick" but only "Schweinchen Dick" they were prompted for the definite article: "Der, die, das?" - which nearly all children answered correctly. The few children who said: "Das ist der Dick" were told that this was not "der Dick" but "das Schweinchen Dick"). Ok, this is "das Schweinchen Dick". Who is this (E points at the male doll) (same procedure as above). Ok, this is "der Peter". Who is this (E points at the female doll)? (same procedure as above). Ok, this is "die Tina". Which colour has the scarf which "das Schweinchen Dick" has around the neck? (Children who had difficulties with colours were discarded). Yes, "das Schweinchen Dick" has a yellow scarf. Which colour has the scarf which "der Peter" has around

the neck? Yes, "der Peter" has a red scarf. Which colour has the scarf which "die Tina" has around the neck? Yes, "die Tina" has a green scarf. I want to know whether you can answer my questions. Just tell me which colour I mean. ..." (administration of the natural gender tasks of the performance test).

The instructions for the syntactic gender tasks were the same as for natural gender: after the definite articles and colours of the three objects were checked the child was also told to tell E which colour she meant.

Thereafter, the natural gender awareness and the syntactic gender awareness questions (respectively the inverse order) followed. E said: "We now do something else. I want to see if you notice when I make a mistake. Can I say, the scarf of Peter is green?". All children said "no" and some mentioned that Tina had the green scarf (they also used the 'German demonstrative article': "Die hat doch die grüne Schleife!" (This one has the green scarf!)). Some children said that Peter had a red scarf, a few indicated both possibilities ("Tina has the green scarf and Peter has the red scarf"). In this trial phase the children were not asked to give explanations because of a possible transfer of 'trial explanations' to 'task explanations'. Before the awareness tasks were introduced the child was told that E made only sometimes a mistake but not always. The "natural gender conflict task" (the pig is called Petra) followed the four, respectively five, "natural gender awareness tasks" (as to the instruction, cf. task V in 7.1.4). The "syntactic gender conflict task" (the boat is called Susanne) followed the four, respectively five, "syntactic gender awareness tasks" (as to the instruction, cf. task 5 in 7.1.4).

The cassette-recorder was only used for the awareness questions and the dialogue between the experimenter and the child (the exploratory interview included E's promptings for corrections and explanations). Both performance and awareness answers of the child were recorded on specially prepared answer sheets by the research assistant. If a nonverbal reaction of the child was remarkable it was also noted. The experimenter gave no nonverbal hints to the child when asking questions.

At the end of the experiment E said: "Thank you! You did very well.." (for the final sequence, cf. 6.1.6). All children were "rewarded" with "Smartie"-sweets and not told that a retest was planned. The control group 4 had the same introduction to the tasks (names, definite articles, and colours of the animates for the "natural gender awareness tasks"; definite

articles and colours of the objects for the "syntactic gender awareness tasks") but got the awareness tasks before the performance tasks (cf. 6.1.6).

The second test (POST) was the same as the first one (PRE) (as to the procedure of standardizing the questions, cf. 6.1.6). Again, at the end of the experiment the child was thanked, told about his or her excellent performance, and got "Smarties".

7.2 Results of Study B

Before we give our results of the study on "natural and syntactic gender" (Study B), a few preliminary notes have to be made with respect to the procedure of analyses.

Performance tests

Like in Study A, we first checked children's correct performance in the first test (PRE) and in the second test (POST). We did this for the three "experimental" groups which got the performance test prior to the awareness test (group 1, group 2, and group 3) and for the "control" group 4 which obtained the performance test after the awareness test. Both inter-individual, cross-sectional correct performance of all three "experimental" groups and intraindividual, longitudinal correct performance for each group were analyzed.

Children's correct performances in "natural gender" (= "sexus") are analyzed separately from their correct performances in "syntactic gender" (= "genus"). This means that there will be no uniform performance score of both natural and syntactic gender for each child. Children could be easily correct by chance in the performance tests since there were only three animates in the natural gender task and only three objects in the syntactic gender task. The chance for a correct "ihre"-answer is in both tasks 1/3, and for a correct "seine"-answer 2/3.

Our expectation that children would always choose a different answer (i.e. another predicative adjective = another colour) for the second than for the first performance question was not met. Some subjects, especially the younger ones, referred to the same animate (or object) for both the "ihre"- and the "seine"-question. Because of the different chances for correct "ihre"- and "seine"-answers and because of the possibility of the same answer to two different questions we decided to evaluate both answers together. If just one completion was correct (e.g. to the "ihre"-question)

but the other one incorrect (e.g. to the "seine"-question) the child's total performance is classified as faulty, or incorrect. The same holds if both answers were incorrect. This means that each child had a "general performance score" in sexus and a "general performance score" in genus. In the following, therefore, correct performance in Study B refers always to correct performance with respect to both "ihre"- and "seine"-questions, except for the discussion where performance will be related to our predictions (cf. 7.2.1.2).

Some of the older children (in group 2, group 3, and group 4) showed "plurifunctional usage", when asked for "seine". This means that they referred not only to the boy ("his" scarf is red) but also to the pig ("his" scarf is yellow) in the natural gender task. In the syntactic gender task they referred not only to the dice ("his" colour is black) but also to the boat ("his" colour is blue).

If at least two correct answers (to the "ihre"-question and to the "seine"-question) were given, this correct performance will be called "standard performance". The "standard" performance includes also "plurifunctional usage" (because children added the "plurifunctional usage" to their correct "standard performance").

For group 4 (awareness before performance) a further specification was necessary. Some children gave names to the animates in the natural gender task and also to the objects in the syntactic gender task. This was done spontaneously. If in "sexus" a child said "her scarf is yellow" to the "ihre"-question and argued that "the piggy is called Petra" the "yellow"-answer was evaluated as a correct "ihre"-answer, i.e. there were no scoring problems in the natural gender task. However, scoring difficulties arose in the syntactic gender tasks of group 4: some subjects changed the syntactic gender of the objects by giving names with definite articles to the objects. These children claimed in the performance task that the watering-can (which is in German of feminine gender) is called "der Thomas" (masculine definite article and male name), that the boat (of neuter gender) is called "die Susanne" (feminine definite article and female name), and that the dice (of masculine gender) is called "die Michaela" (feminine definite article and female name). The correspondingly used genders (i.e. what we will call "anaphoric intrusions") are a separate performance class which are added to the "standard performance" scores because such "anaphoric intrusions" yield correct answers with respect to natural gender (i.e. to sex-specific names).

Presentation order effects were examined by comparing the results from experimental group 3 and control group 4, and task order effects by checking whether task presentation (sexus first or genus first) influenced correct performance (of genus second or sexus second) (cf. 7.1.3: 29 Ss had the sexus task first, 32 Ss the genus task first). We also analyzed children's preferences for the plurifunctional "seine" in sexus and genus (which of the two possibilities for "seine" was chosen first), their refusals (only one girl from group 4 replied in genus/PRE when asked for "ihre": "I don't know, this (= a possible reference for "ihre") doesn't exist". No other refusals were observed in Study B), children's mistakes in sexus and genus, and their comments in the performance tasks (there were hardly any comments in Study B except for children who showed plurifunctional usage - e.g. in sexus: "You forgot the pig. There you can also say "seine" scarf". - or in case of "intrusions of anaphoric reasons" - e.g. in genus: "The (female) watering-can should be called Thomas (male name)."). Children's nonverbal reactions were not systematically observed and analyzed.

Although a host of further systematic analyses (on correct and incorrect performance) were done, we will only present those results which are of theoretical interest.

Awareness tests

Like in Study A, we transcribed all utterances and nonverbal responses of E and S in the awareness tests and coded them by means of a special computer program. E and the research assistant transcribed and coded independently all interview texts. After several revisions of the coding scheme, the interrater agreement in the final coding scheme was 92%. Again, children's error detections and corrections (in Study B we dealt not only with "changes of the possessive pronoun" but also with "changes of the predicative adjective", cf. 7.1.4) were not a source of trouble in the coding procedure. Explanations, however, were as problematic in Study B as in Study A (cf. 6.2) though they were slightly more uniform than in Study A. In the final coding scheme we distinguished several kinds of explanations. The essential parts of the awareness data in Study B are: error detections, corrections (either "changes of the possessive pronoun" or "changes of the predicative adjective"), and explanations (examples for different kinds of explanations will be given below).

Like in Study A, the printing of the text interviews was done under

Unix operating system and the codes which concerned the interview texts under RSX operating system. Because of the incompatibility of Unix and RSX file structures we used a third operating system (RT-11).

By means of a Fortran program we got print-outs of code frequencies, frequencies of code combinations, and, if necessary, texts for further enrichment of the abstract codes. This was necessary because we had nearly 500 pages of transcriptions for the awareness data of "natural and syntactic gender" (about four pages of transcription of each child per test session) and nearly 12.000 codes (like in Study A about one hundred for each child per test session, i.e. eight codes for each of the five tasks in sexus and for each of the five tasks in genus plus additional codes for subject, task, and test identification). Frequencies of codes and code combinations were analyzed statistically (cf. Siegel, 1956; Adler & Roessler, 1972; Kriz, 1978).

Error detections

Like in Study A, there were several reactions of the child possible when E mistook the pronoun deliberately (in the sexus task I: "Can I say, his scarf is green?" where the female doll had the green scarf, or in genus task 1: "Can I say, "her" colour is blue?" where the - in German neuter - boat was blue). A "yes"-answer to an incorrect question (in sexus these tasks are tasks I, II, and IV; in genus these are tasks 1, 2, and 4) showed that the child had not been aware that the wrong pronoun had been used. A "no"-answer in tasks I, II, and IV (sexus) and in tasks 1, 2, and 4 (genus) indicated correct error detection. If a child changed his opinion during the interviews (from "yes" to "no" or from "no" to "yes") his last reaction was taken as answer. If in case of a "I don't know"-answer E's prompts and interventions did not result in a reaction of the child which indicated his error detection ability, the "I don't know"-answer was interpreted as an inability to detect an error. These are all instances of error detections in Study B.

For a correct error detection in either sexus or genus it was sufficient if a child had detected an error in only one of the three error detection tasks (I, II, or IV in sexus; 1, 2, or 4 in genus). No differences were made between children who showed correct error detection in one error detection task and children who showed correct error detections in two or three error detection tasks. Correct error detections are not given "by chance" (since

they are generally followed by corrections); even a single instance expresses a certain competence on the child's part. Each child had one "general" (correct or incorrect) error detection score in sexus and one "general" (correct or incorrect) error detection score in genus. The same holds for changes of the possessive pronoun, changes of the predicative adjective, and explanations, i.e. a single instance was sufficient for an awareness classification.

Error corrections

In Study B we have to distinguish between two types of error corrections: a) changes of the possessive pronoun, and b) changes of the predicative adjective.

a) Changes of the possessive pronoun

Whenever the child said "no" in an error detection task in either sexus (task I, II, and IV) or genus (tasks 1, 2, and 4) or if a "yes" was hesitant E asked: "How do I have to say it?". Here, the child had four reaction possibilities (if we exclude "changes of the predicative adjective", cf. b): firstly, he could say "I don't know" (no pronoun correction), secondly, he could yield an inappropriate pronoun (only one child corrected inappropriately in task I, saying "my scarf is green", he later gave the correct pronoun "her"), thirdly, he could choose a partly correct pronoun change (we will give examples below), or fourthly, he could yield a correct pronoun change. Correct changes of the incorrect possessive pronoun in sexus are only the following pronouns: "ihre" (her) in task I, "seine" (his) in task II (only five children conceived the pig as potentially female but they also argued that the pig could be of male gender and suggested "seine", i.e. the possessive pronoun was correctly changed), and "seine" (his) in task IV (cf. 7.1.4). Correct changes of the incorrect possessive pronoun in genus were only: "seine" (his) in task 1, "ihre" (her) in task 2, and "seine" (his) in task 4 (cf. 7.1.4). "I don't know"-answers, the inappropriate pronoun, and partly correct pronoun changes are not evaluated as correct pronoun changes.

Partly correct pronoun changes of sexus and genus occurred in three types: those with a definite or demonstrative article, those with a personal pronoun, and those which indicated a struggle for the correct morphological pronoun form (as to "word innovations", cf. 7.2.2.3). As to the first type (definite or demonstrative article), which was given by five

children in different groups, we want to present two examples from the transcripts.

Task II (sexus)

S15 in group 3/PRE; 5;7; male

V1: "Kann ich sagen, ihre Schleife ist gelb?"

Vp: "Nein, grün!" (schreit)

V1: "Jesses [sic]. Wer hat denn die gelbe Schleife?"

Vp: "Das Schweinchen Dick."

V1: "Ja, und wie muß ich beim Schweinchen Dick sagen?"

Vp: "Das ist ... das Schwein seine gelbe Schleife."

V1: "Gut. (lacht) Nehmen wir mal an, ich müßte jetzt sagen, seine Schleife ist gelb. Das hast du ja eben gesagt. Ich kann nicht sagen, ihre Schleife ist gelb, beim Schweinchen Dick. Warum muß ich beim Schweinchen Dick sagen, seine Schleife ist gelb?"

Vp: "Weil die Farbe (zeigt auf die Schleife der weiblichen Puppe) ja grün ist und die Farbe (zeigt auf die Schleife des Schweinchens) ja gelb ist. Kann doch nicht gleichzeitig sein."

E: "Can I say, her scarf is yellow?"

S: "No, green!" (screams)

E: "Jesus. Now who has the yellow scarf?"

S: "The piggy Dick."

E: "Yes, and how do I have to say for piggy Dick?"

S: "This is .. the pig his yellow scarf."

E: "Good. (laughs) Let us now suppose I had to say, his scarf is yellow. That's what you just said. I cannot say, her scarf is yellow, for piggy Dick. Why do I have to say for piggy Dick, his scarf is yellow?"

S: "Because this colour (refers to the scarf of the female doll) is green and this colour (refers to the scarf of piggy) is yellow. Cannot be at the same time."

- Vl: "Nee, aber ich könnte doch sagen beim Schweinchen Dick: ihre Schleife ist gelb, ja?"
- E: "No, but I could nevertheless say for piggy Dick: her scarf is yellow, yeah?"
- Vp: "Mhmh."
- S: "Mhum."
- Vl: "Kann ich denn das sagen? Das ist das Schweinchen Dick, ihre Schleife ist gelb."
- E: "Can I say this now? This is piggy Dick, her scarf is yellow."
- Vp: "Nein. Weil das (weibliche Puppe) ja grün ist und das (Schweinchen) ja gelb. Und das ist 'ihr' (weibl. Puppe) und das ist der, eh, das Schwein."
- S: "No. Because this one (female doll) is green and this one (piggy) is yellow. And this is 'her' (female doll) and this is the (masc.) article), eh, the (neuter article) pig."
- Vl: "Ah ja. Jetzt will ich wissen: warum muß ich sagen, seine Schleife ist gelb, bei dem Schweinchen?"
- E: "Oh yeah. Now I want to know: why do I have to say, his scarf is yellow, for piggy?"
- Vp: "Weil die Schleife ja ... ein Mann hat ja immer eine gelbe Schleife und eine rote und eine Frau hat ja eine grüne Schleife."
- S: "Because the scarf .. a man has always a yellow scarf and a red one and a woman has a green scarf."
- Vl: "Na, überleg doch mal. Ich könnte mir doch auch eine rote Schleife um den Hals binden. Das muß doch einen anderen Grund haben." (lacht)
- E: "Now, think about it. I could also tie a red scarf around the neck. There must be another reason." (laughs)
- Vp: "Mmm..."
- S: "Mmm..."
- Vl: "Warum muß ich denn bei dem Schwein sagen, seine Schleife?"
- E: "Why do I have to say for the pig, his scarf?"
- Vp: "Weil da ja das Schwein ist. Nicht seine Schleife, sondern das, das seine Schleife."
- S: "Because there is the pig. Not his scarf, but the, the (neuter article) his scarf."

Interestingly, this child (S15) corrected "ihre" in the same task in POST very similarly. E: "How do I have to say?" S: "Das, das Schweinchen Dick ist die Farbe gelb." ("The" (neuter article), the piggy Dick is the colour yellow. The child uses here an ungrammatical sentence).

Task IV (sexus)

S5 in control group 4/POST; 5;7; female

Vl: ... "Wie würdest du denn sagen bei dem Mädchen?"	E: ... "How would you say now for the girl?"
Vp: "Die."	S: "The." (feminine article)
Vl: "Die Schleife?"	E: "The (feminine) scarf?"
Vp: "Ja."	S: "Yes."
Vl: "Und beim Jungen?"	E: "And for boys?"
Vp: "Der, der Schleife."	S: "The (masc.), the (masc.) scarf." (The scarf is in German of feminine gender).
(...)	(...)

One child used the second type of partly correct pronoun changes (i.e. using a personal pronoun): this child of group 4 maintained in sexus that it was impossible to say "his scarf is green" (task I) and that one should say: "Sie ist grün" ("she" is green), thus avoiding the possessive relationship.

Transcripts of the third type (word innovations) will be presented in 7.2.2.3.

b) Changes of the predicative adjective

Correct changes of the predicative adjective were those answers in which the colour of the scarf (in sexus) or of the object (in genus), i.e. the predicative adjective, is in correct correspondence to the given possessive pronoun (cf. 7.1.4).

Correct changes of the predicative adjective in sexus are: "yellow" and "red" in task I, "green" in task II, and "green" in task IV (in task IV "yellow" would also be correct if the child argued that piggy Dick was

female). Correct changes of the predicative adjective in genus are: "yellow" in task 1, "blue" and "black" in task 2, and "yellow" in task 4.

Incorrect changes of the predicative adjective would be: in sexus in task II "red", and in genus in task 1 "black" (the dice is masc.), and in task 4 "blue" (the boat is neuter).

In the following figures "changes of the predicative adjective" comprise only correct colour changes, i.e. non-changes (= no change of the predicative adjective) and incorrect changes are not included.

It was possible that a child did not only give one correction (either a change of the possessive pronoun or a change of the predicative adjective) but both kinds of corrections, i.e. a change of the possessive pronoun and a change of the predicative adjective in one task.

Explanations (sexus)

Answers to "Why (not)?"-questions were generally full explanations. It was pretty difficult to code explanations in Study B and the coding scheme had to be revised several times. A main difficulty in the coding of the natural gender task were the explanations with respect to the pig. If a child said "no" to question II "Can I say, "ihre" (her) scarf is yellow?" and changed "ihre" (her) to "seine" (his) he was prompted for an explanation. In some cases children argued that "seine" was more appropriate because the pig 'looks like a boy', 'is like a father', etc. Here, a correct natural gender explanation was coded. It was, however, even harder to code unambiguously an answer like: "Seine (his) because of the trousers" (E: "Who has trousers, boys or girls?", child: "Boys .. eh no .. girls have sometimes also trousers.") or "seine (his) because of the blue eyes" (E: "What has "seine" (his) to do with the blue eyes?", child despite some counterevidence: "All boys have blue eyes."). These "pars-pro-toto" arguments were classified as "partially correct explanations".

Children's explanations in sexus varied from correct answers* (e.g. "Her (scarf), because this is a girl" or "His (scarf), because this is a

* A correct answer was also a natural gender attribution to the pig on the basis of extralinguistic clues. Nearly all children tried to determine the sex of the pig, turning it upside-down (e.g. "It doesn't have an udder, it must be a boy", "it looks like a father", "half boy, half girl", "it is not a girl, because he has to breasts").

"der")* to partially correct answers (e.g. "You cannot say "his" because it is Tina"), incorrect answers (e.g. "His (scarf) because this is a "she""), so-called "arbitrary" answers and "I don't know"-answers.

Some of the "arbitrary" answers were quite interesting. The children often claimed that a correctly changed pronoun just sounded better. Some argued even that they could not pronounce another pronoun in this context, e.g.: "weil ich das sonst nicht kann" (because otherwise I cannot say it) or "sonst kann man das nicht so gut aussprechen" (otherwise one cannot pronounce it so well), or that others would use the corrected pronoun also, e.g. "weil ich das so gehört habe" (because I have heard it in this way), and "weil ... weil man normal so sagt" (because one normally says so). In the same direction but a bit more enhanced was the normative argument: "weil man nicht lücht [sic]" (because one does not lie). One child just said: "weil ich das so möchte" (because I want it in this way), and another: "weil ich es gerade gesagt habe" (because I said it right now). In the following (general analysis) we only discriminate between correct answers and all other modes of explanations to "why (not)"-questions (about 10% of children's explanations in sexus, PRE and POST, were "arbitrary" explanations; partially correct or incorrect answers were remarkably rare in sexus: two subjects in PRE and also two in POST).

Explanations (genus)

More serious than in sexus was the coding problem in genus. How should one code natural gender explanations for syntactic gender? Like in the following example (task 4): "Can I say, "ihre" (her) colour is black?" (the black dice is of masculine gender), child: "Yes, only if this is a mother-dice (Mutter-Würfel)."

In general, explanations were relatively rare in syntactic gender. Most answers to the "why-not"-questions were "I don't know"-reactions (about 63% in PRE, and 46% in POST). "Arbitrary" explanations occurred also quite often (there is a slight increase over age; in PRE: 20% in POST: 34%). An interesting version of an "arbitrary" explanation which showed awareness is the distinction between a speaker's utterance and his (here:her) intention. E: "Why do I have to say "his" and not "her" colour?", S

*"Der" is in German the masculine definite article.

reflecting: "Weil ... man kann sich ja auch manchmal vertun" (Because ... one can sometimes also be mistaken). "I don't know"-reactions and "arbitrary" explanations are not coded as correct explanations in genus (cf. also the sexus-explanations).

It was often difficult to differentiate between correct and incorrect explanations in genus. Altogether we found more correct explanations (ca. 11% in PRE and ca. 14% in POST) than incorrect explanations. Children's explanations in genus have to be illustrated because quantitative analyses are a comparably poor means for an understanding of the child's train of thoughts. We decided to code sexus arguments in the genus tasks as incorrect if the possessive relationship was preserved but incorrectly used. Example:

Task 2 (genus)

S3 in group 3/PRE; 5;5; female

V1: "So, jetzt will ich wissen, kann ich sagen, seine Farbe ist gelb?"

E: "So, how I want to know, can I say, "his" colour is yellow?"

Vp: "Ihre."

S: "Her."

V1: "Ihre. Wieso muß das denn ihre Farbe heissen?"

E: "Her. Why is it called "her" colour?"

Vp: "Weil das ihre Kanne ist." (Verweis auf weibliche Puppe, die auf dem Stuhl neben dem V1 sitzt)*

S: "Because this is her (watering-)can." (Reference to the female doll who sits on a chair next to E)*

V1: "Wem gehört denn die Kanne?"

E: "To whom belongs the can?"

Vp: "Dem Mädchen da."

S: "To the girl there."

We also classified an answer as "incorrect" if the child attributed the pronoun to the colour. Example:

* The two dolls and the pig of the sexus task were placed on a chair next to the experimenter but in such a way that the child could normally not see the three figures. The objects of the genus task were on the table.

Task 2 (genus)

S12 in group 3/POST; 5;7; female

- | | |
|--|---|
| V1: "Dann will ich von dir wissen,
kann ich sagen: seine Farbe ist
gelb?" | E: "Then I want to know from
you, can I say: "his" colour
is yellow?" |
| Vp schüttelt den Kopf | S shakes her head |
| V1: "Warum nicht?" | E: "Why not?" |
| Vp: "Weil das ja blau ist." | S: "Because this is blue." |
| V1: "Aha. Ehm - wen mein ich da?" | E: "Aha. Eh- to whom am I
referring to?" |
| Vp: "Das Schiff." | S: "The boat." |
| V1: "Und jetzt will ich wissen, warum
sag ich da 'seine Farbe' beim
Schiff?" | E: "And now I want to know, why
do I say 'his' colour' for
the boat?" |
| Vp: "Weil das 'ne Jungen-Farbe ist." | S: "Because this is a boy's
colour." |

We should add that this girl maintained that "black is a boy's colour" and that "yellow is a girl's colour". We could later confirm our assumption for this child that all light colours were girl's colours to which one should refer to with "her" (independently of the indicated object) and that all dark colours were boy's colours to which one should refer to with "his". This becomes also evident in another child's argument:

Task 4 (genus)

S2 in control group 4/POST; 5;8; female

- | | |
|---|--|
| V1: "Kann ich sagen: ihre Farbe ist
schwarz?" | E: "Can I say: "her" colour is
black?" |
| Vp: "Auch." | S: "Also." |
| V1: "Warum?" | E: "Why?" |
| Vp: "Beides hört sich gut an, aber
'seine' hört sich besser an." | S: "Both sound o.k. but "his"
sounds better." |

Vl: "Weisst'e auch warum?"	E: "Do you know why?"
Vp: "Nein."	S: "No."
Vl: "Ja. Muss ich bei dem Würfel 'seine' oder 'ihre' Farbe sagen?"	E: "Yeah. Do I have to say now "his" or "her" colour?"
Vp: "Sagen wir mal 'seine'."	S: "Let us say "his"."
Vl: "Ja. Und warum?"	E: "Yes. And why?"
Vp: "Weil ... Jungs meistens schwarz sind."	S: "Because ... boys are mostly black."

Other incorrect explanations were: "'her" because this is a boy", "because this is so big", or "'her" because the watering-can waters flowers". Our last example for an incorrect explanation shows most clearly that a natural gender explanation in genus is not always a means for expressing the gender of an object but that it can be also an expression for a personification.

Task 4 (genus)

S37 in group 2/POST; 5;1; female

Vl: "Kann ich sagen, ihre Farbe ist schwarz?"	E: "Can I say, "her" colour is black?"
Vp: "Nee."	S: "No."
Vl: "Warum nicht?"	E: "Why not?"
Vp: "Kannste sagen. Aber dann muß man ... eh, eine Mutter haben, die Würfel is. 'Ne Würfel-Mutter und 'n Würfel-Vater ..."	S: "You can say it. But then one must .. eh, have a mother who is dice. A dice- mother and a dice-father.."
Vl: "Ja und was ist ..."	E: "Yeah and what is ..."
Vp: "Und 'n Würfel-Kind und 'n Würfel-Baby." (lacht herzlich) "Hört sich witzig an, ne?"	S: "And a dice-child and a dice-baby." (laughs heartily) "Sounds funny, doesn't it?"

VI. "Ja, eh,... jetzt wollt'ich noch wissen, kann ich sagen, seine Farbe ist schwarz? - Das ist der Wurfel, seine Farbe ist schwarz?"

Vp. "Ja, weil das doch 'n Wurfel ist."

VI: "Und kann ich auch sagen, ihre Farbe ist schwarz?"

Vp: "Ja, nur wenn es ein Mutter-Wurfel ist."

(...)

E "Yes, eh .. now I still wanted to know, can I say, "his" colour is black? - This is the dice, "his" colour is black?"

S "Yes, because this is a dice."

E. "And can I also say, "her" colour is black?"

S: "Yes, only if it is a mother-dice."

(...)

Partly correct (i.e. incorrect) are those explanations in which the child noticed the coreferentiality between the gender of the definite article and the gender of the possessive pronoun but where the gender of the definite article was incorrectly reproduced. Three children said that "you have to say "his" - because "das" boat is not a "die" but a "der"."*

Correct explanations in genus are those in which the coreferentiality between the (correctly used) gender of the definite article and the gender of the possessive pronoun was explicated.

Task 2 (genus)

S15 in group 4/POST; 5,7; male

(...)

VI: "Bei der Gießkanne, wieso is denn bei der Gießkanne 'ihre Farbe' besser als 'seine Farbe'?"

(...)

E: "For the watering-can, why is now for the watering-can "her" colour better than "his" colour?"

* "Das" is the (correctly used) neuter article for the boat. "Die" is the feminine article which, in fact, does not go together with "seine" ("his"). "Der" (masculine article) goes together with "seine" but not with the boat.

Vp: "Weil das ja .. eine Gießkanne,
die heißt ja wie 'n Mädchen, ne.
Und das ist ja auch der gleichen
Name, wegen das 'die'.
Und das ist ja wie ein Würfel,
ne."

E: "Because this yeah ... a
watering-can, this (= female
demonstrative article) is
called like a girl, isn't it.
And this is also the same
name, because of the "die"
(fem. art.). And "das"
(neuter art.) is like a dice,
isn't it."

Protokollantin unterbricht: "Und das
ist wie ein Jungename?"

Female research assistant inter-
rupts: "And "das" is like a
boy's name?"

Vp: "Ja, und das Schiff ist auch
ein Jungename."

S: "Yes, and the boat is also
a boy's name."

VI: "Genau. Ehm- aber jetzt
interessiert mich das noch:
warum denn gerade 'ihre' bei
der Gießkanne?"

E: "Exactly. Eh- but now I am
still curious: why is it
just "her" for the watering-
can?"

Vp: "Weil die das ja, die gießt ja,
ne. Und dann kommt danach noch
die Kanne* und das ist dann
ein Mädchen."

S: "Because "die" (fem.art.)
"das" (neuter art.) yeah,
"die" waters, right. And
thereafter follows the can*
and this is a girl."

Some subjects related the possessive and the personal pronoun correct-
ly.

Task 2 (genus)

S50 in group 1/POST; 4;5; male

(...)

(...)

* Note that the spontaneous segmentation of the German compound "Gieß-kanne".
In German, the last noun determines the gender of the compound.

V1: "Und warum muß ich bei der Gießkanne sagen: 'ihre Farbe' und kann nicht sagen: 'seine Farbe'?"

Vp: "Weil es ja nicht 'er' heißt, sondern 'sie'."

E: "And why do I have to say for the watering-can: "her" colour and cannot say: "his" colour?"

S: "Because it is not called "he" but "she"."

Coding problems emerged for such answers in which children replied that an object was a boy (or a girl). In view of small children's difficulties to express themselves in abstract terms we coded such explanations as correct, especially since some children gave evidence that they did not really think that an object was a boy (or a girl).

Task 1 (genus)

S21 in group 2/POST; 5;1; female

(...)

V1: "Und warum 'seine Farbe'?"

Vp: "Weil das ein Junge ist, nee - ein Segelschiff."

V1: "Das Boot? Ja, und wieso sag ich aber 'seine' bei dem Segelboot?"

Vp: "Weil das ein Segelschiff ist und kein Mädchen."

V1: "Und da muß ich 'seine' sagen?"

Vp nickt

(...)

E: "And why "his" colour?"

S: "Because this is a boy, no - a sailing-ship."

E: "The boat? Yeah, and why do I nevertheless say "his" for the sailing-boat?"

S: "Because this is a sailing-ship and no girl."

E: "And then I have to say "his"?"

E nods

A last interesting correct explanation was given by a girl in group 3.

Task 2 (genus)

S11 in group 3/PRE; 5;4; female

(...)	(...)
Vp: "Ihre."	S: "Her."
Vl: "Genau. Und warum?"	E: "Exactly. And why?"
Vp: "Mm...weil...weil der Gießkanne nicht gut anhört."	S: "Mm...because..because "der" (masc.art.)watering- can does not sound well."
Vl: "Genau. Prima."	E: "Exactly. Very good."

Unlike in Study A, we did not solely analyze error detections and one kind of corrections (pronoun changes) but also another kind of corrections (changes of the predicative adjective) and explanations.

These four metalinguistic abilities (error detections, pronoun changes, changes of the predicative adjective, and explanations) were examined for both sexes and genus. Like in Study A, we will only present those data of Study B which are of theoretical interest.

The relationship between performance and awareness

Like in Study A, the main focus of our research in Study B is the investigation of the cross-sectional and longitudinal relationships between performance (i.e. language use) and linguistic awareness. In Study B, language performance was checked by a completion test (in sexes: her/his scarf is ...?, and in genus: "her"/"his" colour is ...?).

Linguistic awareness, on the other hand, was stimulated by a mismatch within E's utterance (the possessive pronoun and the predicative adjective, i.e. the colour, did not have the same referent). In the within-test and the longitudinal relations between performance and awareness of Study B, we will consider four different metalinguistic abilities: children's error detections, changes of the possessive pronouns, changes of the predicative adjective, and explanations.

Within-test relations between performance and awareness

Pitfalls of comparing performance with metalinguistic abilities were already mentioned in the analyses of Study A (cf. 6.2). They also hold in part for Study B. Despite of these we decided - for the within-test relations between performance and awareness - to rely on the "general" (correct or incorrect) performance scores (e.g. in case of a "general" correct perform-

ance score both items, i.e. "seine" and "ihre", had to be correct). In the first within-test-relation (PRE) each child had one "general" performance score in sexus (either at least two correct items in performance/PRE = $perf_{1+}$, or at least one incorrect item in performance/PRE = $perf_{1-}$) and one "general" performance score in genus (either $perf_{1+}$ or $perf_{1-}$). In the second within-test-relation (POST) each child had, similarly, one "general" performance score in sexus (either $perf_{2+}$ or $perf_{2-}$) and one "general" performance score in genus (either $perf_{2+}$ or $perf_{2-}$).*

For the first within-test-relation in PRE each "general" performance score in sexus/PRE was correlated with four "general" awareness scores in sexus/PRE. firstly, with a "general" error detection score (either at least one correct error detection in PRE = ed_{1+} , or no correct error detection in PRE = ed_{1-}), secondly, with a "general" score for pronoun changes (either at least one correct change of the possessive pronouns in PRE = pp_{1+} , or no correct change of the possessive pronouns in PRE = pp_{1-}), thirdly, with a "general" score for predicative adjectives (either at least one correct change of the predicative adjective in PRE = ref_{1+} , or no correct change of the predicative adjective in PRE = ref_{1-}), and fourthly, with a "general" score for explanations (either at least one correct explanation in PRE = $expl_{1+}$, or no correct explanation in PRE = $expl_{1-}$). An analogous procedure was used for genus/PRE. each "general" genus score in performance was correlated with each of the four "general" awareness scores in genus.

For the second within-test-relation, namely in POST, we correlated each "general" performance score (either $perf_{2+}$ or $perf_{2-}$) in sexus/POST with each of the four "general" awareness scores in sexus/POST, i.e. with either ed_{2+} or ed_{2-} , with either pp_{2+} or pp_{2-} , with either ref_{2+} or ref_{2-} , and with either $expl_{2+}$ or $expl_{2-}$. Again, an analogous procedure was used for genus/POST. each "general" genus score in performance was correlated with each of the four "general" awareness scores in genus.

For the within-test-relations in PRE and POST we used contingency coefficients for the associations of performance and metalinguistic abilities. This was done for the four groups taken together.

* We also analyzed performance for each item in sexus and in genus, and also awareness (all four abilities) for each task in sexus and genus. The data will not be presented here but are available on request.

Longitudinal relations between awareness and performance

For the analyses of the longitudinal relations between awareness in PRE and performance in POST in order to check whether early awareness might be instrumental or facilitative for later performance, we used a different procedure than the one for the within-test-relations. The analyses were done as follows (as to this procedure, cf. also 6.2).

We first dichotomized the performance scores in the first test (PRE) for each child in sexus and genus, i.e. we looked whether a child's performance in PRE was above or below the median performance of his age group. For instance, median performance of a group in sexus might have been one correct pronoun (there were four possibilities for a child: no correct pronoun, one correct pronoun - either "ihre" or "seine", two correct pronouns, and three correct pronouns if the child showed plurifunctional usage). A child of this group who had no pronoun correct showed "low performance". However, a child with two correct pronouns showed "high performance". We then similarly dichotomized the four awareness scores for error detections, pronoun changes, changes of the predicative adjective, and explanations in PRE for both sexus and genus (the dichotomized scores were based on error detections, pronoun changes, changes of the predicative adjective, and explanations in the three error detection tasks I, II, and IV in sexus, and 1, 2, and 4 in genus; e.g. there were four possibilities for a child in sexus: awareness in no task, one task, two tasks, or three tasks).

After having analyzed the child's relative performance and his relative metalinguistic abilities in the first test we determined his performance scores in the second test (POST).

In a final step we performed four tests (error detections, changes of the possessive pronoun, changes of the predicative adjective, and explanations) for each group (and after this, for all four groups together) in sexus. In genus we similarly performed four tests (see above) for each group (and after this, for all four groups together).

The first test is an analysis of difference in means of performance in POST for two groups of children: those with "high error detection" in PRE but "low performance" in PRE and those with "low error detection" in PRE and "low performance" in PRE. Before the t-tests were applied we checked for equal variances of the two types of independent observations. The second test is an analysis of difference in means of performance in POST for children with "high pronoun change" in PRE but "low performance" in PRE and children

with "low pronoun change" in PRE and "low performance" in PRE. The third test is an analysis of difference in means of performance in POST from children with "high change of the predicative adjective" in PRE but "low performance" in PRE and children with "low change of the predicative adjective" in PRE and "low performance" in PRE. The fourth test is an analysis of difference in means of performance in POST from children with "high explanation" in PRE but "low performance" in PRE and children with "low explanation" in PRE and "low performance" in PRE.

These four tests were applied for sexus and genus. They were done for the four groups (and all four groups together) and shall show whether early error detections, pronoun changes, changes of the predicative adjective, or explanations can be predictive for later performance (and, if this is the case, at which age early awareness is most predictive).

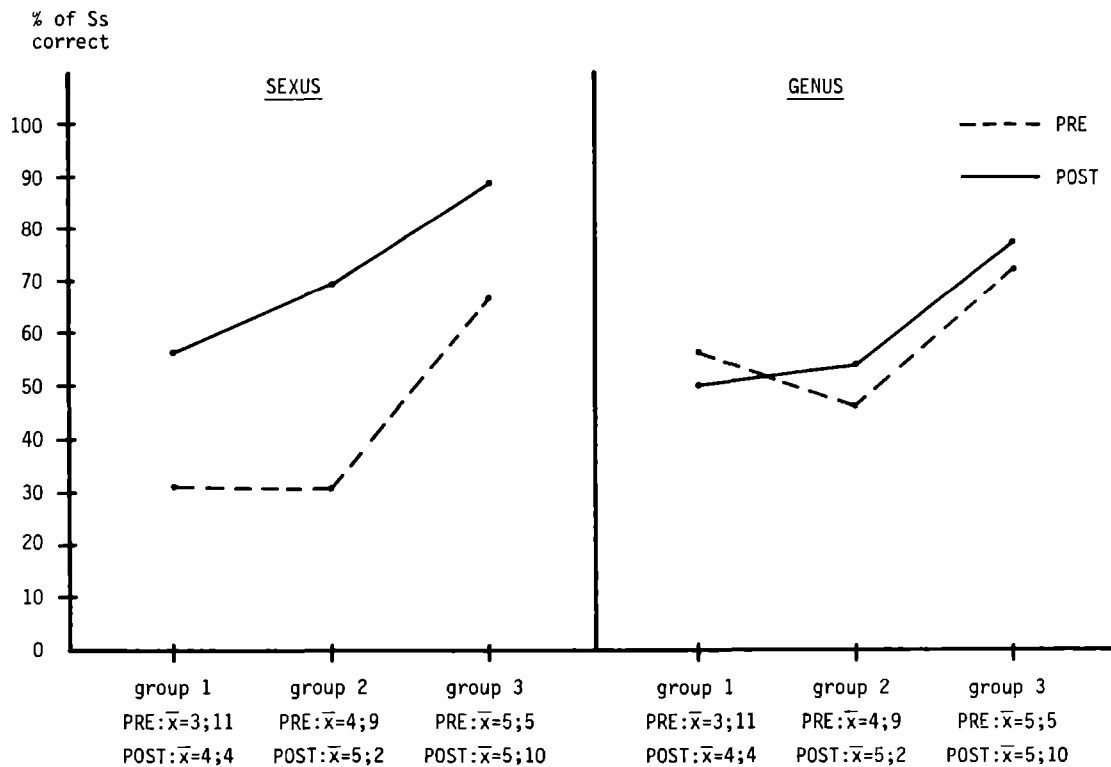
So far for the procedures of analyses to be applied to the data in Study B.

7.2.1 Performance Tests

7.2.2.1 General Results of the Performance Tests

Before we go into a detailed discussion of the results of the study on "natural and syntactic gender" we want to look at the general picture of the "general" correct performance ("standard" performance) in sexus and genus of the first test (PRE) and of the second test (POST) for the three experimental groups, cf. Figure 24:

Fig. 24: Average correct performance of children at the three age levels in sexus and genus (PRE and POST)

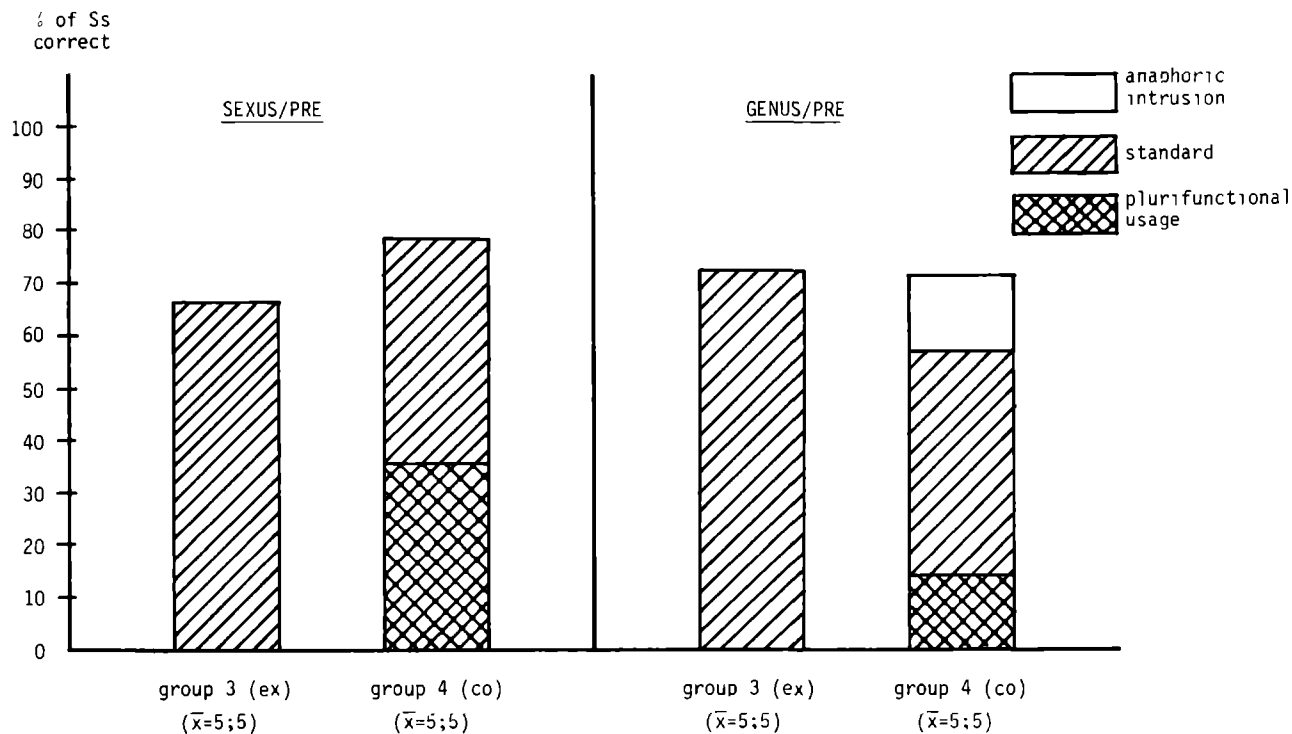


From this figure one major finding becomes apparent: children in all three experimental groups perform better in genus/PRE (group 1: 56%; group 2: 46%; group 3: 72%) than in sexus/PRE (group 1: 31%; group 2: 31%; group 3: 67%). The better performance in genus than in sexus in PRE does not hold anymore for POST. In POST, children perform better in sexus (group 1: 56%; group 2: 69%; group 3: 89%) than in genus (group 1: 50%; group 2: 54%; group 3: 78%). Clearly, children only improve from PRE to POST in sexus, but not in genus.

Presentation order effects

In order to see whether correct performance was influenced by the order of presentation let us look at Figure 25 which displays correct performance ("standard" performance, "plurifunctional usage", and "anaphoric intrusions", cf. 7.2) in PRE from the oldest experimental children in group 3 (performance before awareness) and the coeval control group 4 (awareness before performance).

Fig. 25: Average correct performance (standard, plurifunctional usage, and anaphoric intrusion) of the oldest age group and the control group in sexus and genus (PRE)



An inspection of the correct performance in *sexus/PRE* (in Fig. 25) reveals a twofold difference between group 3 and group 4. 79% of the children from group 4 are correct, with respect to the "standard" performance, and 67% from group 3. Thus, in the "standard" performance group 4 exceeds group 3. However, this difference is insignificant. The other difference between group 3 and group 4 in *sexus/PRE* is the "plurifunctional usage" in group 4. 36% of the children in control group 4 yield a second referent with respect to the "seine"-question (here: the pig) whereas no child does this in experimental group 3. The difference between the two groups is significant ($p = .031$).*

In *genus/PRE*, we observed more correct answers with respect to the "standard" performance in group 3 (72%) than in group 4 (57%). The difference, however, just misses significance. Also, the difference with respect to plurifunctional usage between group 3 (no plurifunctional usage) and group 4 (14% of the children) does not yet reach significance. If we add the "anaphoric intrusions"*** to the correct "standard" performance in *genus/PRE* we can see that the performance of group 4 (71%) equals nearly that of group 3 (72%).

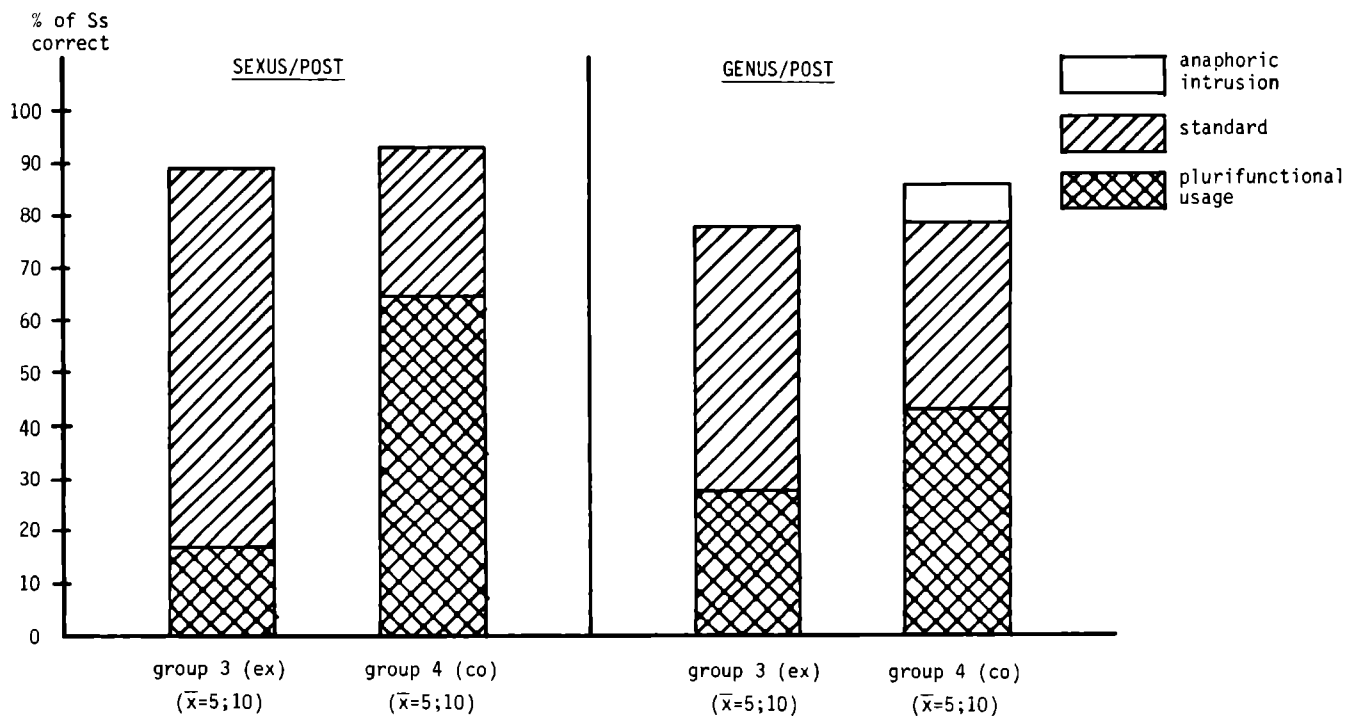
Thus, the most notable difference between group 3 and group 4 in *sexus/PRE* is the plurifunctional usage in group 4. The major, but non-significant difference between group 3 and group 4 in *genus/PRE* is firstly, the "anaphoric intrusion", and secondly, the "plurifunctional usage" of group 4, which got awareness before performance.

We now consider Figure 26 for differences between experimental group 3 and control group 4 in the second test (POST):

* Here, we used the Binomial Test because of a small expected frequency.

** These are gender changes of objects by definite articles and names.

Fig. 26: Average correct performance (standard, plurifunctional usage, and anaphoric intrusion) of the oldest age group and the control group in sexus and genus (POST)



In *sexus*/POST, the "standard" performance of group 3 (89% of the children were correct) is nearly equal to that of group 4 (93% of the children). Interestingly, group 3 shows now in *sexus*/POST also "plurifunctional usage" (17% of the children) but is still surpassed by group 4 (64%) in this respect. The difference in "plurifunctional usage" between group 3 and group 4 in *sexus*/POST is significant ($\chi^2 = 12.1$, $df = 1$, $p < .01$). In *genus*/POST, no significant differences between group 3 and group 4 were observed. In the "standard" performance 78% of group 3 and 79% of group 4 were correct.

With the "anaphoric intrusions" group 4 (86%) exceeds slightly group 3 (78%) in *genus*/POST. Again, group 3 shows also "plurifunctional usage" in *genus*/POST (28%) but is surpassed by group 4 (43%).

Apparently, there are presentation effects in both PRE and POST. In *sexus*, group 4 (the group which had awareness before performance) showed in both PRE and POST significantly more often "plurifunctional usage" than group 3 (the group which had to do performance first). In *genus*, group 4 showed also in PRE and POST more often "plurifunctional usage" than group 3. However, the differences are not significant. "Anaphoric intrusions" were only observed in control group 4.

Task order effects

Sexus and *genus* tasks were administered to all children in the four groups, in PRE as well as in POST. However, task order was not the same for all subjects: 29 Ss got the *sexus* task first, 32 Ss the *genus* task first (cf. 7.1.2). We were interested in whether task order had an effect on correct performance on either *sexus* or *genus*.

When the two groups (*sexus* first and *genus* first) were compared with each other, in PRE and in POST, we found that in general task order did not have an effect on correct performance in either the *genus* or the *sexus* task, although there was a tendency for better *genus* performance in POST when the *sexus* task was given first (and the *genus* task subsequently): $\chi^2 = 3.53$, $df = 1$, $p > .05$. A slightly positive effect of "sexus first" on correct *genus* performance was observed in all analyses whereas task order had no influence on correct *sexus* performance.

When we compared differences in correct performance in dependence on task order for each group separately we obtained one significant result: the second age group performed better in PRE on *genus* with the *sexus* task first than with the *genus* task first (Fisher Exact Probability Test $p = .05$). No other significant effect could be found.

One possible reason for the one task order effect (though not a valid explanation) could be that intralinguistic reference in genus is more automatic than extralinguistic reference in sexus (cf. the relatively good performance of the children in the first test with respect to genus in Fig. 24). Having done one test already (sexus), children could have been more at ease in the next test (genus). This could also hold for the generally better performance in genus/POST when sexus was given first. The reason why sexus is not better with genus first could be a lesser automaticity in sexus performance. We will come back to this point in 7.2.1.2.

7.2.1.2 Correct Performance Scores as Related to Predictions

Section 2 (linguistic analysis of German possessive pronouns) and section 3 (general predictions on the order of acquisition for understanding) were also devoted to deriving expectations with respect to the order of acquisition of possessive pronouns in Study B. Like in Study A, this was done from different linguistic points of view: morphophonological, syntactic, semantic, and deictic characteristics (only one prediction was made with respect to deictic characteristics). The morphophonological and the syntactic prediction were the same but semantic and deictic predictions were different. Table 11 in section 3.4 summarized our four predictions. Here, we will - like in Study A - successively discuss the predictions for each of these points of view (whereby the predictions based on morphophonological characteristics and predictions based on syntactic characteristics will be discussed under one heading since they are the same) in order to establish which one(s), if any, of these developmental patterns in fact arise in the data.

Before we discuss our different points of view one precaution has to be given. In our figures we presented only "general" correct performance scores (cf. 7.2) because the chances for a correct "seine"-answer were higher (2/3) than for a correct "ihre"-answer (1/3) since "seine" can refer to the male doll or the neuter pig in the sexus task and to the dice (masculine object) or to the boat (neuter object) in the genus task. With respect to our predictions based on morphophonological and syntactic characteristics we will thus only look at children's correct "seine"-answers in genus as compared to their correct "ihre"-answers in genus and at children's correct "seine"-answers in sexus as compared to their correct "ihre"-answers in sexus.

With respect to our predictions based on semantic characteristics we will compare correct masculine "seine"-answers, correct feminine "ihre"-

answers, and correct neuter "seine"-answers in sexus and genus since the semantic predictions allow for a differentiation between the masculine "seine" and the neuter "seine". The differentiation between the masculine "seine" and the neuter "seine" can be observed in both "standard" performance and "plurifunctional usage".

With respect to our predictions based on deictic characteristics we will look, firstly, if "sex-identical" pronouns are acquired first (i.e. "seine" by boys, "ihre" by girls), and, secondly, if natural gender precedes, as predicted, syntactic gender.

Let us now analyze which of our predictions, if any, can be observed in our data.

Morphophonological and syntactic characteristics

According to Table 11, one would expect the pronoun "ihre" in sexus (= natural gender) to come first, and "seine" in sexus to come last. The two genus (= syntactic gender) pronouns "ihre" and "seine" should be in-between "ihre" in sexus and "seine" in sexus.

Children's actual performance, i.e. the percentages of their correct answers to the "ihre"- and the "seine"-questions in sexus and genus, is presented in Table 26.

Table 26 Correct "Ihre"- and "Seine"-Answers in Sexus and Genus

	SEXUS/PRE		GENUS/PRE	
	"ihre"	"seine"*	"ihre"	"seine"*
group 1 (N=16)	38%	69%	62%	75%
group 2 (N=13)	46%	54%	54%	62%
group 3 (N=18)	72%	89%	72%	89%
	SEXUS/POST		GENUS/POST	
	"ihre"	"seine"*	"ihre"	"seine"*
group 1 (N=16)	56%	87%	56%	81%
group 2 (N=13)	69%	84%	54%	92%
group 3 (N=18)	89%	100%	78%	94%

* Since the predictions based on morphophonological and syntactic characteristics do not allow for a distinction between the masculine and the neuter "seine" we do not differentiate between these two types of "seine" in Table 26.

Table 26 shows us that correct "seine"-answers are always more frequent than correct "ihre"-answers. However, we should be aware that the chances for a correct "seine"-answer (2/3) and for a correct "ihre"-answer (1/3) were different. Thus, we will not concentrate on the precedence of either "seine" or "ihre" with respect to our predictions based on morphophonological and syntactic characteristics, but rather check whether "ihre" is, as predicted, earlier acquired in the sexus than in the genus task, and whether "seine" is, as predicted, earlier acquired in genus than in sexus.

There are at least four exceptions in our data (cf. Table 26). Firstly, for the youngest children "ihre"-scores are earlier in genus/PRE than in sexus/PRE. Secondly, age group 2 performed better on "ihre" in the first genus test than in the first sexus test. Thirdly, "seine" is by the youngest children earlier apparent in sexus/POST than in genus/POST, and fourthly, the oldest children in group 3 showed in POST a better "seine" performance in sexus than in genus. Moreover, the oldest children master "ihre" in sexus/PRE and genus/PRE equally well. They also perform equally well on "seine" in sexus/PRE and genus/PRE. The youngest children master "ihre" in sexus/PRE and genus/POST equally well.

In summary, the only pronouns clearly reflecting an order of acquisition in correspondence with the morphophonological and syntactic predictions with respect to "ihre" in sexus and genus are "ihre" in group 2/POST and in group 3/POST and "seine" in group 1/PRE, in group 2/PRE, and in group 2/POST (cf. Table 26). However, the relatively early acquisition of the syntactic gender pronouns "ihre" and "seine" in the first test of group 1 and group 2 argues against our morphophonological and syntactic explanations (according to our predictions the natural gender pronoun "ihre" should come first). These morphophonological and syntactic predictions are, therefore, definitely insufficient for the early acquisition of natural and syntactic gender.

Semantic characteristics

The predictions based on semantic characteristics (cf. Table 11) suggest that the masculine natural gender pronoun "seine" should come first and the neuter syntactic gender pronoun "seine" last. In-between these two pronouns the masculine syntactic gender pronoun "seine" and the feminine natural gender pronoun "ihre" should precede the feminine syntactic gender pronoun "ihre" and the neuter natural gender pronoun "seine". Thus, two developmental trends are expected: firstly, with respect to "specific" pronouns (i.e. masculine, feminine, neuter pronouns), natural gender should be acquired

before syntactic gender, and secondly, within natural and syntactic gender we should observe the following order: first, the masculine pronoun "seine", then the feminine pronoun "ihre", and finally the neuter pronoun "seine". Table 27 displays children's actual performance with respect to both masculine and the neuter "seine" and "ihre" in sexus and genus, i.e. percentages of their correct identifications.

Table 27 Correct Masculine, Feminine, and Neuter Identifications in Sexus and Genus*

	SEXUS/PRE			GENUS/PRE		
	"masc. "seine" (boy)	fem. "ihre" (girl)	neuter "seine" (pig)	masc. "seine" (dice)	fem. "ihre" (watering- can)	neuter "seine" (boat)
group 1 (N=16)	62%	38%	6%	54%	62%	31%
group 2 (N=13)	23%	46%	38%	31%	54%	31%
group 3 (N=18)	78%	72%	11%	39%	72%	50%
	SEXUS/POST			GENUS/POST		
	"masc. "seine" (boy)	fem. "ihre" (girl)	neuter "seine" (pig)	masc. "seine" (dice)	fem. "ihre" (watering- can)	neuter "seine" (boat)
group 1 (N=16)	81%	57%	6%	31%	56%	50%
group 2 (N=13)	69%	69%	31%	84%	54%	23%
group 3 (N=18)	83%	89%	33%	78%	78%	44%

* Note that this table includes "plurifunctional usage", i.e. masculine and neuter together can attain more than 100%.

With respect to the predicted precedence of natural gender before syntactic gender in "specific" pronouns we have at least eight exceptions in our data (cf. Table 27). Genus precedes sexus for, firstly, the masculine "seine" in group 2/PRE, secondly, the masculine "seine" in group 2/POST, thirdly, the feminine "ihre" in group 1/PRE, fourthly, the feminine "ihre" in group 2/PRE, fifthly, the neuter "seine" in group 1/PRE, sixthly, the neuter "seine" in group 3/PRE, seventhly, the neuter "seine" in group 1/POST, and finally, the neuter "seine" in group 3/POST. Moreover, the feminine pronoun "ihre" is mastered equally well by the oldest children in sexus/PRE and genus/PRE.

Pronouns which reflect the predicted preference in sexus before genus in "specific" pronouns are more frequent in POST (masc. "seine" in group 1 and group 3, fem. "ihre" in group 1, group 2, and group 3, and neuter "seine" in group 2) than in PRE (masc. "seine" in group 1 and group 3, and neuter "seine" in group 2). Thus, with respect to the precedence of natural gender before syntactic gender in "specific" pronouns a semantic explanation is not supported by the data.

With respect to the predicted order of masculine before feminine, and feminine before neuter within sexus and genus our data show at least six exceptions for the precedence of masculine "seine" before feminine "ihre" (cf. Table 27). The feminine pronoun "ihre" is mastered better than the masculine pronoun "seine" in sexus/PRE by group 2, in sexus/POST by group 3, in genus/PRE by group 1, in genus/PRE by group 2, in genus/PRE by group 3, and finally, in genus/POST by group 1. Moreover, the masculine "seine" and the feminine "ihre" are equally well mastered in sexus/POST by group 2 and in genus/POST by group 3. The precedence of masculine over feminine is more often correctly predicted for sexus (in the first test of group 1 and group 3 and in the second test of group 1) than for genus (only in the second test of group 2). The feminine pronoun "ihre" precedes, as expected, in all tests the neuter pronoun "seine". The frequently observed precedence of the feminine "ihre" before the masculine "seine" has to be seen in the light of task requirements and identification possibilities (i.e. there was only one "seine"-question but two referents could be chosen). It is thus difficult to decide on the basis of our data if the prediction that masculine precedes feminine is valid or not. However, one prediction which can be checked by our data and where the chance for a correct answer is 1/2, is not fully valid. The masculine pronoun "seine" should, according to Table 11, come before the neuter pronoun "seine". There are at least three exceptions in

our data (cf. Table 27). firstly, group 2 choses the neuter "seine" in sexus/PRE more often than the masculine "seine", secondly, group 3 identifies the neuter "seine" in genus/PRE more often correctly than the masculine "seine", and thirdly, the neuter "seine" is in genus/POST of group 1 more often correct than the masculine "seine". In genus/PRE, group 2 choses the masculine "seine" as often as the neuter "seine".

In summary, despite of a few correct predictions for the precedence of sexus before genus with respect to "specific" pronouns in POST and for the precedence of feminine before neuter there are numerous exceptions in the data. A semantic explanation for the acquisition of gender in pronouns is thus not convincing.

Deictic characteristics

The last prediction for the gender acquisition is based on deictic characteristics (cf. Table 11). Here, two cases can be distinguished. firstly, sex-identical pronouns should be acquired first in both sexus and genus, and secondly, natural gender should precede syntactic gender.

When we analyzed our data with respect to the question whether girls are more often correct on "ihre" than boys and boys more often correct on "seine" than girls we found that boys are in general better on both "seine" and "ihre". However, none of the differences in correct identifications of "seine" and "ihre" between boys and girls turned out to be significant. Thus, we have to reject the prediction that sex-identical pronouns are acquired first.

Our data (cf. Figure 24) show that for all age groups, the genus-scores are higher than the sexus-scores in the first test (PRE). This disconfirms our deictic expectation that natural gender is acquired before syntactic gender, despite of the fact that the situation reverses in the POST tests. We will shortly return to this latter finding.

It is therefore, reasonable to conclude that the gender acquisition in possessive pronouns cannot be due to the development of their deictic characteristics.

Further predictions

In 3.2 we expected that children are likely to substitute the masculine "seine" (and not the neuter "seine") if they err on the feminine "ihre". Table 28 in 7.2.1.4 shows us that this is in general not the case for natural gender and syntactic gender, with one exception. The most frequent mistake

for "ihre" is in natural gender/POST the masculine "seine". Thus, a semantic feature explanation with respect to children's mistakes and substitutions is not very attractive.

The other prediction which was made relates to both Study A and Study B. In 3.2 we said that "sein-e" and "ihr-e" of the gender study (= Study B) should be acquired later than "sein" and "ihr" of the "shifting reference" study (= Study A). The inspection of our data in Study B (cf. Table 26) and in Study A (cf. Figure 2 and Figure 3) shows us that "sein-e" in Study B is, contrary to our expectation, earlier acquired than "sein" in Study A. "Ihr-e" in Study B and "ihr" in Study A are nearly equally well mastered. However, these comparisons are not very conclusive because of differences in task requirements and identification possibilities.

7.2.1.3 Conclusions with Respect to Performance Tests as Related to Predictions

In 7.2.1.2 we discussed various predictions with respect to our data and found that none of our four different points of view (morphophonological characteristics, syntactic characteristics, semantic characteristics, and deictic characteristics) are valid for an explanation of the results in the gender study. All of the four predictions assume (at least with respect to "specific" pronouns) a precedence of natural gender over syntactic gender. However, this turns out not to be the case, since our results show for all three age groups in PRE better performance on syntactic gender.

What could have facilitated the early acquisition of genus, as opposed to what should have been expected from a "Piagetian-cognitive" point of view.

One possible explanation for the precedence of intralinguistic reference before extralinguistic reference (cf. Böhme & Levelt, 1979) could be that young children used two intralinguistic cues in their selection of the correct pronoun: firstly, the suffix "-e" (like in: die Gießkanne) correlates strongly with feminine gender in German (cf. e.g. Spitz, 1965; Altmann & Raettig, 1973; Werner, 1975), and secondly, the correlation of syllabicity and gender. Monosyllabic stems are in German mostly either neuter (das Boot, das Schiff*) or masculine; polysyllabic ones are in general associated with

* Diminutives which were also used (like "das Bötchen" or "das Schiffchen") are always neuter (cf. e.g. Spitz, 1965; Jarnatowska, 1968).

feminine (die Gieß-kan-ne) or masculine gender (der Würfel) (cf. Arndt, 1970*). Automatic acquisition could have been promoted by these phonological and morphological cues at an early stage. This interpretation seems to find support in similar findings, as reported for French (Karmiloff-Smith, 1976, 1978, 1979b), for Russian (Popova, 1958/1973), and for Swiss-German (Schneuwly, 1978a, 1978b, 1979) although two objections could be made. In contrast to our assumption, MacWhinney (1977, p. 86) claims: "Thus use of phonological cues to gender cannot emerge before the use of overt cues to gender." However, in view of ambiguities in the chosen material one can doubt the validity of MacWhinney's results.**

Still the question whether morphophonological cues facilitate the acquisition of genus in German remains unfortunately unresolved since our sample of nouns is much too small for allowing a general conclusion (cf. also Karmiloff-Smith, 1979b, p. 235: "In French, for instance, most children do seem to acquire the gender distinction by first concentrating on phonological procedures. However, in another linguistic environment (e.g. German, where word endings are not necessarily good clues to formal gender but to semantic cases), different procedures may be used for acquiring gender.").

Despite of this tempting interpretation, we have some unexplained issues in the results of the performance tests in the gender study which require a careful further analysis, since some additional factors may be involved in children's gender acquisition.

* Arndt (1970, p. 251) writes: "German noun gender may be by no means randomly distributed, where morphology rather than semantics is concerned. The nonfeminine probably predominates in monosyllables; the nonneuter, in dissyllables and polysyllables.

** Among the nouns with "real or inherent semantic gender" MacWhinney chose words like "Kind" (child) or "Pferd" (horse). Among the nouns with "phonological endings which served as clear cues for their gender" he chose words like der "Hammer"/the (masc.) hammer (counter-evidence: "Mutter"/mother; "Schwester"/sister; or das Muster/the (neuter) pattern), das "Scheusal"/the (neuter) monster (counter-evidence: der Kanal/the (masc.) channel; die Moral/the (fem.) morality, etc.), die "Schweinerei"/the (fem.) piggery (counter-evidence: der Papagei/the (masc.) parrot), or die "Pfeife"/the (fem.) pipe (counter-evidence which holds also against our explanation: der Matrose/the (masc.) sailor; der Löwe/the (masc.) lion; der Knabe/the (masc.) boy, etc.).

7.2.1.4 Other Influential Factors in the Performance Tests

Like in Study A, we inspected all data in Study B again in order to find out what potential further factors might have been influential in children's gender acquisition. It turned out that there are at least three factors which are seemingly relevant for a full understanding of children's performance.

The first factor is the plurifunctional usage. In Figure 25 we saw that only the control group which had awareness before performance showed plurifunctional usage (and "anaphoric intrusions") but not in sexus/PRE and genus/PRE in the coeval experimental group 3. Figure 26 demonstrates that in POST both the control group and the experimental group 3 yield a second referent to the "seine"-question, i.e. plurifunctional usage (but only the control group displays "anaphoric intrusions").

This finding suggests that testing awareness before performance stimulates older children to consider more than one alternative in the following performance tasks. This means that older children who do not have recent metalinguistic experience use only one reaction possibility in the performance test whereas older children with metalinguistic experience use more than one.

The second factor is a preference for clear extralinguistic cues in sexus. In general children prefer the boy with his male looks and outfit over the pig with its unspecified sex when asked for "seine" (cf. Table 27).

The third factor is the difference in mistakes for "ihre" between sexus and genus. This can be seen from Table 28.

Table 28 Mistakes for the Feminine Pronoun "Ihre" in Sexus and Genus (All Four Groups)

test item given to child		SEXUS			GENUS		
		"ihre" (her)			"ihre" (her)		
frequency of mistakes		object designated by child			object designated by child		
		boy (masc.)	pig (neuter)	other mistakes	dice (masc.)	boat (neuter)	other mistakes
absolute frequencies of mistakes	PRE	11	14	--	6	13	--
	POST	7	6	1	2	15	2
percentage of mistakes out of all mistakes per item	PRE	44%	56%	--	32%	68%	--
	POST	50%	43%	7%	11%	79%	11%
	total	46%	51%	3%	21%	74%	5%

From Table 28 we can see that in sexus there is no major preference of an "ihre"-mistake for either the boy or the pig. This holds for PRE as well as POST. However, in both PRE and POST genus tests, there were more incorrect references to the boat (neuter object) than to the dice (masculine object). In POST, this tendency is significant ($\chi^2 = 9.9$, $df = 1$, $p < .01$). This finding argues against a semantic explanation (second ontogenetic principle of the SFH (cf. 3.2).

A possible explanation for this finding can lie in children's colour stereotypes. We mentioned earlier (in 7.2.1) that some children considered light colours as girls' colours and dark colours as boys' colours. It might have been that the light blue of the boat attracted them more in case of uncertainty for "ihre" than the black of the dice.

Let us now summarize the further findings on performance:

- awareness before performance, i.e. metalinguistic experience, seems to enhance plurifunctional usage in older children,
- children show a preference for clear extralinguistic cues in sexus, and
- there is a possibility that colour stereotypes influenced children's mistakes in the identification of gender pronouns.

So far for the results of the performance tests in the gender study.

7.2.2 Awareness Tests

7.2.2.1 General Results of the Awareness Tests

Before we relate our awareness results to our theoretical questions, we will first present the general results of children's performance and awareness (i.e. of their error detections, changes of the possessive pronoun, changes of the predicative adjective, and explanations) in sexus and genus. Note that the concerning figures contain both performance and awareness scores for comparison.

Figures 27 and 28 show the performance results and the awareness results for the three experimental groups taken together in sexus and genus, and for PRE and POST respectively.

Fig. 27: Average correct standard performance and awareness (i.e. error detections, changes of possessive pronoun, changes of predicative adjective, and explanations) of children at the three age levels in sexus and genus (PRE)

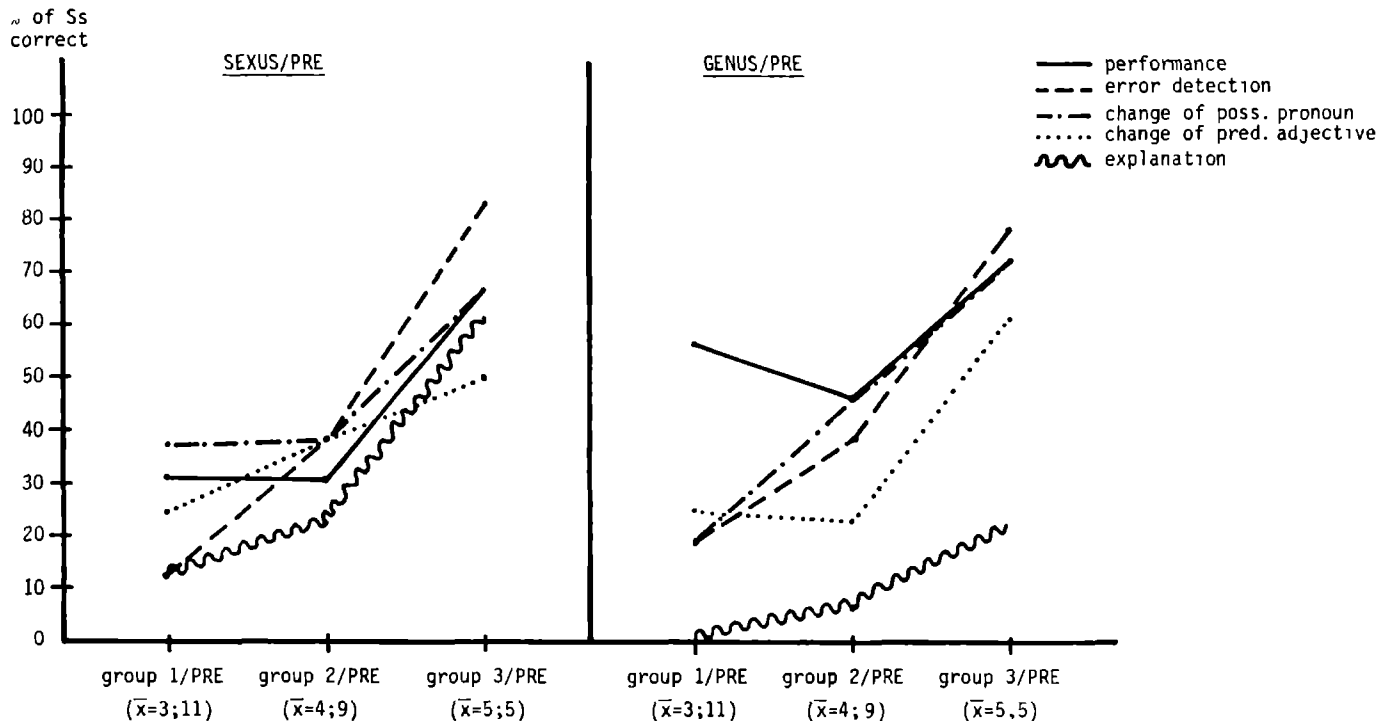
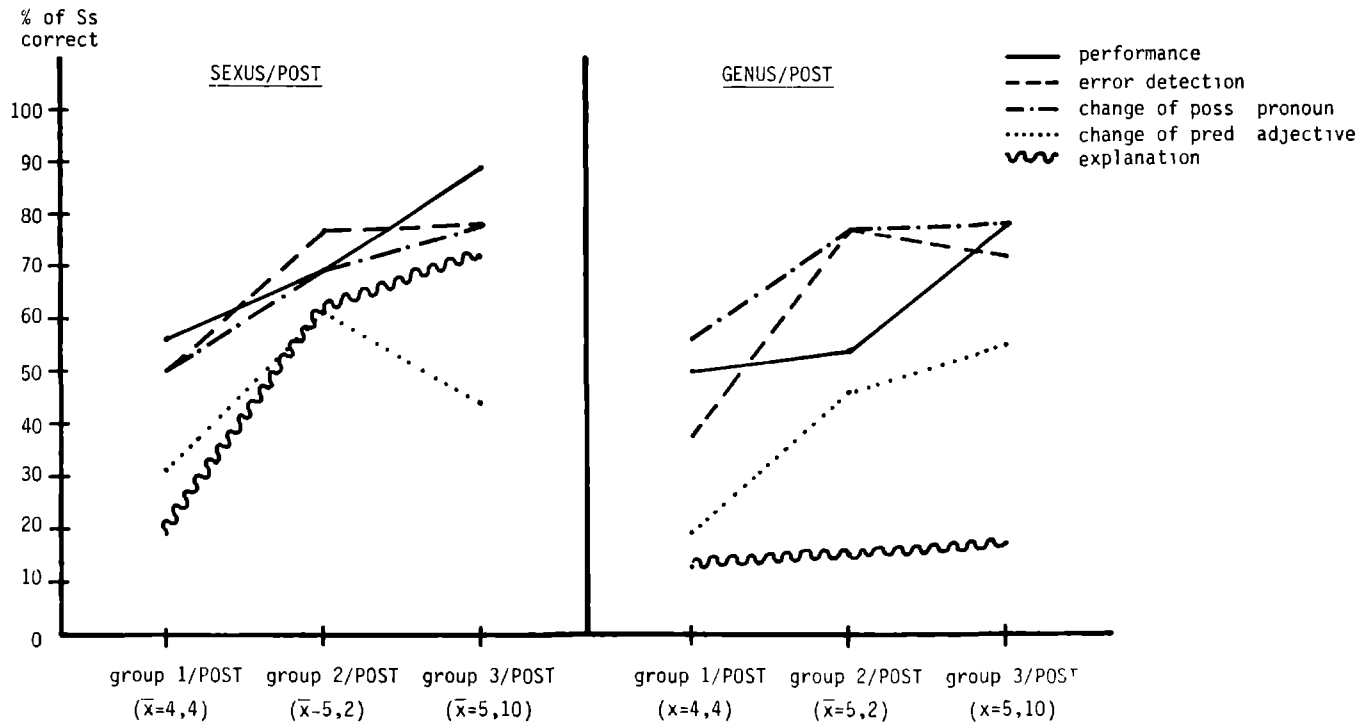


Fig 28 Average correct standard performance and awareness (i.e. error detections, changes of possessive pronoun, changes of predicative adjective, and explanations) of children at the three age levels in sexus und genus (POST)



Figures 29-31 give the PRE and POST performance and awareness data in sexus and genus for the three experimental age groups, respectively.

Fig. 29: Average correct standard performance and awareness (i.e. error detections, changes of possessive pronoun, changes of predicative adjective, and explanations) of the youngest age group in sexus and genus (PRE and POST)

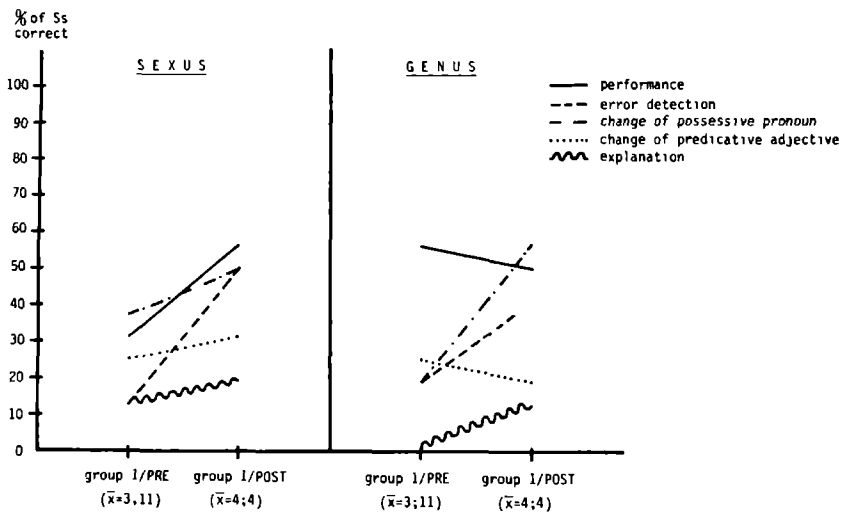


Fig. 30: Average correct standard performance and awareness (i.e. error detections, changes of possessive pronoun, changes of predicative adjective, and explanations) of the middle age group in sexus and genus (PRE and POST)

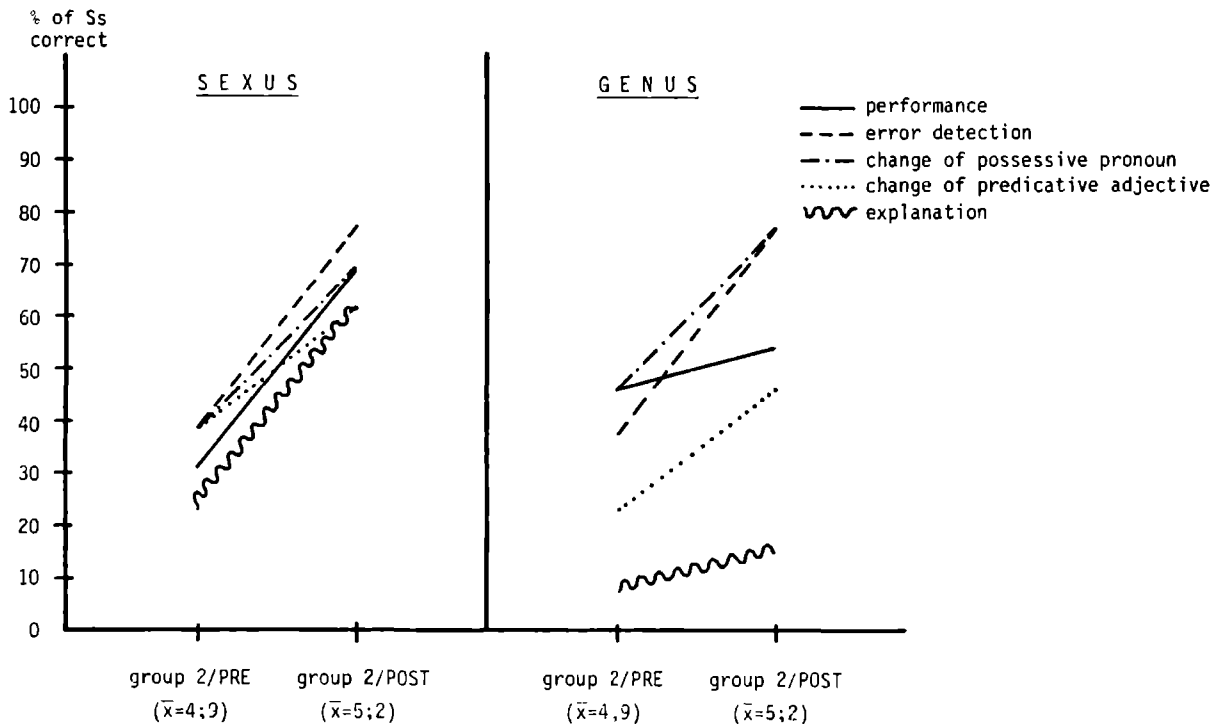


Fig. 31: Average correct standard performance and awareness (i.e. error detections, changes of possessive pronoun, changes of predicative adjective, and explanations) of the oldest age group in sexus and genus (PRE and POST)

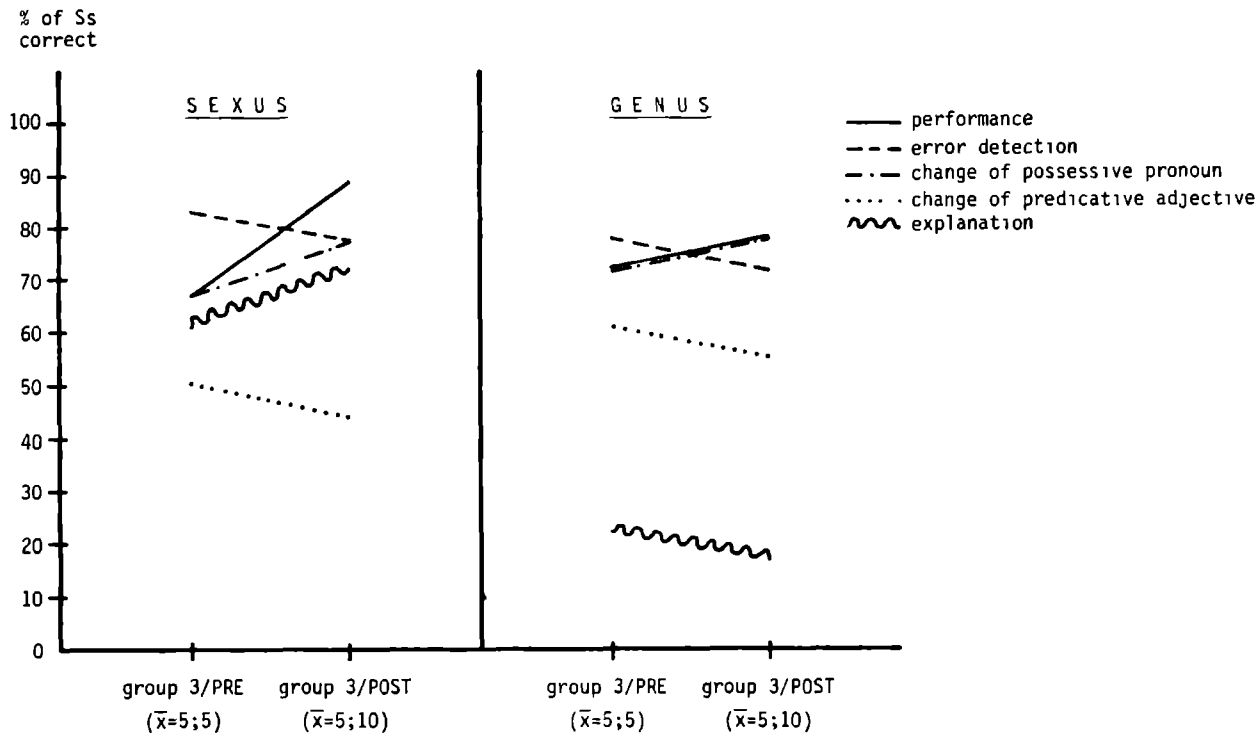
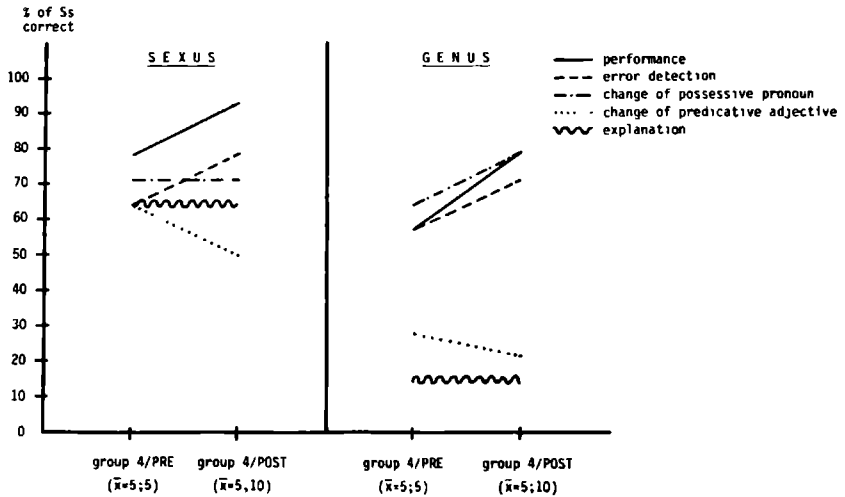


Figure 32, finally, shows the PRE and POST performance and awareness data in sexus and genus for the control group 4.

Fig. 32 Average correct standard performance and awareness (i.e. error detections, changes of possessive pronoun, changes of predicative adjective, and explanations) of the control group in sexus and genus (PRE and POST)



Comments on these figures will follow in later sections. In order to study correlations of the four metalinguistic abilities (error detections, correct changes of the possessive pronoun, correct changes of the predicative adjective, and correct explanations) we had to consider six relationships (cf. Table 29). Let us now look at the contingency coefficients C (a measure of the extent of association between two sets of attributes) for these relationships in sexus and genus, in PRE and POST respectively (note that the maximum value which C can attain in a 2x2 table is $\sqrt{0,5} = .707$). Table 29 lists the different contingency coefficients and the χ^2 -values for the relationships a., b., c., d., e., and f.: if "C" is underlined we can conclude that C is significantly different from zero.

Table 29: Contingency Coefficients for the Associations Among Metalinguistic Abilities (All Four Groups)

	SEXUS		GENUS	
	PRE	POST	PRE	POST
a relation between error detections and correct changes of the poss. pronoun	<u>C = .38</u> ($\chi^2=10.4$, df=1) p < .01	<u>C = .45</u> ($\chi^2=15.6$, df=1) p < .001	<u>C = .43</u> ($\chi^2=13.8$, df=1) p < .001	<u>C = .44</u> ($\chi^2=14.4$, df=1) p < .001
b relation between error detections and correct changes of the pred. adjective	<u>C = .46</u> ($\chi^2=16.1$, df=1) p < .001	<u>C = .32</u> ($\chi^2=7.2$, df=1) p < .01	<u>C = .36</u> ($\chi^2=9.2$, df=1) p < .01	<u>C = .42</u> ($\chi^2=12.8$, df=1) p < .001
c relation between error detections and correct explanations	<u>C = .58</u> ($\chi^2=30.6$, df=1) p < .001	<u>C = .51</u> ($\chi^2=21.0$, df=1) p < .001	<u>C = .30</u> ($\chi^2=6.0$, df=1) p < .02	C = .17 ($\chi^2=1.7$, df=1)
d relation between correct changes of the poss. pronoun and correct changes of the pred. adjective	<u>C = .28</u> ($\chi^2=5.1$, df=1) p < .05	C = .18 ($\chi^2=2.2$, df=1)	C = .19 ($\chi^2=2.4$, df=1)	<u>C = .25</u> ($\chi^2=3.9$, df=1) p < .05
e relation between correct changes of the poss. pronoun and correct expl.	<u>C = .50</u> ($\chi^2=17.4$, df=1) p < .001	<u>C = .55</u> ($\chi^2=26.0$, df=1) p < .001	<u>C = .29</u> ($\chi^2=5.6$, df=1) p < .02	C = .09 ($\chi^2=.50$, df=1)
f relation between correct changes of the pred. adjective and correct expl.	<u>C = .45</u> ($\chi^2=15.2$, df=1) p < .001	C = .15 ($\chi^2=1.5$, df=1)	C = .21 ($\chi^2=2.7$, df=1)	C = .20 ($\chi^2=2.46$, df=1)

Table 29 shows that the associations between error detections and correct changes of the possessive pronoun and between error detections and correct changes of the predicative adjective are relatively strong. This suggests that error detections and corrections often go hand in hand.

In *sexus* we have also a high correlation between error detections and correct explanations, on the one hand, and between correct changes of the possessive pronoun and correct explanations on the other hand.

Associations between correct changes of the possessive pronoun and correct changes of the predicative adjective are rather low. This finding indicates that children often gave only one kind of correction (either a change of the possessive pronoun or a change of the predicative adjective).

Relatively low correlations were also observed for the relations between correct changes of the predicative adjective and correct explanations, with the exception of *sexus/PRE* where we found many children who could neither change nor explain correctly.

Except for associations between, on the one hand, error detections and correct changes of the possessive pronoun, and, on the other hand, error detections and correct changes of the predicative adjective, correlations in *genus* are lower than correlations in *sexus*. This holds especially for all those associations in which correct explanations are correlated with another metalinguistic ability (i.e. with error detections, cf. c in Table 29, with correct changes of the possessive pronoun, cf. e in Table 29, and with correct changes of the predicative adjective, cf. f in Table 29). For both *sexus* and *genus*, correct changes of the predicative adjective are in general less strongly associated with other metalinguistic abilities (error detections and correct explanations) than correct changes of the possessive pronoun. This finding could be due to children's preferences for changes of the possessive pronoun in case of a correction. Thus, children might have noticed that E asked for pronouns and not colours (i.e. predicative adjectives).

Presentation order effects

Figure 33 displays the performance and awareness data in PRE for the oldest experimental group 3 (performance before awareness) and the control group 4 (awareness before performance) which was of the same age as the children in group 3.

Fig. 33: Average correct standard performance and awareness (i.e. error detections, changes of possessive pronoun, changes of predicative adjective, and explanations) of the oldest age group and the control group in sexus and genus (PRE)

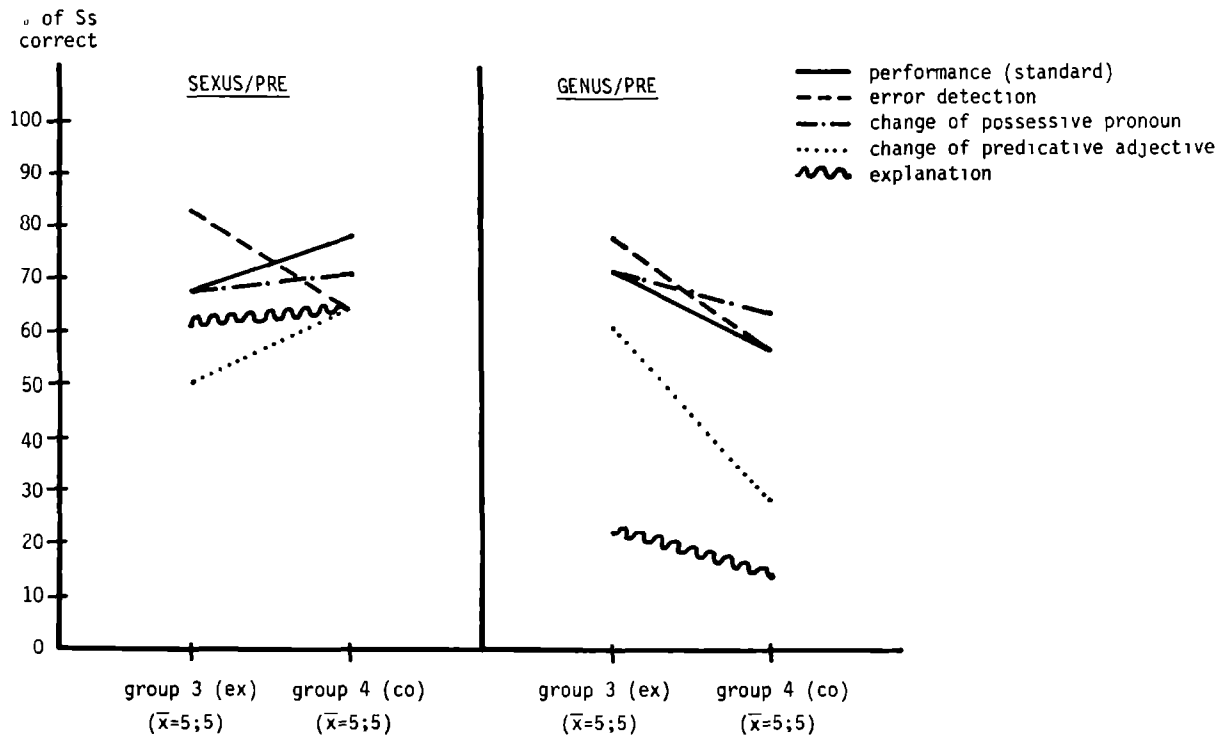


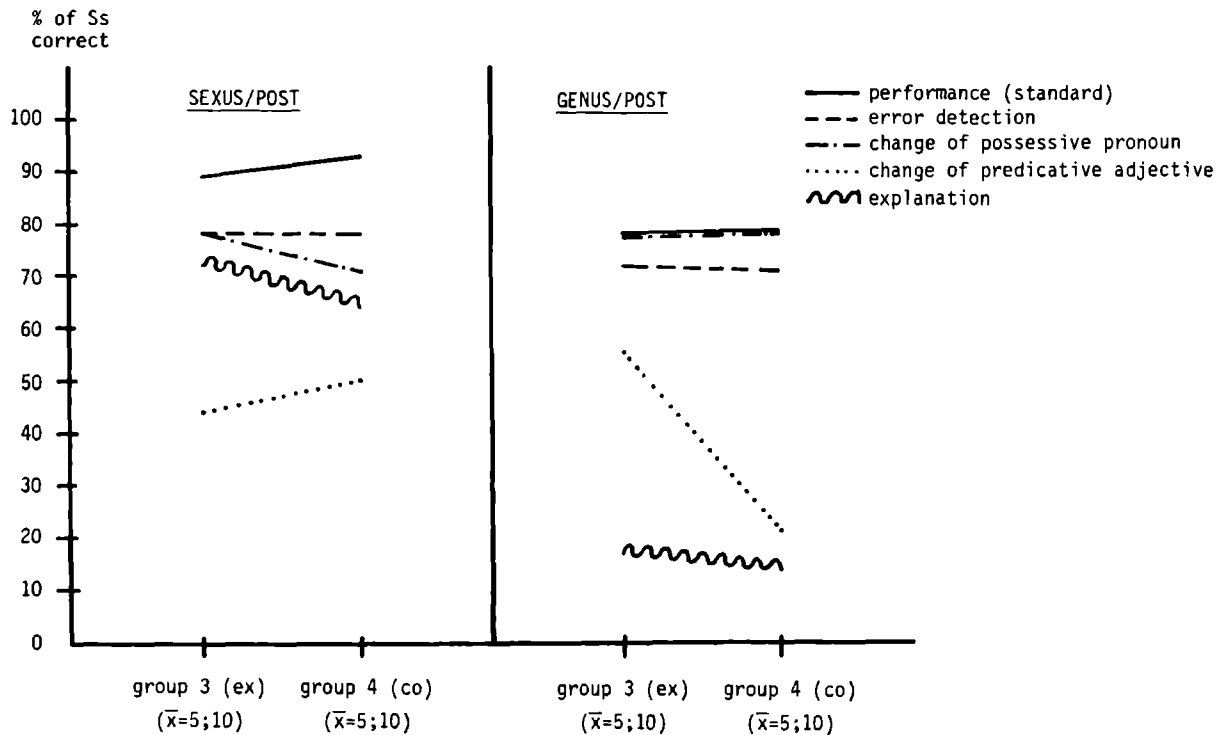
Figure 33 exhibits that for both sexus and genus error detections in PRE are more frequent in the experimental group 3 (sexus: 83%, genus: 78%) than in the control group 4 (sexus: 64%, genus: 57%). This difference, however, is not significant.

Pronoun changes do not differ in sexus/PRE and genus/PRE between group 3 and group 4. In sexus/PRE the control children change more often the predicative adjective than the children in group 3 (the difference is not significant), whereas the "experimental" children in group 3 change the predicative adjective in genus/PRE more often than the "control" children (the difference between the two groups just misses significance: $p = .059$).

Explanations in PRE are in both sexus and genus not much different in group 3 and group 4. Thus, we did not observe any significant differences between group 3 and group 4 in sexus/PRE and genus/PRE with respect to error detections, changes of the possessive pronoun, changes of the predicative adjective, and explanations.

Figure 34 depicts the comparison of performance and metalinguistic abilities for group 3 and group 4 in POST.

Fig. 34: Average correct standard performance and awareness (i.e. error detections, changes of possessive pronoun, changes of predicative adjective, and explanations) of the oldest age group and the control group in sexus and genus (POST)



This comparison shows that there are no major differences in *sexus*/POST and *genus*/POST with respect to our four metalinguistic abilities, with one exception: like in *genus*/PRE group 3 changes the prediative adjective in *genus*/POST more often than group 4 (however, this difference between the two groups also misses significance).

Thus, there are no significant results with respect to differences of metalinguistic abilities between group 3 and group 4 in *sexus*/PRE, *sexus*/POST, *genus*/PRE, and *genus*/POST, i.e. we have no reason to assume strong presentation order effects for metalinguistic abilities in the gender tests.

Task order effects

Half of the children got the natural gender awareness tasks before the syntactic gender awareness tasks, and the other half the inverse order (syntactic gender awareness tasks before natural gender awareness tasks) (cf. 7.1.4). When we analyzed our data with respect to task order effects we did not obtain any significant findings. Thus, the position of a metalinguistic gender task does not influence results on error detections, changes of the possessive pronoun, changes of the predicative adjective, and explanations.

7.2.2.2 Awareness Results as Related to Hypotheses

Section 4 and section 5 were not only devoted to deriving hypotheses on the role of linguistic awareness in language acquisition for Study A, but also for Study B. In 5. we specified our predictions for both studies which were summarized in 5.6.

In H_A 1a we proposed on the basis of Claparède's observations, that metalinguistic abilities arise more likely in case of a mismatch between sentence content and communicative intent than in case of a correspondence between these two.

The "filler-tasks" IIIa and IIIb in *sexus* and 3a and 3b in *genus*, i.e. the "correct" tasks, function as testing-ground for the Claparède-suggestion that awareness for "incorrect" precedes awareness for "correct".

Let us list them once more (cf. also 7.1.4):

- filler task IIIa (*sexus*): "Can I say, "seine" (his) scarf is yellow?",
- filler task IIIb (*sexus*): "Can I say, "seine" (his) scarf is red?",
- filler task 3a (*genus*): "Can I say, "seine" (his) colour is black?" and
- filler task 3b (*genus*): "Can I say, "seine" (his) colour is blue?".

In general, children accepted these questions, sometimes emphasizing that E could say this. However, some children hesitated for a long time and some even said that E's utterance was wrong. Most of these "negators" changed their opinion during the interviews (i.e. said later that "seine" was correct). It is remarkable that in the "a-tasks" (IIIa and 3a) quite a number of children (in IIIa: 16% of all children in PRE and POST; in 3a: 12% of all children in PRE and POST) said "no" at first and referred to the other "seine"-animate or object (i.e., in IIIa "no, because the boy has the red scarf" and in 3a "no, because the boat is blue") but noticed later that there were two possible referents for "seine". Thus, these children discovered the plurifunctionality of "seine" (usually without E's prompts) in the course of the interview (children reacted often with surprise; e.g. in 3a: "Nein, weil das Boot blau ist ... Oh, doch, wart mal, doch, kannst du sagen"/No, because the boat is blue ... Oh, yes, wait a minute, yes, you can say that).*

We now want to look at children's awareness (defined as children's ability to reflect and comment on linguistic structures and functions) for the correct "filler"-tasks (cf. Table 30) in order to have a basis for comparing awareness for "correct" and awareness for "incorrect". "Error detections" in Table 30 refer to at least one "no"-answer in the two "correct" tasks of sex, or genus respectively. "Changes of the possessive pronoun" refer to at least one pronoun change (e.g. "ihre"/her or "das seine"/the (neuter) his. Scores for pronoun changes were also considered if children asserted that "seine" was also possible or more appropriate in IIIa, IIIb, 3a and 3b). Changes of the predicative adjective refer to at least one colour change (nearly always the other referent, for "seine"), and explanations refer to at least one correct explanation.

*The discovery of plurifunctionality of "seine" during the awareness interview explains children's plurifunctional usage of "seine" in the performance tests after the administration of the awareness tests (cf. 7.2.1.4).

Table 30: Children's Awareness in the "Correct"-Tasks (All Four Groups)

	SEXUS				GENUS			
	error detections	changes of the poss. pronoun	changes of the pred. adjective	explanations	error detections	changes of the poss. pronoun	changes of the predic. adj.	explanations
PRE	26%	13%	18%	11%	23%	7%	15%	2%
POST	38%	10%	25%	31%	41%	8%	16%	5%

Table 30 shows that in both sexus and genus "error detections" in the "filler"-tasks become more frequent in the second test than in the first test. "Changes of the predicative adjective" are in both sexus and genus more frequent than "changes of the possessive pronoun". "Explanations" are more often in sexus than in genus.

For a comparison between awareness for "correct" and awareness for "incorrect" we have to give the general awareness scores of the four groups in PRE and POST for the "incorrect" tasks (cf. Table 31, the scores in Table 31 can also be derived by averaging children's scores in Fig. 27, Fig. 28, and Fig. 29).

Table 31: Children's Awareness in the "Incorrect"-Tasks (All Four Groups)

	SEXUS				GENUS			
	error detections	changes of the poss. pronoun	changes of the pred. adjective	explanations	error detections	changes of the poss. pronoun	changes of the pred. adjective	explanations
PRE	51%	54%	44%	41%	49%	51%	36%	11%
POST	70%	67%	46%	52%	64%	72%	36%	14%

When we compare Table 30 with Table 31* we can see that awareness for "incorrect" precedes awareness for "correct" although awareness for "correct" is frequently observed. This result suggests that we can partially confirm H_A 1a although, apparently, the plurifunctionality of "seine" in the "correct" tasks attracted the child's attention and provoked metalinguistic comments.

Our next hypothesis, H_A 1c, relates only to the gender study:

H_A 1c: Metalinguistic abilities (error detections, corrections, and explanations) can be observed earlier (respectively more often) for natural gender where cognitive and linguistic factors coincide than for syntactic gender where only linguistic factors play a role.

H_A 1c, which was also derived from Claparède's observations, cannot be fully confirmed since changes of the possessive pronoun were observed more often in *genus*/POST than in *sexus*/POST (cf. Table 31). From inspection of Table 31 one can see that the differences between natural gender and syntactic gender with respect to error detections and changes of the possessive pronoun are relatively small. This finding can also be confirmed by a check of the correlations between these two metalinguistic abilities in *sexus* and *genus* (cf. Table 29).

However, the intraindividual coherence of the predicative adjective between *sexus* and *genus* was more loose (cf. also Table 31). Nearly one third (in PRE: 31%, in POST: 33%) of all children exhibited differences between *sexus* and *genus*. Table 31 reveals big differences between *sexus* and *genus* with respect to explanations. This observation can also be confirmed by comparing the levels of explanations in the *sexus* and the *genus* tasks: 19 children gave correct explanations in *sexus* but not in *genus*, and only one child could explain correctly *genus* but not *sexus*.** This difference is even

* Note that in the "incorrect" tasks pronoun changes are most frequent (except for *sexus*/PRE where error detections are more frequent) whereas in the "correct" tasks error detections can be observed more often. Also, changes of the possessive pronoun are more frequent than changes of the predicative adjective in the "incorrect" tasks whereas the "correct" tasks display the reverse relationship.

** In a control study with 13 adults (only two psycholinguists) we discovered that all subjects could explain natural and syntactic gender correctly. (*Genus* was usually not explained by coreferentiality rules but by a one-to-one mapping between pronoun and definite article, e.g. "You have to say "ihre" (her) because one say "die" (the, fem.) watering-can").

clearer in POST 24 children (39%) explained sexus correctly but not genus. There was no child in the four groups in the second test who could explain genus correctly but not sexus. The differences between sexus and genus explanations are significant in PRE (McNemar $-\chi^2$ 14.45, $df = 1$, $p < .001$) as well as in POST (McNemar $-\chi^2$ 22.04, $df = 1$, $p < .001$).

These findings indicate that H_{A1c} can be definitely confirmed for explanations, probably for changes of the predicative adjective (i.e. reference changes), and error detections, but not fully for pronoun corrections.

Our next hypotheses H_{A2} and H_{A3} , concern the existence of a unified general metalinguistic ability.

H_{A2} Metalinguistic abilities (error detections, corrections, and explanations) are within a test rather more interdependent than contrasting.

In Table 29 (in 7.2.2.1) we presented the contingency coefficients for the associations among metalinguistic abilities in sexus and genus, in PRE and POST respectively. Although some metalinguistic abilities are strongly correlated suggesting the existence of a common underlying factor (error detections, pronoun corrections, and explanations in sexus, error detections and pronoun corrections in genus) we observed that in sexus/POST and genus/PRE changes of the predicative adjective do not much correlate with pronoun changes and correct explanations, and that in genus/POST explanations do not correlate with other metalinguistic abilities. These findings suggest that we have to reject H_{A2} at least in so far that a "single factor" theory of awareness is clearly insufficient. Task-specific factors are surely involved as well. The most evident difference of metalinguistic abilities between sexus and genus is the difference in explanations whereas error detections and pronoun corrections are rather contingent in sexus and genus. It seems that explanations for intralinguistic reference require a different kind of reflective ability than explanations for extralinguistic reference.

H_{A3} relates to the differential development of different metalinguistic abilities with age.

H_{A3} : The cross-sectional and longitudinal development of metalinguistic abilities (error detections, corrections, and explanations) with age is ordered according to "strain" in reflective ability first are error detections, then corrections, and finally explanations.

H_{A3} has to be rejected with respect to the precedence of error detections. pronoun corrections are sometimes earlier than error detections (cf.

Fig. 27, Fig. 28, in Fig. 29 *sexus*/PRE and *genus*/POST, in Fig. 30 *genus*/PRE, in Fig. 31 *genus*/POST, and in Fig. 32 *sexus*/PRE and *genus*/PRE and POST). Although changes of the predicative adjective can be earlier than error detections (cf. in Fig. 29 *sexus*/PRE and *genus*/PRE of the youngest children), they are in some tests later than explanations (cf. in Fig. 31 *sexus*/PRE and POST of the oldest children, and in Fig. 32 *sexus*/POST of the control group). However, H_A^3 can be confirmed with respect to the precedence of error detections and pronoun corrections over explanations in both *sexus* and *genus* (cf. Fig. 27, Fig. 28, and Fig. 32).

Let us summarize our findings with respect to our hypotheses H_A 1a, H_A 1c, H_A^2 , and H_A^3 :

- H_A 1a: (awareness for incorrect precedes awareness for correct) can be - at least partially - confirmed although the plurifunctionality of "seine" in the "correct" tasks gave rise to metalinguistic comments of the child,
- H_A 1c: (awareness for *sexus* precedes awareness for *genus*) can be definitely confirmed for explanations, probably for reference changes and error detections, but not fully for pronoun corrections,
- H_A^2 : (metalinguistic abilities are within a test rather more interdependent than contrasting) has to be rejected because of clear differences in explanations between *sexus* and *genus* tasks, and
- H_A^3 : (in the development of metalinguistic abilities error detections should be first, then corrections, and finally explanations) cannot be fully confirmed for the precedence of error detections before corrections. However, H_A^3 is correct with respect to the precedence of error detections and pronoun corrections over explanations.

Thus, our hypotheses cannot fully explain children's development of metalinguistic abilities. We, therefore, will look for other factors underlying awareness in the *sexus* and *genus* tasks.

7.2.2.3 Other Influential Factors in the Child's Metalinguistic Abilities

There are at least seven factors which are not accounted for by our predictions but which might be informative with respect to children's metalinguistic abilities.

These factors are: the enhancement of awareness through metalinguistic experience, children's striving for internal coherence, the adherence to

conversational maxims, children's post-hoc rationalizations in genus, their partial awareness of pronoun features, children's preference for sexus, and the role of stereotypes in the gender tasks.

The first factor is the enhancement of awareness through metalinguistic experience. This factor can be seen in the enhancement of error detections in POST through error detections in PRE (cf. Fig. 27 and Fig. 28 in 7.2.1.1, cf. also Figs. 29, 30, and 32) for both sexus and genus tasks of group 1, group 2, and control group 4 (however, not of group 3). The enhancement of pronoun changes in POST through pronoun changes in PRE becomes apparent in Fig. 27 and Fig. 28, also in Figs. 29, 30, 31, and 32, in all tests of all four groups, except for the control group in sexus. Except for group 2 in sexus and genus there is no enhancement of changes of the predicative adjective in POST through changes of the predicative adjective in PRE (cf. Fig. 27 and Fig. 28, cf. also Fig. 30). There is only one clear enhancement of explanations in POST over explanations in PRE: in the sexus test of group 2 (cf. Fig. 27 and Fig. 28, cf. also Fig. 30). This means that the enhancement of awareness through metalinguistic experience is stronger for error detections and pronoun corrections than for reference corrections and explanations. This enhancement is not (much) different for sexus and genus.

Unlike in Study A (cf. 6.2.2.3) we did not observe in Study B an effect on the awareness tests from previous experience in the performance tests (cf. Fig. 33 and Fig. 34).

Enhancement of error detections in POST through error detections in PRE has not only been observed for the "incorrect" tasks but also for the "correct" tasks IIIa and IIIb in sexus (group 1/PRE: 6%; group 1/POST: 31%; group 2/PRE: 23%; group 2/POST: 46%) and for the "correct" tasks 3a and 3b in genus (group 1/PRE: 12%; group 1/POST: 25%; group 2/PRE: 8%; group 2/POST: 46%). But it was not found for older children (group 3 and group 4), or for other metalinguistic abilities than error detections.

Like in Study A (cf. 6.2.2.3) we assume that metalinguistic abilities rely on an "awareness"-raising situation: early or late involvement could be decisive for the early or late development of metalinguistic abilities.

The second factor is children's striving for internal coherence of linguistic units. Like in Study A, we observed that some children struggled for the correct pronoun and that gender pronouns are a problem per se. Let us present two transcripts which contain the word innovation "ere" ("er" = he, "ihre" = her) of two children.

Task IV (natural gender)

S38 in group 1/POST; 4,7, female

VI: "Kann ich sagen, ihre Schleife ist rot?"	E "Can I say, her scarf is red?"
Vp schüttelt den Kopf	S shakes her head
VI: "Warum nicht?"	E. "Why not?"
Vp. "Weil, weil das Schweinchen ist 'n Junge ist."	S. "Because, because the piggy is a boy is."
VI: "Und dann muß ich sagen? Wie muß ich da sagen bei dem Schweinchen?"	E: "And then I have to say? How do I have to say for the piggy?"
Vp: "Ere, ihre ..."	S. "Ere", "ihre" ..." ("er" = he, "ihre" = her)
VI: "Schleife ist ..."	E. "Scarf is ..."
Vp: "Gelb."	S: "Yellow."
VI: "Hmhm. Und wer hat jetzt die rote Schleife?"	E: "Humhum. And who has now the red scarf?"
Vp: "Lukas." (mannl. Puppe)	S: "Lukas." (male doll)
VI: "Hmhm. Kann ich da sagen, ihre Schleife ist rot?"	E: "Humhum. Can I say there, her scarf is red?"
Vp schüttelt den Kopf	S shakes her head
VI. "Ja? Nee? Warum nicht?"	E "Yes? No? Why not?"
Vp: "Weil das ein Junge ist."	S "Because this is a boy."
VI: "Und dann muß ich sagen?"	E. "And then I have to say?"
Vp: "Ere Schleife ist rot."	S: "'Ere" scarf is red."
VI: "Das hab ich eben gesagt: ihre Schleife ist rot."	E. "I said that: her scarf is red."
Protokollantin: "Nee, ere!"	Research assistant: No, "ere"!"
VI: "Ach, ere Schleife?"	E: "Oh, "ere" scarf?"
Vp nickt	S nods (consents)

V1: "Und beim Jungen? Sag ich da:
"Ere" Schleife oder ihre Schleife?"

Vp: "Ihre Schleife."

V1: "Und wo sag ich seine Schleife?"

Vp: "Beim Lukas."

V1: "Hmhm. Und wo sag ich ihre
Schleife?"

Vp zeigt auf die weibliche Puppe

E: "And for the boy? Do I say:
"ere" scarf or her scarf?"

S: "Her scarf."

E: "And where do I say his
scarf?"

S: "For Lukas."

E: "Humhum. And where do I say
her scarf?"

S points at the female doll

It is noteworthy that this girl brought up the same word innovation ("ere") in the ambiguous task V where the piggy was baptized Petra. The same word innovation was also chosen by another child in group 2.

Task I (natural gender)

S35 in group 2/POST; 5;2; male

V1: "So, jetzt mocht' ich von dir
wissen - guck jetzt mal die drei
an - kann ich sagen: seine
Schleife ist grün?"

Vp: "Nee."

V1: "Warum nicht?"

Vp: "Warum* das falsch ist."

V1: "Warum is 'n das falsch?"

Vp: "Warum der kein Mann ist."

V1: "Ja stimmt. (lacht). Und bei
'nem Mann sagt man? - Seine
oder ihre Schleife?"

E: "So, now I want to know from
you - now look at the three
- can I say: his scarf is
green?"

S: "No."

E: "Why not?"

S: "Why* this is wrong."

E: "Why is 't wrong?"

S: "Why this is no man."

E: "Yes, true. (laughs). And
for a man, one says? - His
or her scarf?"

*The confusion between "warum" (why) and "weil" (because) occurred quite frequently in both Study A and Study B, mostly between five and six years.

Vp: "Er ... ere Schleife."	S: "'Er' ... 'ere' scarf." (er = he)
Vl: "Wie?"	E: "How?"
Vp: 'Er... ere seine Schleife.'	S: "'Er'... 'ere' his scarf."
Vl: "Er seine Schleife. (lacht) Okay. Und bei 'ner Frau sagt man?"	E: "He his scarf. (laughs) ok. And for a woman one says?"
Vp: "Seine Schleife."	S: "His scarf."
Vl: "Sagt man bei 'ner Frau 'seine Schleife' oder 'ihre Schleife'?"	E: "Does one say for a woman 'his scarf' or 'her scarf'?"
Vp: "Ihre Schleife."	S: "Her scarf."
Vl: "Hmhm. Und jetzt will ich noch wissen, kann ich sagen ... - Ach so, wie muß ich denn sagen, wenn ich nicht sagen kann: seine Schleife ist grün? Dann muß ich sagen?"	E: "Humhum. And now I still want to know, can I say ... -Oh yeah, how do I have to say then if I cannot say: his scarf is green? Then I have to say?"
Vp: "Ihre Schleife."	S: "Her scarf."
Vl: "Prima. Und warum?"	E: "Very good. And why?"
Vp: "Warum das auch 'ne Frau ist."	S: "Why this is also a woman."
Vl: "Ja, gut."	E: "Yeah, fine."

We already listed other examples of children's uncertainty with respect to the correct pronouns (cf. 7.2). The confusion in finding the correct pronoun becomes also evident in the "natural gender conflict" task V (the piggy Petra):

Task V ("natural gender conflict" task)

S34 in group 2/PRE; 4;9; male

(...)	(...)
Vp: "Ihre."	S: "Her."
Vl: "Warum ihre?"	E: "Why her?"

- Vp: "Um das sich besser anhört."
 S: "So that sounds better" (the incorrect connective "so that" expresses more a conditional than a causal relation)
- Vl: "Ja? Wieso hört sich das besser an?"
 E: "Yes? Why does it sound better?"
- Vp: "Von sie, ih, se... sie, ihr gehört, deswegen heißt das auch richtig seine, ihre Schleife."
 S: "Of she, "ih", "se" ...she, her belongs, that's why it is called correctly his, her scarf."
- Vl: "Wie heißt es denn besser? Seine oder ihre Schleife? Das Schweinchen heißt Petra."
 E: "How is it better called? His or her scarf? The piggy is called Petra."
- Vp: "Ihre Schleife."
 S: "Her scarf."
- Vl: "Mein ich dann das Schweinchen oder die Petra?"
 E: "Do I mean then the piggy or Petra?"
- Vp: "Das Schweinchen."
 S: "The piggy."

Clearly, the struggle for intralinguistic organization is an important factor in both Study A and Study B.

Our third factor in the development of gender pronouns is the adherence to conversational maxims. In 7.2 we gave examples of "arbitrary" explanations, like "because one normally says so" or "because one does not lie". Children seem even to know that linguistic errors are possible (i.e. they are not that unusual) in conversations, like in the examples where a child said that "one can sometimes also be mistaken". Apparently, some children in the age span studied are already aware of conversational obligations, restrictions, and possibilities.

A fourth factor concerns children's post-hoc rationalizations in genus. Some children used natural gender in interpreting genus, like the five-year-old who invented a whole "dice-family" (for further examples, cf. 7.2). This finding confirms Nisbett & DeCamp Wilson's assumption (1977, p. 231) that reports on cognitive processes are based on "judgments about the extent to which a particular stimulus is a plausible case of a given response", i.e.

on post-hoc-rationalizations.

The fifth factor relates to children's partial awareness of pronoun features. When children give sexus explanations in genus they sometimes preserve the feature possessiveness (e.g. "the dice belongs to a boy", "the dice has a father", etc.), sometimes not (e.g. "the dice is a boy", "seine (his) colour is a boy's colour").

In the syntactic gender task 5 (the boat "Susanne") some children dissociated the boat from "Susanne", i.e. they argued on the basis of the female name but did not preserve the gender feature. Let us give an example:

Task 5 ("syntactic gender conflict" task)

S26 in group 2/PRE; 4;2; female

(...)	(...)
Vp: "Ihre Farbe."	S: "Her" colour."
Vl: "Warum?"	E: "Why?"
Vp: "Weil da die Susanne drin fährt."	S: "Because Susanne crosses the sea in it."
Vl: "Das Schiff heißt Susanne, da fährt nicht die Susanne drin." (lacht)	E: "The boat is called Susanne, Susanne does not cross the sea in it." (laughs)

It is possible that children master the gender feature without the possessiveness feature, and that they master the possessiveness feature without the gender feature.

Our sixth factor is children's preference for sexus in the natural gender conflict task V (the piggy Petra) and in the syntactic gender conflict task 5 (the boat Susanne). Children preferred "ihre" over "seine" (significant differences in task V/PRE: $\chi^2 = 7.7$, $df = 1$, $p < .01$; in task V/POST: $\chi^2 = 28.7$, $df = 1$, $p < .001$; and in task 5/POST*: $\chi^2 = 14.75$, $df = 1$, $p < .001$).

*The youngest children and children in group 2 prefer in task 5/PRE "seine". This finding corresponds to the precedence of genus (over sexus) in young children (cf. 7.2.1.1, Fig. 24).

The seventh and last factor relates to the role of stereotypes. Children often told us how the objects should look like. The pig, for instance, should have - like cows in the Bavarian Alps - "ringing things" ("Schelledinger") around its neck (and not a scarf), or that for being a real boat, people should sit in the boat. Stereotypes could also affect their ideas with respect to sexus-specific characteristics. The presence or absence of such characteristics could then determine children's pronoun choice, like in the following example:

Task V ("natural gender conflict" task = piggy Petra)

S15 in control group 4/POST; 6;0; male

(...)	(...)
Vp: "Seine."	S: "His."
Vl: "Warum denn?"	E: "Why so?"
Vp: "Ich kann das sehen, wenn das ein Junge ist."	S: "I can see it, if it is a boy."
Vl: "Bei dem kann man das auch sehen, hast du gesagt?"	E: "There you can see it, too, you said?"
Vp: "Das hat ja keinen ... kein 'wo man draus trinken kann', kein Milchgefäß."	S: "This has no (masc. form).. no 'where you can drink from' no milk container."

We already mentioned that children's search for extralinguistic cues in sexus was frequent, mostly for the pig (cf. 7.2.1). In genus, some children looked also for extralinguistic cues; they had the conception that all light colours are girls' colours and that all dark colours are boys's colours (cf. also 7.2.1). One child even said that one has to say "seine" (his) for the dice, and that the dice is a boy who wears a black suit ("Weil, daß ist ja ein Bube und der hat schwarz: der hat 'nen schwarzen Anzug an.>"). The size of the objects played also a role. The relatively big dice was in some cases conceived as masculine because of its size ("seine, weil das ja auch so groß ist, ist das auch eine* Junge"/his, because it is also so big, it is also a

* Note that the suffix "e" in "Junge", correlates in German with feminine gender (cf. 7.2.1.3).

(fem.) boy). This factor, children's stereotyping, can be related to our fourth factor, their post-hoc rationalizations in interpreting genus.

7.2.2.4 Summary of the Results of the Awareness Tests

All of our predictions on linguistic awareness could be only partially confirmed.

Claparède's difference hypothesis (it is easier to become aware of differences than of similarities) seems to hold with the reservation that plurifunctional pronouns attract the child's attention. Moreover, since in natural gender cognitive and linguistic factors coincide metalinguistic abilities should be observed earlier for sexus than for genus where only linguistic factors play a role. This prediction is correct although pronoun corrections in genus sometimes precede those in sexus.

Different metalinguistic abilities do not develop in the same way. The most evident difference is the difference of explanations between sexus and genus: whereas explanations with respect to extralinguistic reference (sexus) correlate with other metalinguistic abilities explanations with respect to intralinguistic reference (genus) do not go hand in hand with other metalinguistic abilities.

Clearly, one cannot maintain the notion of a simple unified metalinguistic ability. In the gender study error corrections can precede error detections but explanations are generally preceded by error corrections and detections.

Other influential factors seem to play a role in children's acquisition of metalinguistic abilities: the enhancement through metalinguistic experience, children's striving for internal coherence, their adherence to conversational maxims, their post-hoc rationalizations in genus, their partial awareness of pronoun features, their preference for sexus in conflict-tasks, and their use of stereotypes in pronoun decisions. The first three factors (the enhancement of awareness through metalinguistic experience, children's striving for internal coherence, and their adherence to conversational maxims) are also apparent in Study A.

Despite of noticeable parallels between our two studies, our assumptions and our results on the development of metalinguistic abilities need further theoretical and empirical evaluation.

7.2.3 The Relationship between Performance and Awareness

7.2.3.1 General Results of the Relationship between Performance and Awareness

In Table 32 an overview is presented of the relationships obtained between performance and different metalinguistic abilities, i.e. the relations

- between correct performance and error detections,
- between correct performance and correct pronoun changes,
- between correct performance and correct reference changes (= changes of the predicative adjective), and
- between correct performance and correct explanations (cf. Table 32).

The analyses for these relations are described in 7.2.

Table 32: Contingency Coefficients for the Associations of Correct Performance and Awareness (All Four Groups)

	SEXUS		GENUS	
	PRE	POST	PRE	POST
a relation between correct performance and error detections	$C = .48$ $(x^2=17.85, df=1)$ $p < .001$	$C = .35$ $(x^2=8.5, df=1)$ $p < .01$	$C = .25$ $(x^2=4.06, df=1)$ $p < .05$	$C = .14$ $(x^2= 1.16, df=1)$
b relation between correct performance and correct changes of the poss. pronoun	$C = .52$ $(x^2=22.35, df=1)$ $p < .001$	$C = .31$ $(x^2=6.43, df=1)$ $p < .02$	$C = .33$ $(x^2=7.5, df=1)$ $p < .01$	$C = .22$ $(x^2= 3.17, df=1)$
c relation between correct performance and correct changes of the pred. adjective	$C = .28$ $(x^2= 5.0, df=1)$ $p < .05$	$C = .15$ $(x^2=1.39, df=1)$	$C = .15$ $(x^2=1.4, df=1)$	$C = .32$ $(x^2=7.2, df=1)$ $p < .01$
d relation between correct performance and correct explanations	$C = .50$ $(x^2=17.23, df=1)$ $p < .001$	$C = .34$ $(x^2=7.72, df=1)$ $p < .01$	$C = .01$ $(x^2=.0133, df=1)$	$C = .04$ $(x^2=.12, df=1)$

Table 32 shows that correct performance in the sexus task goes hand in hand with error detections, changes of the possessive pronoun, and explanations (correct performance and changes of the predicative adjective are only associated in sexus/PRE, but not in sexus/POST). In genus we find relatively weak associations, except for the correlations of performance with error detections and pronoun changes in PRE and the correlation of performance with changes of the predicative adjective in POST. The weakest relations are those between performance and explanations in genus/PRE and genus/POST. These findings will be discussed in 7.2.3.2.

Presentation order effects

Figure 33 and Figure 34 show that there are no major presentation order effects with respect to the relation between performance and awareness.

7.2.3.2 Within-Test Relations between Performance and Awareness as Related to Theoretical Expectations

In 5.6 we formulated three hypotheses with respect to the within-test relations between performance and awareness in Study B.

In the first one (H_{A4}) we expected that awareness can be observed although children do not yet perform correctly. This assumption can be confirmed for sexus with respect to error detections, pronoun changes, and changes of the predicative adjective (cf. Figure 27 and Figure 28). We even observed four children who explained natural gender but could not perform correctly.

H_{A4} can also be confirmed for genus with respect to error detection and pronoun changes (cf. Figure 27 and Figure 28). Moreover, we observed seven children who changed the predicative adjective correctly and one child who explained genus correctly but could not (yet) perform correctly. However, in general children who are aware at an early or late stage are partially correct in the performance test as well, i.e. they master at least one pronoun (either "ihre" or "seine"). Thus, we conclude that in both sexus and genus error detections and corrections are possible without completely correct performance, but correct explanations are less likely without correct performance.

In general, children who master the awareness tests, show at least partially correct performance.

In our next hypothesis, H_{A5} , we assumed that performance precedes meta-

linguistic abilities. For our analysis on the within-test relations between performance (= perf) and different metalinguistic abilities (i.e. error detections = ed; pronoun changes = pp; reference changes = ref; and explanations = expl) we compared the number of children who perform correctly but are not aware (i.e. perf+, ed-; perf+, pp-; perf+, ref-; perf+, expl-) with the number of children who cannot perform correctly but are aware (i.e. perf-, ed+; perf-, pp+; perf-, ref+; perf-, expl+). This was done for all four groups together in PRE and POST, but for sexus and genus separately.

In general, there are more subjects who can perform correctly but are not aware than subjects who cannot perform correctly but are aware. However, the within-test relations between performance and error detections, and the relation between performance and pronoun changes, do neither in sexus nor in genus reveal significant differences. The within-test relations between performance and reference changes and between performance and explanations show in sexus and genus significant differences:

$n(\text{perf+}, \text{ref-}) > n(\text{perf-}, \text{ref+})$ in sexus: $\chi^2 = 12.$, $df = 1$, $p < .001$,
 $n(\text{perf+}, \text{expl-}) > n(\text{perf-}, \text{expl+})$ in sexus: $\chi^2 = 10.93$, $df = 1$, $p < .001$,
 $n(\text{perf+}, \text{ref-}) > n(\text{perf-}, \text{ref+})$ in genus: $\chi^2 = 23.12$, $df = 1$, $p < .001$,
 and
 $n(\text{perf+}, \text{expl-}) > n(\text{perf-}, \text{expl+})$ in genus: $\chi^2 = 55.9$, $df = 1$, $p < .001$.

These results indicate that we cannot reject H_{A5} although performance precedes more clearly reference changes and explanations than error detections and pronoun corrections.*

In H_{A6} , our third hypothesis with respect to within-test relations between performance and awareness, we assumed that it is harder to become aware of early acquired pronouns than of later acquired pronouns. Although this hypothesis cannot be confirmed with respect to performance and error detections, pronoun changes, and reference changes in sexus and genus, it is fully confirmed with respect to performance and explanations in sexus and genus (cf. Fig. 27 and Fig. 28). Genus is earlier correctly used than sexus

* Note that the argument given in 6.2.3.2 with respect to H_{A5} (all features for correct performance, but only contrasting ones for error detections) does not hold anymore. This confirms rather than disconfirms the given explanation.

but genus-explanations lag far behind sexus-explanations. It might well be that early gender usage is influenced by intralinguistic factors (and not conceptual ones) but that gender explanations develop primarily where extralinguistic cues are provided.

This completes the analysis of the within-test relations as far as required by the theoretical analyses (cf. section 5). Let us summarize our main findings:

- error detections and corrections are in both sexus and genus tests possible without completely correct performance, but correct explanations are less likely without correct performance,
- performance precedes in general metalinguistic abilities (especially reference changes and explanations), and
- although early gender understanding seems to be influenced by intralinguistic factors, gender explanations seem to develop primarily on the basis of extralinguistic factors.

7.2.3.3 Longitudinal Relations between Awareness and Performance

Let us first repeat our main hypothesis:

Children who show metalinguistic abilities in the first test but whose primary performance is not yet appropriate will improve their primary performance in the second test more than children who are neither aware nor perform correctly in the first test.

In 7.2 we described the data analyses required for a check of our main hypothesis in Study B. The procedures are the same as in Study A (cf. 6.2.3.3): we dichotomized children's performance scores and awareness scores in PRE and compared the absolute performance scores in POST of children with low performance and low awareness in PRE (00) with the absolute performance scores in POST of children with low performance but high awareness in PRE (01).

In the few cases where a child's performance or awareness score was exactly the median for his age group we checked - like in Study A - the protocols and transcripts: when very hesitant or inconsistent answers were given we decided for a "0"-classification. Since this criterion was still insufficient we assigned randomly a "0" or "1" score in all other cases, and before the inspection of the performance scores in POST.

In 7.2 the final steps of these analyses were described: Four tests (error detections, pronoun changes, reference changes, and explanations) for each group (and thereafter for all four groups together) were carried out. Let us repeat them:

The first test analyzes differences in means (= M) of performance in POST for "00_{ed}"*-children ("00_{ed}" = children with "low performance" and "low error detections" in PRE) and "01_{ed}"-children ("01_{ed}" = children with "low performance" but "high error detections" in PRE).

The second test analyzes differences in means (= M) of performance in POST for "00_{pp}"*-children ("00_{pp}" = children with "low performance" and "low possessive pronoun corrections" in PRE) and "01_{pp}"-children ("01_{pp}" = children with "low performance" but "high possessive pronoun corrections" in PRE).

The third test analyzes differences in means (= M) of performance in POST for "00_{ref}"*-children ("00_{ref}" = children with "low performance" and "low reference changes" in PRE) and "01_{ref}"-children ("01_{ref}" = children with "low performance" but "high reference changes" in PRE).

The fourth and last test analyzes differences in means (= M) of performance in POST of "00_{expl}"*-children ("00_{expl}" = children with "low performance" and "low explanations" in PRE) and "01_{expl}"-children ("01_{expl}" = children with "low performance" but "high explanations" in PRE).

These four tests were applied to each of the groups and to all four groups together, for sexus separately and for genus separately.

For all four tests we applied t-tests after having checked for equal variances of the two types of independent observations.

Let us now look at the results with respect to our main hypothesis, i.e. the question whether awareness can be predictive for later performance.

*"ed" stands for "error detection"; "pp" for "possessive pronoun correction"; "ref" for "changes of reference" = "changes of the predicative adjective"; "expl" for "explanation".

Table 33 Differences in Performance/POST Scores between non-Aware Children and Early-Aware Children in Sexus and Genus

	SEXUS			
	error detections significant differences between "00 _{ed} " and "01 _{ed} " in performance/POST	pronoun changes significant differences between "00 _{pp} " and "01 _{pp} " in performance/POST	reference changes significant differences between "00 _{ref} " and "01 _{ref} " in performance/POST	explanations significant differences between "00 _{expl} " and "01 _{expl} " in performance/POST
group 1	no ($M_{00_{ed}} = 1.5/M_{01_{ed}} = 2.$)	no ($M_{00_{pp}} = 1.25/M_{01_{pp}} = -$) ^a	no ($M_{00_{ref}} = 1./M_{01_{ref}} = 2.$)	no ($M_{00_{expl}} = 1.25/M_{01_{expl}} = -$) ^a
group 2	yes ($M_{00_{ed}} = 0.75/M_{01_{ed}} = 2.2$) ($p < .01/3.47 >$) $t(0,95,7) = 1.895$	no ($M_{00_{pp}} = 1.5/M_{01_{pp}} = 2.$)	no ($M_{00_{ref}} = 1.33/M_{01_{ref}} = 2.$)	no ($M_{00_{expl}} = 1.33/M_{01_{expl}} = 2.$)
group 3	no ($M_{00_{ed}} = 1.75/M_{01_{ed}} = 2.$)	no ($M_{00_{pp}} = 1.75/M_{01_{pp}} = 2.$)	no ($M_{00_{ref}} = 1.67/M_{01_{ref}} = 2.$)	no ($M_{00_{expl}} = 1.75/M_{01_{expl}} = 2.$)
group 4	no ($M_{00_{ed}} = 2./M_{01_{ed}} = 2.6$)	no ($M_{00_{pp}} = 2.3/M_{01_{pp}} = 3.$)	no ($M_{00_{ref}} = 2.3/M_{01_{ref}} = 2.5$)	no ($M_{00_{expl}} = 2.2/M_{01_{expl}} = 2.75$)
all four groups together	yes ($M_{00_{ed}} = 1.3/M_{01_{ed}} = 2.33$) ($p < .005/4.14 >$) $t(0,95,26) = 1.706$ ^a	yes ($M_{00_{pp}} = 1.7/M_{01_{pp}} = 2.4$) ($p < .05/1.77 >$) $t(0,95,26) = 1.706$	yes ($M_{00_{ref}} = 1.53/M_{01_{ref}} = 2.23$) ($p < .025/2.44 >$) $t(0,95,26) = 1.706$	yes ($M_{00_{expl}} = 1.63/M_{01_{expl}} = 2.33$) ($p < .025/2.25 >$) $t(0,95,26) = 1.706$

	GENUS			
	error detections significant differences between "00 _{ed} " and "01 _{ed} " in performance/POST	pronoun changes significant differences between "00 _{pp} " and "01 _{pp} " in performance/POST	reference changes significant differences between "00 _{ref} " and "01 _{ref} " in performance/POST	explanations significant differences between "00 _{expl} " and "01 _{expl} " in performance/POST
group 1	no ($M_{00_{ed}} = .75/M_{01_{ed}} = 1.$)	no ($M_{00_{pp}} = .86/M_{01_{pp}} = -$) ^a	no ($M_{00_{ref}} = .83/M_{01_{ref}} = 1.$)	no ($M_{00_{expl}} = .86/M_{01_{expl}} = -$) ^a
group 2	yes ($M_{00_{ed}} = 1./M_{01_{ed}} = 2.3$) ($p < .005/5.75 >$) $t(0,95,5) = 2.015$	yes ($M_{00_{pp}} = 1./M_{01_{pp}} = 2.$) ($p < .05/2.04 >$) $t(0,95,5) = 2.015$	no ($M_{00_{ref}} = 1.25/M_{01_{ref}} = 2.$)	yes ($M_{00_{expl}} = 1.2/M_{01_{expl}} = 2.5$) ($p < .01/3.683 >$) $t(0,95,5) = 2.015$
group 3	yes ($M_{00_{ed}} = .67/M_{01_{ed}} = 2.5$) ($p < .025/4.19 >$) $t(0,95,3) = 2.353$	yes ($M_{00_{pp}} = 1./M_{01_{pp}} = 3./$) ($p < .05/2.53 >$) $t(0,95,3) = 2.353$	yes ($M_{00_{ref}} = .67/M_{01_{ref}} = 2.5$) ($p < .05/2.99 >$) $t(0,95,3) = 2.353$	yes ($M_{00_{expl}} = 1./M_{01_{expl}} = 3.$) ($p < .05/2.53 >$) $t(0,95,3) = 2.353$
group 4	no ($M_{00_{ed}} = 2./M_{01_{ed}} = 2.5$)	no ($M_{00_{pp}} = 2.25/M_{01_{pp}} = 2.25$)	no ($M_{00_{ref}} = 2.25/M_{01_{ref}} = 2.25$)	no ($M_{00_{expl}} = 2.1/M_{01_{expl}} = 2.5$)
all four groups together	yes ($M_{00_{ed}} = 1.2/M_{01_{ed}} = 2.14$) ($p < .005/3.18 >$) $t(0,95,29) = 1.699$	yes ($M_{00_{pp}} = 1.4/M_{01_{pp}} = 2.22$) ($p < .025/2.4 >$) $t(0,95,29) = 1.699$	yes ($M_{00_{ref}} = 1.4/M_{01_{ref}} = 2.1$) ($p < .025/2.12 >$) $t(0,95,29) = 1.699$	yes ($M_{00_{expl}} = 1.4/M_{01_{expl}} = 2.6$) ($p < .005/3.36 >$) $t(0,95,29) = 1.699$

^a "-" indicates that no child had "low performance" in PRE but "high awareness" in PRE.

^aNote that when group 1, group 3 and group 4 in sexus are taken together the difference between "00_{ed}"-children and "01_{ed}"-children is also significant with respect to performance/POST ($p < .005/3.11 >$) $t(0,95,17) = 1.740$.

Table 33 shows that in general those children who are aware but cannot yet perform correctly in the first test show better performance in the second test than children who can neither perform correctly nor are aware in the first test. This holds for different kinds of metalinguistic abilities (error detections, pronoun changes, reference changes, and explanations) in sexus and genus.

More specifically, it was found that for the sexus task, when all four groups are taken together the difference between "00"-children and "01"-children is significant for error detections ($p < .005$), for pronoun changes ($p < .05$), for reference changes ($p < .025$), and for explanations ($p < .025$). The individual age groups all show the same tendency, though significance is only reached for group 2 on error detections.

These results indicate that early awareness (error detections, pronoun changes, reference changes, and explanations) may be instrumental or facilitative for later performance of natural gender.

For the genus-task, findings are similar, and even slightly stronger: when all four groups are taken together in the genus tests the difference between "00"-children and "01"-children is significant for error detections ($p < .005$), for pronoun changes ($p < .025$), for reference changes ($p < .025$), and for explanations ($p < .005$). Significant results are also obtained for all of these relations in group 3, and all but "reference changes" in group 2.

These results suggest that early awareness (error detections, pronoun changes, reference changes, and explanations) may be also instrumental or facilitative for later performance of syntactic gender.

The results of the sexus and the genus tests seem to confirm our main hypothesis: linguistic awareness can function as a feedback mechanism or correction device in the gender acquisition of possessive pronouns.

The main hypothesis is, in both sexus and genus tests, most clearly supported for error detections, and for older children (group 2, group 3, and group 4). Between the age of four-and-a-half and six years (i.e. in group 2 and group 3) early metalinguistic abilities serve more clearly as correction device for genus than for sexus performance. The finding that the youngest children in genus do not improve their performance from PRE to POST as much as older children could be due to the automaticity in early genus acquisition. The fact that early corrections (pronoun changes and reference changes) do not have an apparent influence on later genus performance in the control group can be explained by the observation that the genus performance

in PRE is (because of plurifunctional usage which might have been the result of the preceding awareness test) already quite good and that it does not improve very much in POST (note that the sexus performance improves more from PRE to POST with respect to "standard" performance, cf. Figure 25 and Figure 26).

In our last hypothesis (H_{A8}) which also concerns longitudinal relations between awareness and performance in Study B we expected that early language performance is stronger correlated with later language performance than early reflective abilities.

In order to test this hypothesis we used - like in Study A - Kendall's partial rank correlation coefficients for partial correlations between awareness in PRE and performance in POST (partialling out the effect of performance in PRE) and for partial correlations between performance in PRE and performance in POST (partialling out the effect of awareness in PRE). This was done in four tests (error detections, pronoun changes, reference changes, and explanations). In sexus and genus, for each of the four groups and for the four groups together we carried out all four tests.

The analyses were done like in Study A. In a first step we determined three correlations. The first one is the correlation between performance in POST (= $perf_2 = y$, "x" is based on the number of correct pronouns in POST, i.e. from 0 to 3*) and awareness in PRE (in our first test error detections in $PRE=y_{ed}$, in the second test pronoun changes in $PRE=y_{pp}$, in our third test reference changes in $PRE=y_{ref}$, and in our fourth test explanations in $PRE=y_{exp}$; "y" is based on the number of correct error detections, or pronoun changes, or reference changes, or explanations in the three error detection tasks in sexus, and genus respectively, i.e. from 0 to 3).

The second one is the correlation between performance in POST (= $perf_2 = x$) and performance in PRE (= $perf_1 = z$; "z" is based on the number of correct pronouns in PRE, i.e. from 0 to 3). The third correlation is between awareness in PRE (i.e. in our first test = y_{ed} ; in our second test = y_{pp} ;

*With the inclusion of plurifunctional usage three pronouns could be maximally correct in either sexus or genus. We ranked our observations on the x variable from 1 to N (N is the number of subjects in a group). Our computations had to be corrected for ties because some Ss had the same scores.

in our third test = y_{ref} ; in our fourth test = y_{expl}) and performance in PRE (= $perf_1 = Z$).

For each group in sexus and genus we had three correlations in each test, for error detections T_{xyed} , T_{yedz} , and T_{xz} , for pronoun changes T_{xypp} , T_{yppz} , and T_{xz} , for reference changes T_{xyref} , T_{yrefz} , and T_{xz} , and for explanations T_{xyexpl} , T_{yexplz} , and T_{xz} (note that T_{xz} is the same in all four tests).

In a second step, we determined for the first test (error detections) the correlation between performance in POST and error detections in PRE, partialling out performance in PRE, ($T_{xyed.z}$), and the correlation between performance in POST and performance in PRE, partialling out error detections in PRE, ($T_{xz.yed}$).

Similarly, for our second test (pronoun changes) the correlation between performance in POST and pronoun changes in PRE, partialling out performance in PRE, ($T_{xypp.z}$), was determined as well as the correlation between performance in POST and performance in PRE, partialling out pronoun changes in PRE, ($T_{xz.ypp}$).

For our third test (reference changes) the correlation between performance in POST and reference changes in PRE, partialling out performance in PRE, ($T_{xyref.z}$), was analyzed as well as the correlation between performance in POST and performance in PRE, partialling out reference changes in PRE, ($T_{xz.yref}$).

Finally, for our fourth test (explanations) the correlation between performance in POST and explanations in PRE, partialling out performance in PRE, ($T_{xyexpl.z}$), was determined as well as the correlation between performance in POST and performance in PRE, partialling out explanations in PRE, ($T_{xz.yexpl}$).

These eight partial correlations ($T_{xyed.z}$ as compared to $T_{xz.yed}$; $T_{xypp.z}$ as compared to $T_{xz.ypp}$; $T_{xyref.z}$ as compared to $T_{xz.yref}$; $T_{xyexpl.z}$ as compared to $T_{xz.yexpl}$) were analyzed for each of the four groups and for all four groups together, in sexus and genus.

The results are presented in Table 34.

Table 34 Partial Correlations between Early Awareness and Later Performance and between Early Performance and Later Performance

	GENUS							
	Awareness- Error detections		Awareness- Pronoun Changes		Awareness- Reference Changes		Awareness- Explanations	
	r_{xyedz}	$r_{xz yed}$	r_{xyppz}	$r_{xz ypp}$	r_{xyrefz}	$r_{xz yref}$	$r_{xyexplz}$	$r_{xz yexpl}$
	partial correlations between performance in POST and error detections in PRE, partialling out performance in PRE	partial correlations between performance in POST and performance in PRE, partialling out error detections in PRE	partial correlations between performance in POST and pronoun changes in PRE, partialling out performance in PRE	partial correlations between performance in POST and performance in PRE, partialling out pronoun changes in PRE	partial correlations between performance in POST and reference changes in PRE, partialling out performance in PRE	partial correlations between performance in POST and performance in PRE, partialling out reference changes in PRE	partial correlations between performance in POST and explanations in PRE, partialling out performance in PRE	partial correlations between performance in POST and explanations in PRE, partialling out explanations in PRE
group 1 (N=16)	.26	.47	.39	.37	.41	.53	.02	.53
group 2 (N=13)	.70	.14	.50	.27	.31	.24	.39	.33
group 3 (N=18)	.74	.19	.38	.06	.64	.16	.31	.36
group 4 (N=14)	.68	-.65	.30	-.49	.10	-.41	.44	-.36
all four groups together (N=61)	.48	.02	.38	.04	.19	.25	.11	.30

	SEXUS							
	Awareness- Error detections		Awareness- Pronoun Changes		Awareness- Reference Changes		Awareness- Explanations	
	r_{xyedz}	$r_{xz yed}$	r_{xyppz}	$r_{xz ypp}$	r_{xyrefz}	$r_{xz yref}$	$r_{xyexplz}$	$r_{xz yexpl}$
	partial correlations between performance in POST and error detections in PRE, partialling out performance in PRE	partial correlations between performance in POST and performance in PRE, partialling out error detections in PRE	partial correlations between performance in POST and pronoun changes in PRE, partialling out performance in PRE	partial correlations between performance in POST and performance in PRE, partialling out pronoun changes in PRE	partial correlations between performance in POST and reference changes in PRE, partialling out performance in PRE	partial correlations between performance in POST and performance in PRE, partialling out reference changes in PRE	partial correlations between performance in POST and explanations in PRE, partialling out performance in PRE	partial correlations between performance in POST and explanations in PRE, partialling out explanations in PRE
group 1 (N=16)	.35	~	.09	.54	.49	.49	.36	.50
group 2 (N=13)	.44	.33	.69	.55	.26	.20	.37	.10
group 3 (N=18)	.55	.21	.38	.32	.46	.12	.68	.37
group 4 (N=14)	.32	.08	.67	-.33	-.15	.11	.49	.28
all four groups together (N=61)	.48	.14	.41	.16	.25	.34	.46	.10

Note that tests of the significance r_{xyz} and r_{xzy} are not possible because the observations are not independent

Table 34 indicates that, except for the youngest children in group 1, performance in POST is in general stronger correlated with awareness in PRE than with performance in PRE. This holds for sexus as well as for genus.

Let us first discuss the results for sexus: except for the youngest children, performance in POST is stronger positively correlated with error detections, pronoun changes, and explanations in PRE than with performance in PRE. This can be seen for group 2, group 3, group 4, and all four groups together. However, performance in POST is in group 4 and in all four groups together stronger correlated with performance in PRE than with reference changes in PRE. An explanation for this could be that children often chose only one kind of pronoun correction, either a pronoun change or a reference change, and reference changes were relatively rare when compared with pronoun changes. This holds especially for control group 4 (cf. Figure 32). Performance in POST is in all four groups together most strongly correlated with error detections in PRE.

In genus, we observe relatively similar results as in sexus, except for explanations. Performance in POST is in genus stronger positively correlated with error detections and pronoun changes in PRE than with performance in PRE in all groups, with one exception: in the youngest group, performance in POST is stronger correlated with performance in PRE than with error detections in PRE. Although performance in POST is in group 2, group 3, and group 4 stronger positively correlated with reference changes in PRE than with performance in PRE, performance in POST is in group 1 and in all four groups together stronger correlated with performance in PRE than with reference changes in PRE. Unlike in sexus, performance in genus/POST, group 3, and in all four groups taken together, is stronger correlated with performance in PRE than with explanations in PRE (in both sexus and genus tasks this finding holds also for the youngest children). Like in sexus, performance in genus/POST for the four groups together, is most strongly correlated with error detections in PRE.

Thus, we have to reject our hypothesis that early language performance is stronger correlated with later language performance than are early reflective abilities for our tasks. It seems that in general early awareness is more predictive for later performance than is early performance. This holds more for older than for younger children, more for error detections, pronoun changes, and explanations in sexus than for reference changes in sexus, and more for error detections and pronoun changes in genus than for

reference changes and explanations in genus.

A possible reason for the observation that early awareness is less predictive for later performance than early performance in younger children could be that gender is first automatically used without much reflection (though not necessarily always correctly). Still, at a later stage awareness seems to be instrumental for acquiring additional aspects of gender usage.

We now want to turn to our last question: is linguistic performance in PRE facilitative for linguistic awareness in POST? Like in Study A, the procedure of our analysis was very similar to the one of our main hypothesis. We compared the absolute awareness scores (error detections, pronoun changes, reference changes, and explanations) in POST of children with "high performance" but "low awareness" (low error detections, pronoun changes, reference changes, and explanations) in PRE with absolute awareness scores in POST of children with "low performance" and "low awareness" in PRE. None of our comparisons proved to be significant with one exception: early genus performance is a predictor for the ability in POST to change pronouns in the genus awareness tests (group 1: $p < .05$; group 3: $p < .025$; all four groups together: $p < .01$). This means that early performance is in general not predictive for later awareness except for the facilitation of early genus performance for later pronoun corrections in genus.

Let us summarize our findings with respect to the longitudinal relations between awareness and performance in the gender study:

- early linguistic awareness may be "instrumental" or "facilitative" for later performance,
- early awareness seems, in general, to be more predictive for later performance than early performance, and
- early performance is in general not predictive for later awareness.

8. CONCLUDING REMARKS AND SUGGESTIONS FOR FURTHER RESEARCH

The main finding of this study is that the child's linguistic awareness at one stage of development is predictive for his linguistic performance at a later stage. We found that this holds generally for all types of linguistic awareness measured in this study (error detections and pronoun corrections (Study A and Study B), as well as reference changes and explanations (Study B)).

The significance of these results is enhanced by the fact that linguistic performance at an early stage is, generally, less predictive for later performance in the same tasks, than is linguistic awareness. Moreover, linguistic performance at an early stage is, in almost all cases, non-predictive for linguistic awareness at a later stage.

One cannot, therefore, explain the main result by assigning it to the development of a unified underlying linguistic competence which is equally well reflected in the child's linguistic awareness and performance. If early awareness is a better predictor for later performance on a particular linguistic task, than is early performance on that very same task, there is reason to assign a specific instrumental role to linguistic awareness in the child's acquisition of linguistic skills (i.e. linguistic awareness is not merely an epiphenomenon in language acquisition). Early awareness is, so to say, a litmus test for linguistic ingredients which appear overtly only at a later stage of development. Or, in other words, awareness tests present us with insights into what the child is "working at". By explicit questioning, the child may reveal knowledge which is not yet available to him in fully "automatized" form. Our performance tasks consisted in finding the correct referent for a linguistic expression containing a possessive pronoun. This is a perceptual task which, normally, involves no "controlled" or conscious processing. There is automatic application of tacit knowledge, no higher level problem solving.

For the age levels and tasks we used in this study, the child may have missed the ability to access linguistic information at a fully automatic level, even if that information were available to more conscious processing. When asked for a referent of a linguistic expression, the child would, generally, reply in the "automatic mode", thus often missing access to relevant linguistic information. Only when forced into a conscious or "controlled mode" of processing, access to the relevant information would be realized. Presence (or absence) of this relevant information, or knowledge, appears to

be the best predictor for later automatic processing.

This, then, provides us with important insight in the way linguistic knowledge "enters the system": the stage of automatic access to information is, apparently, preceded by a stage where the information is only consciously accessible as in a real problem solving situation. This existence of a preliminary "conscious" stage strongly resembles the situation in the acquisition of some other skills, such as car-driving, writing, or typing. Initially, there is a build up of conscious knowledge which can only be accessed in a "controlled mode". Only repeated use of such knowledge makes it accessible to automatic processing.

Such a progression of stages is rather surprising for the acquisition of linguistic skills, though. It is increasingly apparent that, in terms of development, linguistic abilities in the child are more on a par with other biologically preprogrammed systems, such as locomotion and vision, than with non-native skills such as writing, or bike-riding. These preprogrammed systems are supposed to develop "automatically", without much conscious effort or "controlled processing", though we are not aware of any experimental tests of these suppositions.

The question to be answered, therefore, is how generalizable our findings are to other linguistic skills. All tasks in the present study involved the comprehension of possessive pronouns. Are they a special class? Could it be that our findings will stay limited to the acquisition of lexical items with variable reference, such as deictic pronouns, deictic verbs, or kinship terms? This is surely possible. In fact, this implies a suggestion for further research: apply similar tests to the acquisition of other variable terms as well as to non-variable (or rather less variable) reference terms. If anything of the same sort is found there, extensions to other than lexical forms of knowledge might be envisaged, so, for instance, knowledge of sentence-internal anaphoric constraints (cf. Deutsch & Koster, 1982), or phonological knowledge (which is, clearly, so much involved in learning to read). A particularly important extension would concern knowledge of pragmatic use.

Still, if similar findings would be obtained in such tests, we see no reason to conclude that linguistic skills are, after all, on a par with "arbitrary" skills, such as typing or car-driving. Preprogrammed biological abilities are characterized by the constraints they impose on the end-state of the skill. Just as human locomotion varies within very narrow boundaries, the scale of possible human languages seems to be highly constrained as well.

But the existence of strong biological constraints does not tell us anything about the way in which these constraints are realized in the process of acquisition. A stage of "controlled processing" might well be involved in the child's acquisition of various linguistic skills: the constraints are imposed on the set of alternatives the child chooses to consider in this conscious processing.

It is, on the other hand, surely possible that some linguistic skills do not proceed through such a stage. In fact, there is evidence in our data that the youngest age group acquired aspects of syntactic gender without showing the otherwise quite general phenomenon in our data: their initial awareness of syntactic gender is non-predictive for their later performance. It could be that syntactic, i.e. language-internal, agreement relations develop rather more early and at an automatic level than agreement relations involving extra-linguistic referents. These, we feel, are the main issues to be considered in further research. Over and above these, the present study gave occasion to observe various other aspects of linguistic acquisition which might warrant further study.

We found that "linguistic awareness" is not a unified factor in language acquisition. This makes it even more necessary than expounded in chapter 6.2.2, to investigate the interrelationships between different types of meta-knowledge in child development (research along these lines is reported by Yussen & Bird, 1979; as to theoretical positions on the metacognition/meta-language relationship, cf. Van Kleeck, 1982; Goldman, 1982), and to explore the relations of different types of metaknowledge with respect to different cognitive abilities in development (as to the relation of metamemory and performance, cf. e.g. Waters, 1982).

Moreover, the present study did not exhaust the different ways awareness might arise or function. In chapter 4.2 several causes and functions of awareness were mentioned which were not studied in our experiments. So, for instance, awareness as a coordination or a superaddition device. Again further study might be helpful to disentangle the role of these causes and functions in language acquisition.

Another point in need of further analysis is the question whether older children (at the formal-operational stage) show more advanced awareness of rules, norms and conventions involving the notion of "intersubjectivity" than younger children who mainly exhibit awareness of dyadic interactions. One wonders when children attain Selman's level 3, i.e. awareness for mutual

perspectives, and when level 4 (multi-dimensional communication), but how specifically as measured in linguistic tasks. Is there a "linguistic precedence" for the higher levels of social-cognitive awareness, just as we observed for the lower levels in our subjects? Clearly, there is the important general issue of the relations between linguistic awareness and social-cognitive awareness (e.g. of friendship or morality concepts).

The apparent importance of these and similar issues in the study of awareness and consciousness makes one agree with Norman (1979, p. 43) when he states:

"When we come to understand the mechanisms of awareness, then we will have made a major step in our understanding of ourselves".

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SUMMARY

In this study we are concerned with the enigmatic role of "linguistic awareness", the ability to reflect and comment on language structures and functions, in language development.

Two major aims are pursued. A first aim of this work is the investigation of children's understanding (performance) and awareness (different metalinguistic abilities) of German possessive pronouns in language development. A second aim concerns causes and functions of metalinguistic abilities in language acquisition. Failure in communication might be a cause for linguistic awareness to arise, a possible function of linguistic awareness could be prevention or repair of such failure.

The main thesis is that linguistic awareness has an instrumental function in the development of primary linguistic skills, and that one should therefore expect that linguistic awareness at one stage of development (as apparent from error detection, the ability to provide better alternatives, and explanations) has predictive value for the child's primary language skill, especially in understanding ability, at a next stage of development.

We set up two studies in which understanding and awareness of German possessive pronouns were cross-sectionally and longitudinally tested. The focus of the first study, "shifting reference" (Study A), is children's understanding and awareness of the speaker/addressee shift, especially in those pronouns which change their form according to the point of reference (speaker or addressee). The focus of the second study, "natural and syntactic gender" (Study B), is children's understanding and awareness of "natural gender" with its extralinguistic reference and of "syntactic gender" with its intralinguistic reference. Both of these studies have the same experimental design. German possessive pronouns serve as our study material.

This book consists of eight chapters, and begins with the research aims and some research requirements (chapter 1).

Chapter 2 is devoted to the linguistic analysis of those pronouns which are used in the experiments of both studies. Various features of pronouns are considered: morphophonological, syntactic, semantic, and deictic features. Complexity of the different pronouns is analyzed in terms of these characteristics.

Chapter 3 derives the general predictions on the order of pronoun acquisition with respect to the performance tests. Our predictions are based

on differential complexities of morphophonological, syntactic, semantic, and deictic features. In 3.4 we give an overview of the predictions for the comprehension tests (performance) in Study A, "shifting reference", (cf. Table 10) and of the predictions for the comprehension tests (performance) in Study B, "natural and syntactic gender", (cf. Table 11). In 3.5 we deal with longitudinal and cross-sectional studies on the acquisition of possessive pronouns from the literature with respect to these predictions.

Chapter 4 contains general assumptions on linguistic awareness. In 4.1 we are concerned with assumptions on the structure of linguistic awareness, and in 4.2 with assumptions on its functions. In 4.3 we review the research literature on overt expressions of different metalinguistic abilities. This review deals mainly with those metalinguistic abilities which are investigated in the present research: error detections, corrections, and explanations.

In chapter 5 we present general hypotheses on the role of linguistic awareness with respect to our studies. Our main hypothesis is that early metalinguistic abilities can be predictive for later performance.

Chapter 6 is devoted to Study A, "shifting reference". Performance and awareness tasks were given to 59 German children at ages 3 to 6. Two sorts of data were collected at two different points of time (time interval of five months).

The results of the performance tests show that children's acquisition of possessive pronouns is most likely influenced by a combination of semantic and deictic (proximal) features. The predictions of the Semantic Feature Hypothesis (SFH) and those which are based on the "proximal-nonproximal contrast" are clearly more powerful than those based on morphophonological, syntactic, and other deictic characteristics. A few additional factors seem also to be involved in pronoun acquisition: the child's concentration on the dyad of the interlocutors, his preservation of the "gender" feature in the speaker pronoun "my" and the addressee pronoun "your", a conflict of pronouns which relate to a 3rd person participant and plural pronouns, as well as non-verbal factors.

The results of the awareness tests indicate that our predictions on linguistic awareness could be partially confirmed. It seems that children become more easily aware if something is different from their own egocentric point of view (and not just from an adult's point of view). Different metalinguistic abilities do not develop in the same way. If the quality of pronoun corrections is considered, we can see that linguistic judgments (i.e. error

detections) precede appropriate corrections.

Other influential factors seem to be at work in children's metalinguistic abilities: the enhancement of linguistic awareness through metalinguistic experience (this finding argues against postulating one metalinguistic capacity), the saliency of dyadic factors, the change from egocentricity in younger children to perspective-taking in older children (there is evidence for the existence of four partially overlapping but discernible stages in the development of children's self-reflections and social cognitions), children's striving for intralinguistic coherence, and a growing awareness of Grice's cooperative principle.

As to the relation between early awareness and later performance we could confirm the main hypothesis, early linguistic awareness (as apparent from error detections and corrections) is predictive for later performance. This result supports the view that awareness can be instrumental or facilitative for the development of primary linguistic skills. We also obtained two further interesting results: firstly, early awareness (as apparent from error detections and corrections) seems to be in general more predictive for later performance than early performance, and secondly, early linguistic performance is not predictive for later awareness.

Chapter 7 deals with Study B, "natural and syntactic gender". Performance and awareness tasks were given to 61 German children at ages 3 to 6 (there were different children in Study A and in Study B). Again, two sorts of data were collected at two different points of time (a time interval of five months).

The results of the performance tests reveal an unexpected outcome: "syntactic gender" with its morphophonological/syntagmatic base and intralinguistic reference is earlier acquired than "natural gender" with its semantic/cognitive base and extralinguistic reference. Apparently, morphophonological factors seem to be at work in early gender acquisition, i.e. the "Piagetian-cognitive" point of view is not supported. Moreover, a couple of other factors seem to be influential: firstly, children show plurifunctional usage in the performance tests if awareness tests are given prior to the performance tests; secondly, children rely on extralinguistic factors in the "natural gender" tasks, and thirdly, mistakes in the "syntactic gender" tasks can, in part, be explained by children's stereotypes.

The results of the awareness tests show that - like in Study A - our predictions could be partially confirmed. Children "correct" not only incorrect utterances but also correct ones in case of plurifunctional pronouns.

Study B exhibits even more clearly than Study A that we should not assume the existence of one unified metalinguistic ability (explanations are very different for natural and syntactic gender). Also, it is easier to become aware of natural gender with its extralinguistic reference than of syntactic gender with its intralinguistic reference although pronoun corrections in syntactic gender can precede pronoun corrections in natural gender.

There are seven other factors underlying awareness in natural and syntactic gender tasks. The first three factors were also found in Study A: the enhancement of awareness (error detections and corrections) through metalinguistic experience, children's striving for intralinguistic coherence, and awareness of the cooperative principle in conversations. The fourth factor is the child's post-hoc rationalizing when he uses natural gender for explaining syntactic gender. The fifth one is the partial awareness of pronoun features (e.g. the child masters only the possessiveness feature in the awareness tasks). The sixth one is children's preference for natural gender in gender conflict tasks. The seventh and last factor is children's stereotyping in their explanations (they say, for instance, "it must be her and not his yellow colour - for the yellow watering-can - because light colours are girls' colours").

As to the relation between early awareness and later performance we can show that - like in Study A - early linguistic awareness (as apparent from error detections, corrections, and explanations) is predictive for later performance. Two further findings are noteworthy: firstly, early awareness (as apparent from error detections, corrections, and explanations) seems to be in general more predictive for later performance than early performance for older children. Secondly, in general early linguistic performance is not predictive for later awareness - with one exception: early linguistic performance relates to later pronoun corrections in syntactic gender.

Chapter 8 discusses some theoretical implications of our main findings, namely: awareness tests present us with insights into what the child is "working at". For the age levels and tasks of our study, the child may have missed the ability to access linguistic information at a fully automatic level, even if that information were available to more conscious processing. Presence (or absence) of this relevant information, or knowledge, appears to be the best predictor for later automatic processing. Thus, we may assume the existence of a preliminary "conscious" stage in the development of automatic pronoun processing.

Although our results are the first experimental data suggesting a specific role for metalinguistic abilities in the acquisition of automatic language understanding, the study is necessarily limited in scope and leaves untouched a range of important issues. Therefore, chapter 8 makes also suggestions for further research which may stimulate studies with respect to the role of awareness in the acquisition of linguistic and other cognitive abilities.

Dit onderzoek betreft de raadselachtige rol van "taalbewustzijn", het vermogen om over structuur en functie van taal na te denken en te rapporteren, in de taalontwikkeling van kinderen. Het onderzoek heeft twee doelstellingen. De eerste is de ontwikkeling in kaart te brengen van het gebruik, met name het begrijpen, van bezittelijke voornaamwoorden door Duitse kinderen, alsook van hun ontwikkelend taalbewustzijn ten aanzien van die pronomina. De tweede doelstelling betreft de oorzaken en functie van metalinguïstische vaardigheden in de taalontwikkeling. Falende communicatie kan een oorzaak zijn voor het ontstaan van taalreflectie; een mogelijke functie van zulke vaardigheden kan gelegen zijn in de preventie of het herstel van zulk falen. De kern van dit onderzoek betreft echter de vraag naar de functie van taalbewustzijn in de taalontwikkeling. De hoofdstelling is dat taalbewustzijn een instrumentele functie heeft in de ontwikkeling van het taalgedrag, en dat derhalve taalbewustzijn in een bepaald stadium van ontwikkeling (zoals blijkt uit detectie, verbetering en verklaren van linguïstisch falen) predictieve waarde heeft voor het taalgebruik, met name het taalverstaan van het kind in een later stadium.

Wij deden twee empirische studies waarin taalverstaan en bewustzijn van bezittelijke voornaamwoorden zowel cross-sectioneel (verschillende leeftijdsgroepen) als longitudinaal (herhaald testen van dezelfde kinderen op verschillende leeftijden) werden onderzocht.

De eerste studie, "referentie-verschuivingen" (Studie A), richt zich op het begrijpen en het bewustzijn van de zg. spreker/aangesprokene-verschuiving, speciaal voor pronomina zoals "mein" en "dein", die afhankelijk zijn van het referentiepunt (spreker of angesprokene).

De tweede studie, over "natuurlijk en syntactisch geslacht" (Studie B), vergelijkt "natuurlijk geslacht", dat extralinguïstische referentie heeft, met "syntactisch geslacht" dat intralinguïstisch gebonden is. Ook hier wordt taalbegrip en taalbewustzijn bepaald bij kinderen.

De twee studies hebben dezelfde experimentele opzet, en in beide werden bezittelijke voornaamwoorden als onderzoeksmateriaal gebruikt.

Dit boek bestaat uit acht hoofdstukken het begint met een beschrijving van de doelstellingen en de aan het onderzoek te stellen eisen (Hoofdstuk 1).

Hoofdstuk 2 is gewijd aan de linguïstische analyse van de voornaamwoorden die in de twee experimentele studies gebruikt worden. Van die voornaam-

woorden worden morfonologische, syntactische, semantische, en deictische kenmerken onderzocht. De complexiteit van de verschillende voornaamwoorden wordt in termen van die kenmerken geanalyseerd.

Hoofdstuk 3 leidt een aantal algemene voorspellingen af over de volgorde waarin de kinderen die voornaamwoorden leren gebruiken. Die voorspellingen zijn gebaseerd op de juist genoemde complexiteit van de linguïstische kenmerken. In paragraaf 3.4 wordt een overzicht gegeven van de predicties voor de begripstests in Studie A, "referentie-verschuivingen" (vgl. Tabel 10), en van die voor de begripstests in Studie B, "natuurlijk en syntactisch geslacht" (vgl. Tabel 11). Paragraaf 3.5 geeft een literatuuroverzicht van longitudinale en cross-sectionele onderzoeken over de verwerving van bezittelijke voornaamwoorden vanuit het gezichtspunt van deze voorspellingen.

Hoofdstuk 4 behandelt een aantal opvattingen over taalbewustzijn. Structuur en functie van taalbewustzijn komen achtereenvolgens ter sprake in paragrafen 4.1 en 4.2. Paragraaf 4.3 geeft een literatuuroverzicht van onderzoek naar overte expressies van metalinguïstische vaardigheden. Het beperkt zich voornamelijk tot vaardigheden die ook in ons onderzoek getest worden: fout-detectie, - correctie, en - verklaring.

In hoofdstuk 5 leiden we een aantal hypothesen af over de rol van taalbewustzijn met betrekking tot onze empirische studies. De belangrijkste hypothese is dat de aanwezigheid van metalinguïstische vaardigheden in een bepaalde fase van ontwikkeling voorspellende waarde kan hebben voor het correcte taalgebruik in een later stadium.

In hoofdstuk 6 wordt Studie A behandeld, "referentie-verschuivingen". Aan 59 Duitse kinderen, variërend van 3 tot 6 jaar, werden begrips- en bewustzijnstaken gegeven. Er werden twee soorten data vergaard: cross-sectionele, en longitudinale waarbij dezelfde kinderen na vijf maanden opnieuw werden getest.

De resultaten van de gebruikstests tonen aan dat de verwervingsvolgorde van bezittelijke voornaamwoorden hoogst waarschijnlijk wordt bepaald door een combinatie van semantische en proximaal-deictische kenmerken. De voorspellingen op grond van de "Semantische Kenmerken Hypothese", en op grond van het "Proximaal-distaal Contrast" zijn aanzienlijk beter in overeenstemming met de data dan voorspellingen gebaseerd op morfonologische, syntactische en andere deictische kenmerken. Er is ook een aantal additionele factoren werkzaam in de verwerving van deze voornaamwoorden: de mate waarin het kind zich concentreert op de dyade van spreker en luisteraar; de tendens

om het natuurlijk geslacht van "mijn" en van "jouw" te handhaven; een conflict tussen pronomina voor derde persoon en meervoud; alsmede enkele niet-verbale factoren.

De resultaten van de bewustzijnstests geven een gedeeltelijke bevestiging van de voorspellingen. Het blijkt dat kinderen zich relatief snel bewust worden van dingen die uit egocentrisch oogpunt verschillend zijn (en dus niet alleen uit het oogpunt van de volwassen gesprekspartner). Het blijkt verder dat verschillende metalinguïstische vermogens zich niet gelijknamig ontwikkelen. Detectie van linguïstisch falen gaat bijvoorbeeld in de ontwikkeling vooraf aan het kunnen corrigeren van zulk falen.

Behalve de voorspelde effecten, blijken er ook andere ontwikkelingsverschijnselen op te treden: de toename van taalbewustzijn door specifieke metalinguïstische ervaringen (Dat soort taalbewustzijn blijft echter beperkt tot die specifieke ervaringen); de opvallendheid van dyadische factoren, en met name de verandering van egocentriciteit in jongere kinderen naar het vermogen om van gezichtspunt te veranderen in oudere kinderen (dit proces verloopt in vier onderscheidbare maar enigszins overlappende fasen); het streven van kinderen naar coherentie binnen hun linguïstische systeem; het groeiende bewustzijn van het coöperatieve principe dat door Grice is beschreven.

Voor wat betreft de relatie tussen eerder taalbewustzijn en later taalgebruik vonden we bevestiging van onze belangrijkste hypothese, namelijk dat taalbewustzijn in een vroeg stadium (blijkens foutdetecties en -correcties) een goede voorspeller is voor correct taalgebruik vijf maanden later. Het ligt voor de hand om aan taalbewustzijn een instrumentele of faciliterende functie toe te kennen in de ontwikkeling van het primaire taalgebruik. Dit resultaat krijgt extra cachet in het licht van twee andere bevindingen: het taalbewustzijn in de eerste test is een betere voorspeller van het taalgebruik in de tweede test, vijf maanden later, dan het taalgebruik in de eerste test. Bovendien blijkt taalgebruik in de eerste test geen predictieve waarde te hebben voor taalbewustzijn in de tweede test.

Hoofdstuk 7 gaat over Studie B, "natuurlijk en syntactisch geslacht". Aan een nieuwe groep van 61 Duitse kinderen van 3 tot 6 jaar werden weer begrips- en bewustzijnstaken gegeven. Ook werden weer cross-sectionele en longitudinale data verzameld, de laatste over een tijdsspanne van vijf maanden.

De gebruikstests geven een onverwacht resultaat: "syntactisch geslacht" met zijn morfonologisch/syntactische basis, en zijn intralinguïstische refe-

rentie wordt vroeger verworven dan "natuurlijk geslacht" met zijn semantisch/cognitieve basis en zijn extralinguïstische referentie. Blijkbaar spelen morfologisch-syntactische factoren een belangrijke rol in de eerste fase van de verwerving van linguïstisch geslacht. Dat is in strijd met de Piagetaans-cognitieve opvattingen over taalverwerving. Voorts speelt er nog een aantal andere factoren een rol: ten eerste vertonen kinderen de mogelijkheid het voornaamwoord "sein" spontaan een mannelijke zowel als een onzijdige interpretatie te geven ("plurifunctioneel gebruik") wanneer de bewustzijnstests aan de gebruikstests vooraf gaan; extralinguïstische factoren spelen, ten tweede, een rol waar het de interpretatie van natuurlijk geslacht betreft; en ten derde zijn de kinderen onderhevig aan stereotype interpretaties die zich soms uitdrukken in fouten tegen het syntactisch geslacht.

De resultaten van de bewustzijnstests bevestigen, net als in Studie A, voor een gedeelte de voorspellingen. Er blijkt nog duidelijker dan in Studie A dat er geen sprake is van een uniform metalinguïstisch vermogen (zo blijken kinderen over het algemeen al vroeg verklaringen te kunnen geven voor de linguïstische effecten van natuurlijk geslacht, maar nauwelijks of niet voor die van syntactisch geslacht). Het kunnen verklaren van de relatie tussen natuurlijk geslacht en extralinguïstische referentie is veel vroeger het geval dan het verklaren van de metalinguïstische referentie van syntactisch geslacht, dit ondanks het feit dat zowel correct gebruik als foutcorrecties voor natuurlijk geslacht vroeger zijn kunnen.

Verder is er nog een zevental factoren die het taalbewustzijn in deze experimentele taken blijken te beïnvloeden. De eerste drie ervan kwamen ook in Studie A naar voren: het "bewustzijnsverhogend" effect van metalinguïstische ervaringen, het streven van het kind naar intralinguïstische coherentie, en het groeiend bewustzijn van het coöperatieve principe in conversaties. De vierde factor is de neiging van het kind "natuurlijke" verklaringen te geven voor syntactisch geslacht. De vijfde factor is het differentiële bewustzijn dat het kind vertoont voor sommige kenmerken van de voornaamwoorden (met name het kenmerk "bezit" wordt goed beheerst in de bewustzijnstaken). De zesde factor is de preferentie van het kind voor natuurlijk geslacht wanneer syntactisch en natuurlijk geslacht conflicteren. De zevende, ten slotte, is een neiging tot stereotypering bij het geven van verklaringen (van bepaalde kleuren wordt bijvoorbeeld gezegd dat die mannelijk of vrouwelijk zijn, hetgeen op zijn beurt het geslacht van het bijbehorende voornaamwoord bepaalt).

De belangrijkste hypothese van Studie B die de relatie tussen vroeg taalbewustzijn en later taalgebruik betreft, kon worden bevestigd: vroeg taalbewustzijn is een goede predictor voor later correct taalgebruik. Het ligt ook hier weer voor de hand te veronderstellen dat taalbewustzijn een instrumentele of faciliterende werking heeft. Voorts zijn er weer de twee additionele bevindingen, namelijk dat vroeg taalbewustzijn een betere predictor is voor taalgebruik vijf maanden later dan vroeg taalgebruik, en dat vroeg taalgebruik geen predictieve waarde heeft voor later taalbewustzijn. Hierop is slechts één uitzondering: er is een verband tussen taalgebruik in de eerste test en correcties van foute voornaamwoorden in de tweede test.

Hoofdstuk 8 bespreekt enkele theoretische implicaties van onze belangrijkste resultaten: Bewustzijnstests geven ons inzicht in waar kinderen mee "aan het werk zijn" in hun taalontwikkeling. Het vermoeden wordt uitgesproken dat bepaalde vormen van taalkennis beschikbaar kunnen zijn vóórdat die kennis volledig geautomatiseerd als vaardigheid functioneert. De toestand van deze "voorkennis" blijkt een goede predictor te zijn voor automatische verwerkingsmogelijkheden dat het kind in een volgend stadium vertoont. De suggestie wordt gedaan dat er een "bewuste" fase vooraf gaat aan de uiteindelijke en volledig automatische beheersing van de onderzochte voornaamwoorden.

Onze resultaten zijn de eerste experimentele gegevens die wijzen op een specifieke rol van metalinguïstische functies in het verwerven van primaire linguïstische vaardigheden. Toch is het onderzoek noodzakelijkerwijs van beperkte omvang, en het laat een aantal belangrijke vragen onbeantwoord. Hoofdstuk 8 wordt derhalve besloten met enkele suggesties voor verder onderzoek over de rol van bewuste reflectie in de verwerving van linguïstische en andere cognitieve vaardigheden.

Die vorliegende Arbeit befaßt sich mit der Frage, welche Rolle das "Sprachbewußtsein" (d.h. der Fähigkeit über Sprachstrukturen und -funktionen zu reflektieren und sie zu kommentieren) in der Sprachentwicklung spielt.

Zwei Hauptziele werden angestrebt. Ein erstes Ziel dieser Arbeit ist die Erforschung kindlichen Verstehens (im folgenden "Performanz" genannt) und Bewußtseins (verschiedene metasprachliche Fähigkeiten) deutscher Possessivpronomina in der Sprachentwicklung. Ein zweites Ziel betrifft Ursachen und Funktionen von metasprachlichen Fähigkeiten im Spracherwerb. Kommunikative Fehler könnten eine Ursache für die Entstehung von Sprachbewußtsein sein. Eine mögliche Funktion des Sprachbewußtseins könnte die Verhinderung oder Korrektur solcher Fehler sein.

Die zentrale These lautet: Sprachbewußtsein hat eine nützliche Funktion in der Entwicklung primärer Sprachfähigkeiten. Deshalb sollte man erwarten, daß Sprachbewußtsein in einem Entwicklungsabschnitt (erkennbar an Fehlerentdeckungen, der Fähigkeit bessere Alternativen zu liefern und Erklärungen abzugeben) die primäre Sprachfähigkeit, besonders die des Verstehens, in einem nächsten Entwicklungsabschnitt vorhersagen kann.

Zwei Untersuchungen wurden konzipiert, in denen Sprachverstehen und Sprachbewußtsein deutscher Possessivpronomina mittels Querschnitt- und Längsschnittdaten überprüft wurden. Das Hauptaugenmerk der ersten Untersuchung, "wechselnde Referenz" (Untersuchung A), wird auf das kindliche Verstehen und Bewußtsein des Sprecher/Adressaten-Wechsels gerichtet, besonders auf solche Pronomina, die ihre Form in Abhängigkeit vom Bezugspunkt (Sprecher oder Adressat) ändern. (Beispiel: Wenn ein Sprecher "mein Geschenk" sagt, muß der Adressat zu demselben Geschenk "dein Geschenk" sagen. Wenn jedoch ein Sprecher in bezug auf das Geschenk eines Dritten "sein Geschenk" sagt, so muß auch der Adressat "sein Geschenk" sagen.) Das Hauptaugenmerk der zweiten Untersuchung, "natürliches und grammatikalisches Geschlecht" (Untersuchung B), wird auf das kindliche Verstehen und Bewußtsein des "natürlichen Geschlechts" mit seiner außersprachlichen Referenz und des "grammatikalischen Geschlechts" mit seiner innersprachlichen Referenz gerichtet. Beide Untersuchungen haben dasselbe experimentelle Design. Deutsche Possessivpronomina fungieren als Untersuchungsvariablen.

Das vorliegende Buch enthält acht Kapitel. Es beginnt mit einer Darstellung der Forschungsziele und der allgemeinen Untersuchungsbedingungen (Kapitel 1).

Kapitel 2 befaßt sich mit der linguistischen Analyse derjenigen Pronomina, die in den Experimenten beider Untersuchungen verwendet werden. Verschiedene Merkmale von Pronomina werden betrachtet: morphophonologische, syntaktische, semantische und deiktische Merkmale. Die Komplexität verschiedener Pronomina wird mit Bezug auf diese Charakteristika analysiert.

In Kapitel 3 werden allgemeine Voraussagen über die Anordnung des Pronomenerwerbs in den Performanztests abgeleitet. Unsere Vorhersagen basieren auf unterschiedlichen Komplexitäten morphophonologischer, syntaktischer, semantischer und deiktischer Merkmale. In 3.4 wird ein Überblick über die Vorhersagen für die Verstehenstests (Performanz) in Untersuchung A, "wechselnde Referenz" (vgl. Tabelle 10) und über die Vorhersagen für die Verstehenstests (Performanz) in Untersuchung B, "natürliches und grammatikalisches Geschlecht" (vgl. Tabelle 11) gegeben. In 3.5 werden Längsschnitt- und Querschnittstudien aus der Literatur zum Erwerb von Possessivpronomina in bezug auf unsere Vorhersagen besprochen.

Kapitel 4 enthält allgemeine theoretische Annahmen über das Sprachbewußtsein. In 4.1 werden Annahmen über die Struktur des Sprachbewußtseins diskutiert und in 4.2 Annahmen über seine Funktionen. In 4.3 wird die Literatur zu Forschungen über erkennbare Ausdrucksformen verschiedener metasprachlicher Fähigkeiten aufgearbeitet. Dieser Literaturüberblick beschränkt sich vor allem auf diejenigen metasprachlichen Fähigkeiten, die in unserer Forschung untersucht werden: Fehlerentdeckungen, Korrekturen und Erklärungen.

In Kapitel 5 werden allgemeine Hypothesen über die Rolle des Sprachbewußtseins in Bezug auf unsere Untersuchungen dargelegt. Unsere zentrale Hypothese lautet: Frühe metasprachliche Fähigkeiten können spätere Performanz vorhersagen.

Kapitel 6 behandelt Untersuchung A, "wechselnde Referenz". 59 deutschen Kindern im Alter von 3 bis 6 Jahren wurden Aufgaben gegeben, die Verstehen (Performanz) und Bewußtsein überprüfen. Zweierlei Arten von Daten wurden zu zwei verschiedenen Erfassungszeitpunkten (mit einem Zeitintervall von fünf Monaten) erhoben.

Die Ergebnisse der Performanztests zeigen, daß der kindliche Erwerb von Possessivpronomina sehr wahrscheinlich durch eine Kombination von semantischen und deiktischen (proximalen) Merkmalen beeinflußt wird. Die Voraussagen der Semantischen Merkmalshypothese (der "Semantic Feature Hypothesis", "SFH", von Eve und Herbert Clark) und die Voraussagen, die auf dem Kontrast von Nähe/Ferne ("proximal-nonproximal contrast") basieren, haben deutlich

stärkere Vorhersagekraft als die Voraussagen, die auf morphophonologischen, syntaktischen und weiteren deiktischen Charakteristika basieren. Darüberhinaus scheinen einige zusätzliche Faktoren beim Pronomenerwerb eine Rolle zu spielen: die Konzentration von Kindern auf die Dyade der Gesprächsteilnehmer, ihre Beibehaltung des "Geschlechtsmerkmals" beim Sprecherpronomen "mein" und beim Adressatenpronomen "dein", ein Konflikt zwischen Drittpersonenpronomina und Pluralpronomina und ebenso nonverbale Faktoren.

Die Ergebnisse der Bewußtseinstests weisen darauf hin, daß unsere Vorhersagen über das Sprachbewußtsein zum Teil bestätigt werden konnten. Offensichtlich wird Kinder etwas leichter bewußt, wenn es von ihrem eigenen egozentrischen Standpunkt verschieden ist (und nicht nur von dem Standpunkt eines Erwachsenen). Verschiedene metasprachliche Fähigkeiten entwickeln sich nicht in derselben Weise. Wenn die Qualität von Pronomenkorrekturen berücksichtigt wird, können wir feststellen, daß Sprachurteile (d.h. Fehlerentdeckungen) angemessenen Korrekturen vorausgehen.

Andere Faktoren scheinen metasprachliche Fähigkeiten von Kindern zu beeinflussen: die Verstärkung des Sprachbewußtseins durch metasprachliche Erfahrung (dieses Ergebnis spricht gegen die Annahme einer metasprachlichen Fähigkeit), das Herausragen dyadischer Faktoren, der Wechsel vom Egozentrismus in jüngeren Kindern zur Perspektivenübernahme in älteren Kindern (unsere Daten zeigen vier einander überlappende, aber klar voneinander unterscheidbare Phasen in der Entwicklung von Selbstreflexionen und sozialen Kognitionen bei Kindern), das Streben von Kindern nach innersprachlicher Kohärenz und ein wachsendes Bewußtsein des Kooperationsprinzips in Konversationen (im Sinne des Sprachphilosophen M.P. Grice).

Hinsichtlich der Beziehung zwischen frühem Bewußtsein und späterer Performanz konnten wir die Haupthypothese bestätigen, daß frühes Sprachbewußtsein (erkennbar an Fehlerentdeckungen und Korrekturen) spätere Performanz vorhersagen kann. Dieses Resultat stützt die Annahme, daß Bewußtsein sich nützlich oder fördernd auf die Entwicklung primärer Sprachfähigkeiten auswirken kann. Weiterhin ermittelten wir zwei weitere wichtige Ergebnisse: erstens, frühes Bewußtsein (wie es aus Fehlererkenntnisse und Korrekturen ersichtlich ist) scheint im allgemeinen spätere Sprachperformanz besser vorherzusagen als frühe Sprachperformanz, und zweitens, frühe Sprachperformanz kann späteres Bewußtsein nicht vorhersagen.

In Kapitel 7 wird Untersuchung B, "natürliches und grammatikalisches Geschlecht", dargestellt. 61 deutschen Kindern im Alter von 3 bis 6 Jahren

wurden Aufgaben gegeben, die Verstehen (Performanz) und Bewußtsein überprüfen (die Kinder in Untersuchung B waren nicht dieselbe wie die in Untersuchung A). Wiederum wurden zweierlei Arten von Daten zu zwei verschiedenen Erfassungszeitpunkten (mit einem Zeitintervall von fünf Monaten) erhoben.

Die Performanztests zeigen überraschende Ergebnisse: Das "grammatikalische Geschlecht" mit seiner morphophonologischen/syntagmatischen Grundlage und innersprachlichen Referenz wird früher erworben als das "natürliche Geschlecht" mit seiner semantischen/kognitiven Grundlage und außersprachlichen Referenz. Offensichtlich sind beim frühen Geschlechterwerb morphophonologische Faktoren ausschlaggebend. Dies bedeutet, daß unsere Daten die kognitive Sichtweise der Piaget-Schule nicht stützen. Darüberhinaus scheinen einige weitere Faktoren Einfluß zu haben: erstens, Kinder zeigen plurifunktionellen Gebrauch in der Performanztests, wenn die Bewußtseinstests vor den Performanztests gegeben werden; zweitens, Kinder verlassen sich auf außersprachliche Faktoren in den Aufgaben zum "natürlichen Geschlecht", und drittens, Fehler in den Aufgaben zum "grammatikalischen Geschlecht" können zum Teil durch Stereotypen von Kindern erklärt werden.

Die Ergebnisse der Bewußtseinstests zeigen, daß - ähnlich wie in Untersuchung A - unsere Vorhersagen teilweise bestätigt werden konnten. Kinder "korrigieren" nicht nur falsche Aussagen, sondern auch richtige mit plurifunktionellen Pronomina. Untersuchung B weist noch deutlicher als Untersuchung A darauf hin, daß wir nicht eine einheitliche metasprachliche Fähigkeit vermuten sollten (Erklärungen für das natürliche und das grammatikalische Geschlecht sind voneinander sehr verschieden). Wir fanden auch, daß es leichter ist, sich des natürlichen Geschlechts mit seiner außersprachlichen Referenz bewußt zu werden als des "grammatikalischen Geschlechts" mit seiner innersprachlichen Referenz, obwohl Pronomenkorrekturen beim grammatikalischen Geschlecht früher als Pronomenkorrekturen beim natürlichen Geschlecht auftreten.

Sieben weitere Faktoren, die dem Bewußtsein in den Aufgaben zum natürlichen und grammatikalischen Geschlecht zu Grunde liegen, konnten gefunden werden. Die ersten drei Faktoren wurden auch in Untersuchung A beobachtet: die Verstärkung des Bewußtseins (Fehlererkenntnisse und Korrekturen) durch metasprachliche Erfahrung, das Streben von Kindern nach innersprachlicher Kohärenz und im Bewußtsein des Kooperationspostulats in Konversationen. Der vierte Faktor ist eine Post-hoc-Rationalisierung von Kindern, wenn sie das natürliche Geschlecht für die Erklärung des grammatikalischen Geschlechts

heranziehen. Bei den Altersstufen und Aufgaben unserer Studie könnten Kinder sprachliche Informationen auf einem völlig automatischen Niveau verfehlt haben, obgleich diese Informationen mehr kontrollierter Informationsverarbeitung zugänglich waren. Vorhandensein (oder Fehlen) dieser relevanten Informationen oder dieses Wissens scheint spätere automatische Verarbeitung am besten zu prognostizieren. Wir nehmen deshalb ein "bewußtes" Vorstadium in der Entwicklung der automatischen Verarbeitung von Pronomen an.

Obgleich unsere Resultate die ersten experimentellen Daten sind, die beim Erwerb automatischen Sprachverstehens für metasprachliche Fähigkeiten eine spezifische Rolle nahelegen, ist diese Studie notwendigerweise hinsichtlich ihrer theoretischen Reichweite beschränkt und läßt eine Reihe von wichtigen Bereichen unberührt. Deshalb werden in Kapitel 8 auch Vorschläge für weitere Forschung formuliert: Untersuchungen sollen angeregt werden, die die Rolle des Bewußtseins beim Erwerb sprachlicher und anderer kognitiver Fähigkeiten erforschen.

CURRICULUM VITAE

Karin Gudrun Böhme werd geboren op 16 februari 1949. Zij studeerde Psychologie en Sociologie aan de Universiteit van Mannheim, Psychologie en Germanistiek aan de Universiteit van Freiburg, en Psychologie en Sociologie aan de Universiteit van Heidelberg waar zij in 1975 de graad van Diplom-Psychologe behaalde. Tevens studeerde zij aan de University of Arizona, met als afsluiting een Master of Arts degree in Linguistics (1973).

Na afsluiting van haar psychologiestudie vervulde zij een functie als wetenschappelijk medewerker bij de Bayerische Rundfunk te München.

Van 1977 tot 1979 deed zij het onderzoek waarover in deze dissertatie bericht wordt in de toenmalige Max-Planck-Projektgruppe für Psycholinguistik, dank zij een promotie-stipendium vanwege de Max-Planck-Gesellschaft.

Sinds 1980 is zij wetenschappelijk medewerker aan het Institut für Kommunikationswissenschaft van de Universiteit van München.

STELLINGEN

1

Taalbewustzijn is van grotere betekenis voor de verwerving van termen met variabele referentie dan voor termen met niet-variabele referentie.

2

Zelfreflektie is nodig voor het bereiken van zowel de "conventionele niveaus" als de "post-conventionele niveaus" in de morele ontwikkeling.

Kohlberg, L. Zur kognitiven Entwicklung des Kindes. Frankfurt a.M.: Suhrkamp Verlag, 1974, en Kohlberg, L. Philosophy of moral development. Vol. 1. New York: Harper & Row, 1981, in het bijzonder Kohlberg's stages 3, 4, 5, en 6.

3

Kinderen kunnen nauwkeuriger oordelen geven over de frekwentie van inhoudswoorden dan over die van functiewoorden.

4

Succesvolle TV-series hebben de aandacht van de kijkers gestimuleerd. In geval van herhaling worden ze eerder bekeken dan programma-alternatieven die alleen maar nieuwe, onbekende dingen aanbieden, omdat de kijkers met de scenes, intriges en acteurs vertrouwd zijn.

Tannenbaum, P.H. Entertainment as vicarious emotional experience. In: P.H. Tannenbaum (ed.) The entertainment functions of television. Hillsdale, N.J.: Lawrence Erlbaum, 1980.

5

De stadia die Selman onderscheidt in de ontwikkeling van perspectiefnemen gelden niet alleen voor interpersonale communicatie maar ook voor media-effecten.

6

Micro-elektronische informatie- en documentatiesystemen in bibliotheken en archieven kunnen de kenniskloof tussen gebruikers met hogere en lagere opleidingen vergroten.

Men kan op theoretische gronden verwachten dat autistische kinderen die problemen hebben met persoon-deixis, ook problemen hebben met plaats- en tijd-deixis.

Bartolucci, G. & Albers, R.J. Deictic categories in the language of autistic children. *Journal of Autism and Childhood Schizophrenia*, 4, 1972, 131-144, en Fay, W.H., Schuler, A.L. & Schiefelbusch, R.L. (eds.) *Emerging language in autistic children*. Baltimore: University Park Press, 1980.

Scherer's "parasemantische functies", die niet-verbale communicatie relateren aan verbale communicatie (met name "substitutie", "amplificatie", "contradictie" en "modificatie") hebben geen duidelijke theoretische of methodologische status.

Scherer, K.R. Die Funktionen des nonverbalen Verhaltens im Gespräch. In: D. Wegner (ed.) *Gesprächsanalysen*. Hamburg: Buske, 1978, 275-295.

Wanneer kleine kinderen gedragsmotieven beoordelen, letten ze meer op non-verbale dan op verbale indicaties.

Böhme, K. Nonverbale Kommunikation. In: H.J. Kageman & G. Wenninger (eds.) *Medienpsychologie. Ein Handbuch in Schlüsselbegriffen*. München: Urban & Schwarzenberg, 1982, 127-133.

Deze stellingen behoren bij het proefschrift:

Children's understanding and awareness of German possessive pronouns,

K.G. Böhme

Katholieke Universiteit Nijmegen, 10 maart 1983, 16.00 uur.

