Production-Comprehension Asymmetries in Child Language

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This book summarizes papers from the DGfS-workshop *Production-Comprehension-Asymmetries in Child Language* held at the University of Osnabrück in March 2009. The workshop considered asymmetries between children's comprehension and production in various linguistic tasks and discussed grammatical and methodological explanations to the observed patterns.

First of all, we would like to express our thanks to all participants of the workshop for the encouraging discussion during and after the meeting, to the local organizers at Osnabrück for the excellent preparation of the meeting, and to the DGfS for providing a travel grant for the invited speakers.

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We hope that this book contributes to and encourages further discussion on methodological and theoretical explanations to unexpected, unresolved and poorly investigated patterns in children's language. Two crucial aspects are surely the role of contextual information and children's computation of the speaker's intentions. With this book, we hope to have met the intentions of readers who are interested in getting a broad overview of cross-linguistic research on production-comprehension asymmetries, on the acquisition of pronouns, or, symmetrically on both.

Frankfurt and Oldenburg, May 2011

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Introduction

Angela Grimm, Anja Müller, Cornelia Hamann, and Esther Ruigendijk

Asymmetries in child language

Asymmetries have long been observed in child language and it is understood that comprehension or perception usually precedes production. One example pertains to children's lexical development: 16 months-old children produce 45 words but understand approximately 180 words (Fenson et al. 1993 for English). As to children's grammatical development, perception studies (Höhle and Weissenborn 1998, Santelmann and Jusczyk 1998) have established that functional categories are recognized already during the first year of life but are produced consistently only after the third birthday.

However, twenty-five years of research on the acquisition of pronouns has shifted the focus to the possibility of production preceding comprehension. The remarkable observation in this area was that English speaking children produce pronouns in a target-like way in their third year of life (Bloom et al. 1994), but have considerable difficulty in pronoun interpretation up to their sixth birthday (Chien and Wexler 1990 and many others). Under the assumption that one grammatical system underlies comprehension and production (Chomsky 1982), this finding fueled much theoretical speculation and lead researchers to focus on other areas where such asymmetries might be expected, such as focus particles (Müller 2010) or contrast accent (Vogel and Raimy 2002). In these linguistic phenomena, pragmatics or processing interact with syntax, and linguistic models capturing this interaction have become decisive for models of language acquisition as well as for models of the components of grammar.

This book concentrates on production-comprehension asymmetries in child language in the sense that production outperforms comprehension in the same linguistic domain. It grew from the contributions to a workshop with the title "Production-comprehension asymmetries in child language" held at the 2009 Annual Meeting of the DGfS in Osnabrück. In fact, it grew from the contributions of two workshops since we also integrated a special session on the

acquisition of pronouns. So the papers presented here deal with the production-comprehension asymmetry or with pronouns and often with both.

The crucial problem we are addressing comes from the assumption that there is a single grammar for comprehension and production. In the context of the investigation of pronoun interpretation and on the background of what has been called its "delay", this assumption lead to two possible explanations. One explanation explores the fact that the difficulties seem to arise at the interfaces, especially in areas where children have to integrate syntactic knowledge with information from discourse and the situation, i.e. with pragmatics (see Chien and Wexler 1990 and many others). The other explanation is that there are processing limitations in comprehension which do not occur in production (see Grodzinsky and Reinhardt 1993 and much subsequent work). Crucially, both these explanations open the possibility that some of the difficulties in comprehension are performance or task effects, either because the pragmatic context was not optimally controlled in a given experiment (see Grimshaw and Rosen 1990) or because the test conditions are too demanding for a child's immature processing capacity. Both these possibilities raise the question to what extent these asymmetries result from methodological decisions; much recent work has addressed this question in the area of pronoun interpretation (see Elbourne 2005, Conroy et al. 2009).

As to the linguistic models which can capture the empirical findings, again we are faced with two possibilities. Either the phenomenon in question is analyzed as an interface phenomenon with a clear separation of what is syntactic, semantic or pragmatic and suggestions for the interaction of these components (see Reinhardt 2006, Reuland 2001 for pronouns), or the interaction of the components is integrated into one grammar with the proviso that constraints of a pragmatic nature are "soft" constraints in the sense of Burzio (1998). So one of the questions in the focus of current research has been what a grammatical explanation of the observed asymmetries could look like.

This volume sheds light on both the questions outlined above. On the theoretical side, the issue of production-comprehension asymmetries has received a great deal of attention in the last years and many studies suggest that a model of grammar as proposed by Optimality Theory is well suited to capture the asymmetry (see Hendriks and Spenader 2006, Hendriks and Koster 2010, de Villiers et al. 2006).

Under the generative assumption of a narrow computational system, however, the observed asymmetries must arise from performance factors such as processing limitations, processing strategies, or task effects, an idea that has been put forward for example by Grodzinsky and Reinhart (1993), Avrutin (2006), Conroy et al. (2009), and in this volume (by Baauw et al., Botwinik,

Brandt-Kobele and Höhle). One argument for this position is that researchers observed different results when the same participants were tested with different experimental paradigms in the same modality and linguistic area.

As Hendriks and her collaborators point out in several papers, and also propose in this volume, methodological explanations attribute the production-comprehension asymmetries to task effects. They put forward a grammatical explanation to production-comprehension asymmetries in the interpretation of pronouns and word order within the framework of Bidirectional Optimality Theory (Blutner 2000). The basic assumption is that children below age six (or even older) cannot compute the speaker's alternative because they first have to acquire Theory of Mind (Wimmer and Perner 1983) or because their limited processing capacity does not allow them to compute both constraint hierarchies. Thus, at the younger ages, children must optimize unidirectionally, which leads to non-adultlike comprehension. This account predicts production-comprehension asymmetries to occur in all linguistic areas involving pragmatic knowledge. Recent findings from the development of scalar implicatures (Papafragou and Musolino 2004, Zondervan et al. 2009, Koch, Schulz, and Katsos 2010), phrasal stress (Vogel and Raimy 2002), and focus particles (Müller 2010) are in line with the position that tasks involving pragmatic knowledge are not mastered before age five.

Despite the increasing interest in the literature, the source of production-comprehension asymmetries in child language is still an unresolved topic. In addition to the different explanations sketched above, research must also take into account cross-linguistic evidence, which turned out to be crucial in the discussion about pronouns (see McKee 1992, Jakubowicz 1984, Hamann et al. 1997, Baauw et al. this volume). As outlined in more detail in the next section, the present volume aims to consider production-comprehension asymmetries on the one hand and the acquisition of pronouns on the other from cross-linguistic and explanatory perspectives.

Aims of the volume

The first goal of the volume is to bring together cross-linguistic research on production-comprehension asymmetries in syntactic, semantic, and morphological development. This results in papers addressing different linguistic areas such as the acquisition of pronominals (Hendriks, Banga, van Rij, Cannizzaro and Hoeks; Koster, Hoeks and Hendriks; Bittner, Kuehnast and Gagarina; Baauw, Zuckerman, Ruigendijk and Avrutin, Coene and Avram), aspect marking (Sankaran), negation (Wojtecka, Koch, Grimm, and Schulz),

relative clauses (Botwinik), word order (Cannizzaro) and inflection marking (Brandt-Kobele and Höhle). Some of the languages studied here do already have a long research tradition in acquisition such as Dutch and German, but the volume also includes papers on lesser-studied languages such as Romanian, Bulgarian, and Tamil. The study on child Romanian is based on longitudinal production data of two children, all other studies analyzed cross-sectional data of pre-school or school-aged children or of adults. The book thus presents new quantitative information on the acquisition of selected phenomena in several linguistic domains.

The second goal of the volume is to shed light on the source of the production-comprehension asymmetries. As outlined above, previous research puts forward different explanations such as limitations in pragmatic knowledge, limitations in cognitive processing, or methodological effects which may either interact with pragmatics or with processing, and different grammatical evaluation processes in perception and production which are either not equally available to the child or are beyond the child's processing capacity (see e.g., Hendriks and Koster 2010 for an overview). The contributions in this book focus on methodological and grammatical explanations. These two approaches are briefly introduced below.

Methodological effects

Over the years, a number of experimental techniques have been established to investigate children's linguistic behavior. For comprehension, experimental settings such as truth value judgements, syntactic and semantic priming, act out tasks and question after story tasks are in use since the 70s (McDaniel, McKee, and Cairns 1996). The fact that three out of the ten papers in this volume use eye-tracking data (Hendriks, Banga, Cannizzaro, and Hoeks; Cannizzaro, Brandt-Kobele, and Höhle) exemplifies the increasing role of on-line measures for assessing children's comprehension.

The investigation of methodological effects tackles method-inherent problems. Both, production and comprehension experiments normally take place in non-naturalistic and highly controlled situations and test sentences are often presented in isolation or with minimal context. Therefore children first have to construct an appropriate context to master the task (Elbourne 2005, Conroy et al. 2009, Müller 2010). The non-adult performance observed in several studies might reflect children's inability to build a discourse model for the given situation, not their inability to interpret the test sentence proper. As Hendriks et al. (this volume) show, even adults benefit from contextual information to a different extent in the comprehension of pronouns, depending on the research

method. This indicates that the tasks interact with the processing of discourse information. Hence, it appears that the role of the context is not straightforward in the sense of 'the more context the better performance' but that the kind of context and the presentation mode matter as well.

Children's performance also depends on their awareness of the goals and of the general nature of the task. Papafragou and Musolino (2003) investigated the interpretation of scalar implicatures by 5-year olds in two conditions, a) with normal context and, b) with context preceded by a training to detect infelicitous statements (see also Zondervan et al. 2009). They found a significantly better performance in the latter condition. This indicates that knowledge about the communicative expectations impacts task performance.

Perception and production studies also differ with respect to the response categories. Perception studies force children to respond in a certain way. Usually, only one answer is scored as correct, and there are few error categories (e.g. as in truth value judgment tasks). Production studies, in particular spontaneous production settings, are less limited in that respect. Children can avoid difficult structures and produce easier ones, hence spontaneous production never directly reflects children's knowledge (see Ruigendijk et al. 2010 for a close comparison of methodology in a comprehension and production study on pronouns). This explains why children often produce more errors in elicited production tasks than in spontaneous settings (e.g., Kauschke, Kurth, and Domahs in press for plural formation). The production-comprehension asymmetry thus may also be related to the fact that error analyses often use different error categories. For example, in Wojtecka et al.'s study (this volume) on sentence negation no category 'false negatives' is required as false negatives are hardly ever produced in normal conversation and even in elicited contexts. Thus, asymmetries between production and comprehension may also arise from researcher's decisions on the specific qualitative analysis.

In sum, the differences can be diminished if the material allows children to build up an appropriate discourse model. Currently, there is no consensus if (comprehension) experiments should provide contextual information, and if so, how much context is required. Hendriks and Koster (2010: 13–14) argue for caution in that respect because children could use extra-grammatical information for performance on the task. In other words, it cannot be decided if a good test performance results from children's grammatical knowledge or from their interpretation of additional situational cues. Finally, it depends on the research goals if, how much and what type of contextual information should be given (see also Hamann in press). If the focus of research is to test knowledge of a single grammatical phenomenon, conditions must be controlled as far as possible. If children's abilities are assessed across modalities, or if the aim is to

know if children are in principle able to perform well on a certain structure, contextual information is required. As elicited production experiments rarely come out of the blue, this implies that the equivalent comprehension task must be enriched with context. For example, Hendriks and Koster (2010, quoting Spenader et al. 2009) point out that children significantly improved in their interpretation of pronouns if a discourse context was presented. Likewise, contextual information decreased the error rates in the interpretation of focus particles (Müller 2010), and scalar implicatures (Papafragou and Musolino 2003). These considerations – the error analysis, the role of the context, and shared knowledge of communicative goals of the task - support the position that methodological effects provide a source of the production-comprehension asymmetry in children's performance.

Grammatical explanations

Recent research provides different theoretical accounts of the acquisition of production and comprehension. Constraint-based models propose that comprehension and production are generated upon an adult-like underlying representation, and that learning takes place via successive re-ranking of constraints (cf., Tesar and Smolensky 1998, Boersma and Hayes 2001). There are two types of constraints: faithfulness constraints require the output to be identical to the input; i.e., they establish a correspondence between input and output. Markedness constraints require the surface form to be unmarked, i.e., they only target the output form. Constraint-based accounts to learnability need to explain how the same grammar renders different candidates optimal in production and comprehension. As Smolensky (1996: 722) points out, the assumption of a single grammar runs into a dilemma: in comprehension (which is assumed to be adult-like or near adult-like), faithfulness constraints must dominate markedness constraints, while at the same time markedness constraints must dominate faithfulness in production (which is impoverished). Smolensky proposes that different candidate sets compete: in comprehension these are candidates sharing the output form, whereas in production competition takes place between candidates sharing the underlying form. Following the standard position that markedness constraints only apply to the surface form, they have no effect on mappings of the surface form to the underlying form, i.e. in comprehension.

However, as Smolensky's proposal presumes adult-like underlying forms, it disregards that comprehension also develops. A model where comprehension and production simultaneously develop is proposed for the acquisition of phonology in Pater (2004). Pater imposes domain-specific faithfulness constraints

for comprehension (C-Faith) and production (P-Faith); structural constraints are not specific to a particular domain. If C-Faith dominates P-Faith, comprehension outperforms production. Essentially, Pater's model also permits the reverse pattern, i.e., that production outperforms comprehension.

At the level of syntax and semantics, comprehension-production asymmetries can better be explained by the different evaluation processes in comprehension and production. In comprehension, the form provides the input to the optimization process; in production it is the meaning. This is formalized in another constraint-based model, Bidirectional Optimality Theory (Blutner 2000). Bidirectional OT presumes that optimization takes place by associating optimal form-meaning pairs, i.e. optimization always goes in both directions (see Hendriks and Spenader 2006 for a description). For comprehension, the listener must take into account the speaker's alternatives to optimize bidirectionally. For example, to interpret pronouns, children have to evaluate other pronouns, especially the reflexive, in the lexicon and compare them to the associated meaning. If learners are unable to compute the alternatives, they are not able to optimize bidirectionally. Hendriks and Spenader (2006) consider children's inability to optimize bidirectionally as a reason of why comprehension is delayed as compared to production. The insufficiency to perform a bidirectional evaluation might be due to factors such as limited processing load, limited working memory capacities, or incomplete acquisition of Theory of Mind (Wimmer and Perner 1983). Children may also rely on unidirectional optimization because they have not yet mastered the mechanisms behind the bidirectional grammar (Hendriks and Koster 2010: 22).

Bidirectional OT may be able to explain why comprehension sometimes lags significantly behind production. Moreover, it integrates empirical evidence on production-comprehension asymmetries and the attested pragmatic deficits into a single grammar without stipulating child-specific constraints. However, the model needs further explication with respect to the question of how children learn the set of alternatives if grammar and lexicon have to be acquired simultaneously.

The model also should further be extended to capture cross-linguistic differences in comprehension-production asymmetries. For example, it has repeatedly been shown that there is language-specific variation with respect to a possible delay in the comprehension of pronouns (McKee 1992, Hamann et al. 1997, Ruigendijk 2008, Ruigendijk et al. 2010). Additionally, children acquiring Dutch, English, and Hebrew showed difficulties in the interpretation of pronouns but not in the interpretation of reflexives; a pattern which could not be replicated for child German and Spanish (nor for other Romance languages). More precisely, the Dutch, English and Hebrew children, but not the

Spanish and Germans overextended a reflexive meaning to the object pronoun in sentences such as 'Bert is washing him'. To date, these cross-linguistic differences still need to be implemented in a grammatical model. Taken the tenets of constraint-based models such as bidirectional OT, cross-linguistic and inter-individual variation may be captured by different ways of re-ranking the same constraints.

In sum, the evidence so far points to two main explanations to production-comprehension asymmetries in child language. One group of researchers attributes the observed asymmetries to methodical effects, while another group refers to the framework of bidirectional OT. As will become clear by the summary of the papers in the following section, the volume represents both positions, and crucially, both directions of explanation do complement each other.

The organization of the book

The volume is organized into two major sections. Section A summarizes papers on cross-linguistic evidence for production-comprehension asymmetry. Papers providing a theoretical or methodical explanation to the production-comprehension asymmetry are collected in section B.

Section A

The section on cross-linguistic evidence starts with Sankaran's study on aspect marking in child Tamil. Sankaran carried out an elicited production task and a sentence-picture-matching task with children of two different age groups and with adult controls in order to test the influence of verb semantics on children's acquisition of aspect markers. Her findings suggest a two-way asymmetry in the comprehension and production in the acquisition of the two aspect markers under investigation (*kondiru*, *vidu*). In production, the children are still acquiring *kondiru* while showing an adult-like performance in comprehension at the same time. In contrast, *vidu* is produced in an adult-like way by both age groups but performance on the *vidu*-sentences in the comprehension task is poor. Sankaran argues that the disadvantage of *vidu* is related to its dual function as perfective and inceptive marker.

The study of Coene and Avram compared the development of accusative pronominal clitics to reflexives in the spontaneous production data of two Romanian children between 21 and 36 months of age. Their data revealed a difference between 1st/2nd and reflexives on the one hand and 3rd person clitics on the other. The former types of clitics emerge slightly later than 3rd person

clitics but are produced in a target-like way from the very beginning. 3rd person clitics are found in the very early data but undergo omission still at the stage when 1st/2nd person clitics are used in an adult-like manner. Coene and Avram argue that computational difficulty caused by feature intervention effects best account for their findings. Their study indirectly deals with an asymmetry in comprehension and production since it has been long established (with the same methods as for English or Dutch) that Romance pronominals are interpreted correctly much earlier than English pronominals but remain problematic in production for a long time. Coene and Avram show that this asymmetry may vanish when not only 3rd person clitics are considered.

Bittner, Kuehnast, and Gagarina investigated the comprehension and production of personal pronouns by 3- and 5-year-old German-, Russian- and Bulgarian-learning children. They used a question-after-story-design to evaluate comprehension and production of personal pronouns. Their study examined if children relate personal pronouns in subject position to structural prominence and/or to animacy, and if the same patterns are observed in comprehension and production. Comparing different language groups, the authors investigated cross-linguistic differences in the use of cues (e.g., animacy). Their results show that children tend to relate personal pronouns to the same cue pattern in production and comprehension using cues indicating high salience of referents (see also Elbourne 2005). Furthermore, the anaphoric capacity of personal pronouns is determined by language-specific features.

Section B

Taking a theoretical perspective, Koster, Hoeks, and Hendriks argue that Bidirectional Optimality Theory elegantly captures the production-comprehension asymmetries. Their study investigates the processing of discourse anaphoric subject pronouns, full NPs and topic shifts by Dutch preschoolers and adults. In accordance with the Asymmetric Grammar Hypothesis, which states that asymmetries in acquisition are the result of inherent properties of the grammar, the authors argue that asymmetries between production and comprehension are the result of children's inability to take into consideration the other person's perspective in communication. In production, they will be overly economical and produce unrecoverable pronouns after topic shifts. When listening to a story, children will ignore NP topic shift marking and, therefore, will be at a loss as to how to interpret an ensuing subject pronoun. The results confirm their predictions: The children demonstrated non-adultlike production of pronouns and non-adultlike comprehension of full NPs which reflects the asymmetric effects of the constraints of the grammar.

Based on data of child Hebrew and Italian, Botwinik analyzes the production-comprehension asymmetry in object relatives. Starting from the observation that comprehension lags behind production, she argues that the production-comprehension asymmetry attested by object relatives stems from the way their syntactic processing unfolds, a procedure which is crucially involved in the comprehension of object relatives, but not in their production. She claims that the processing (comprehension) of object relatives is comparable to garden path effects, involving an instance of local ambiguity. Based on the assumption that processing is done by the computational system, the nature of the syntactic clues and the point in processing at which they occur account for the level of performance on these relatives in the respective languages.

Cannizzaro studied the comprehension and production of subject-object word order in Dutch 3;6-year-olds and in adults. Comprehension was assessed via a picture-selection task combined with eye-tracking, production by an elicited production task. Her data show that production outperformed comprehension in children, but not in adults. In both groups, there was a tendency for subjects to be matched to [+animate] and objects to [-animate].

Rethinking results from several previous papers, Brandt-Kobele and Höhle take a closer look on methodological issues related to the production-comprehension asymmetry. The particular focus is on verbal inflection. They assume that the grammatical systems for production and comprehension do not develop in an asymmetric fashion. Rather, comprehension and production require different steps of processing. Evaluation takes place structurally and heuristically; i.e., either based on structural information or on probabilistic knowledge of canonical form-meaning relations. Children might be particularly sensitive to heuristics when processing complex structures. The poor performance in comprehension results from conflicting heuristic and structural processing strategies. In contrast, heuristics plays a minor role in production; consequently no conflict arises between heuristics and linguistic structure.

Hendriks, Banga, van Rij, Cannizzaro, and Hoeks investigated the role of the discourse context in the interpretation of pronouns. They performed a combined picture-verification and eye-tracking study with Dutch adults to test their comprehension of object pronouns and reflexives while manipulating the discourse context. Although the adults hardly made any comprehension errors in the picture verification task, their reaction times were significantly slower when the introductory sentence did not unambiguously establish a discourse topic. This suggests that the structure of the discourse context is important for pronoun interpretation and influences adults' on-line processing of object pronouns. The authors argue against experimental artifacts as an explanation of

the Delay of Principle B-Effect. Task effects can, however, explain why context effects were observed in the off-line but not in the on-line task.

In a longitudinal group study, Wojtecka, Koch, Grimm, and Schulz investigated the acquisition of the sentence negator *nicht* 'not' by German preschoolers. Using elicited production data and a truth value judgment task for comprehension, the authors found that target-like production of *nicht* precedes its target-like comprehension. They argue that the comprehension task did not provide enough contextual information to license a certain type of sentence negation (true negatives), and that the gap between production and comprehension would be diminished if the task were embedded in a more appropriate context.

Baauw, Zuckerman, Ruigendijk and Avrutin studied the role of task effects in the interpretation of pronouns. Drawing on experimental evidence from Dutch and Spanish children and from Spanish Broca's aphasics, the authors claim that the problems of interpreting object pronouns (Pronoun Interpretation Problem; also called Delay of Principle B-Effect) is due to a processing problem, not to missing knowledge of binding or coreference principles. This explains the differences in the task performance of picture selection and truth value judgment using the same material and participants. Baauw et al. argue that the performance of these populations is strongly related to the processing load that different experimental methods impose on processing of object pronouns.

Summary

The papers in this volume investigate production-comprehension asymmetries in child language and in adults by studying different languages. Comprehension is measured via truth value judgment, picture selection tasks, question after picture tasks and eye-tracking. In production, most of the studies rely on elicited productions; only one paper analyzes spontaneous production data.

The volume covers a range of linguistic phenomena: pronouns, reflexives, aspect marking, inflection marking, non-canonical word order, negation, and relative clauses. For most of the phenomena considered here, a production-comprehension asymmetry was found in the direction that production precedes comprehension. An exception provides the acquisition of aspect marking in child Tamil, where comprehension (of at least one of the markers) seems to be better than production.

A closer examination of the results reveals that the research method plays an important role for the extent of the production-comprehension asymmetry.

This is particular striking in two papers of this volume. Hendriks et al. found that, in reaction times, Dutch adults showed effects of context information in comprehension but they did not do so in their eye-gaze data. Likewise, Baauw et al. observed a significantly better performance in a picture selection than in a truth value judgment task in Dutch children. Crucially, Baauw et al. used the same materials and assessed the children with the two tasks within a single test session. Thus, while there is clear evidence that tasks influence children's performances, it is still an open issue which is the optimal one for particular research questions, linguistic phenomena and age groups.

The papers in this volume also reflect different positions with respect to the source of the production-comprehension asymmetry: task effects, problems with pragmatics, processing limitations (Baauw et al., Bittner et al., Botwinik) or conflicting processing strategies (Brandt-Kobele and Höhle) are considered as possible causes. Other papers explain the production-comprehension asymmetry by grammatical properties (Hendriks et al., Koster et al., Cannizzaro). These two perspectives are connected by the approaches using bidirectional Optimality Theory, where cognitive and/or pragmatic limitations constrain the grammatical evaluation. The more processing-oriented approaches focus on empirical data. Bringing together the two positions, this volume hopefully inspires researchers to continue bridging the gap between empirical and theoretical research on child language.

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Testing the Aspect Hypothesis in child Tamil

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Introduction

The acquisition of tense and aspect by first and second language learners has generated enormous interest in the past forty-five years. With numerous studies being carried out in the field, certain crucial facts have come to light. Where first language acquisition is concerned it has been observed that in nearly all the child languages investigated there is a close relationship between the semantic properties of verbs and tense-aspectual markings. Children are observed to initially associate past and perfective inflections with telic type verbs and progressive and imperfective inflections with durative type verbs. These patterns of association have been referred to as "the Aspect Hypothesis" in the acquisition literature (Anderson and Shirai 1996). The Aspect Hypothesis in its simplest form makes the following generalizations:

a) Children first use past marking (e.g., in English) or perfective marking (in Chinese, Spanish, etc.) with achievement and accomplishment verbs, eventually extending its use to activity and stative verbs.
b) In languages that encode the perfective-imperfective distinction, imperfective past appears later than the perfective past, and imperfective past marking begins with stative and activity verbs, then extending to accomplishment or achievement verbs.
c) In languages that have progressive aspect, progressive marking begins with activity verbs, then extends to accomplishment or achievement verbs.
d) Progressive markings are not incorrectly overextended to stative verbs". (Anderson and Shirai 1996: 533)

This study tests whether these generalizations can be supported using evidence from child Tamil. A production task followed by a comprehension task was carried out with two child groups and an adult control group in order to test the influence of verb semantics on children's acquisition of aspect markers. The results also provide some insight into the long debated question of whether

production precedes comprehension or vice-versa. This is the first time such a study has been carried out in Tamil and the findings provide valuable insight in the field.

This paper is structured in the following manner: Section 2 examines previous research done in the area, section 3 explains the terminology used in the tense-aspect acquisition literature, section 4 provides insight into Tamil morphology, section 5 gives a detailed account of the present study and in section 6 the summary of results from the two experiments as well as the conclusion are discussed.

Previous research on L1 acquisition of tense and aspect

Both longitudinal and experimental studies that have been carried out in various languages provide empirical evidence to support the generalizations made by the Aspect Hypothesis; French (Bronckart and Sinclair 1973), Italian (Antinucci and Miller 1976), English (Bloom, Lifter, and Hafitz 1980, Harner 1981, McShane and Whittaker 1988, Shirai and Anderson 1995, Johnson, and Fey 2006), Polish (Weist et al. 1984), Greek (Stephany 1981), Turkish (Aksu-Koç 1988), Mandarin Chinese (Li 1990) and Russian (Stoll 2005) to name a few. These studies investigating early verb morphology have helped shape the development of the theories regarding tense and aspect acquisition over the past four decades.

It is crucial to remember, however, that the studies mentioned have mostly been conducted in languages where both tense and grammatical aspectual information are conflated into a single morpheme. Languages such as English and French face this difficulty. For example the past marker in English conveys both perfectivity as well as past meaning and the imparfait in French conveys both the past meaning as well as imperfective aspect. Some languages, moreover, only grammaticize one of the two temporal concepts (e.g. Mandarin Chinese only marks grammatical aspect and Modern Hebrew marks only tense). These issues make it very difficult for researchers to make accurate claims regarding what children use early verbal morphology for.

A study in Polish by Weist et al. (1984), however, was a break-through in the field because Polish is a language where tense and grammatical aspect are marked using distinct linguistic markers. Their study serves to highlight how important it is to be able to investigate languages which grammaticize both tense and grammatical aspect as it makes it easier to discover the exact nature of the temporal concepts that are encoded in their verbal morphology. There are, however, certain drawbacks when investigating Polish and similar Slavic

languages. In such languages the categories of tense and aspect are mutually bound and integrated within the verb stems where a choice is made between perfective and imperfective stems. Also, there is no one marker that can clearly denote tense or aspect. These issues potentially carry several analytical uncertainties. It is therefore crucial that other languages besides Polish are examined in order to be able to help clarify some fundamental questions regarding children's use of early verb morphology.

Tamil is an ideal language to study because it uses separate linguistic devices to code distinctions between tense and aspect. Tamil is also morphologically transparent, making it possible to determine which morphology is being used to mark tense and which morphology is being used to mark aspect. The fact that in theory all tense-aspectual markers can co-occur with all verb type categories in Tamil is another reason why it is advantageous to study this particular language since it allows for creative verb predicate combinations within experimental conditions. Since most of the studies conducted so far have been in Indo-European languages, this paper serves to highlight the importance of investigating the predictions of the Aspect Hypothesis in other languages, especially ones where tense and aspect are not conflated.

Different experimental methods to test the acquisition of tense and aspect

The most popular methods of experimental investigation have involved production and comprehension tasks and they have in many ways proven to be the most effective. In the production tasks, children have usually been asked to describe play-situations enacted by toys or props after being given a neutral-probe question.[1] Studies that have used this method include Bronckart and Sinclair (1973), Harner (1981), McShane and Whittaker (1988) and Li (1990). More recently Stoll (2005) carried out a production experiment using short films instead of toys or props. All these studies have been successful with even very young children and can help elicit a large amount of data within a short period of time. Production experiments have demonstrated that children mostly combine durative verb types such as activities with progressive-imperfective inflections and telic verb types with perfective inflections.

Comprehension studies that examine whether children's comprehension of inflectional markers varies across lexical categories are also extremely successful with very young children. These studies mostly employ sentence to picture

1. Weist et al. (1984) used a non-neutral probe question when carrying out their production task, thereby creating a biased context in order to demonstrate that discourse factors can influence verb-predicate patterns.

matching tasks and those which have employed this method include Weist (1983); Weist, Wysocka, and Lyytinen (1991), and Li (1990). Stoll (1998) modified the traditional method of comprehension experimentation by using video stimuli and Wagner (2001) conducted a sentence to scene matching task where children were presented with actual-acted out events instead of pictures. The overwhelming finding across all these studies is that children comprehend imperfective inflections better with durative verb types and perfective inflections better with telic verb types.

In my study, I have incorporated both these experimental methods in order to test Tamil children's production and comprehension of Tamil aspect markers. When carrying out such production and comprehension tasks, there is the added advantage of being able to test subjects from different age groups within a relatively short time-span in order to provide a cross-sectional developmental picture which clearly traces the changing relationship between lexical and grammatical aspect (Johnson and Fey 2006: 422–424).

Terminology

Temporality conventionally involves three basic notions which are (a) the inherent temporal features/contours of a particular situation, (b) the different perspectives that can be taken and expressed with regard to the temporal course of a particular situation and (c) the temporal reference which relates the time of a situation to another time span (which is most often the time of utterance). These notions correspond to the terms *lexical aspect*, *grammatical aspect* and *tense,* respectively. Lexical aspect (also called *aktionsart* by some scholars) is encoded in the lexicon of natural language and denotes verb semantics.[2] It should not be confused with the term *aspect* which is generally used to refer to grammatical aspect. Grammatical aspect and tense are mostly made evident by the grammatical morphological marking on the finite verb. These three terms will be defined in greater detail below.

2. *Aktionsart* is a German term that was introduced by Agrell (1908) to refer to the inherent semantic features of verbs. I shall not be using this term because it only alludes to the lexical content of verbs rather than to the lexical content of verb predicates (Klein 1994: 17).

Lexical aspect

Lexical aspect refers to the inherent temporal features of a verb that are not encoded in the morphology of a language. It is simply an intrinsic part of the semantics of the verb predicate that expresses the situation or action. Vendler (1967) proposed that the temporal features by which verb types should be categorised in a given language are *telicity, durativity* and *dynamicity.*

Telicity refers to the internal structure of a situation as having an inherent endpoint or a natural completion where there is a goal, outcome or other change of state. Durativity describes a situation as lasting for a period of time, thus emphasizing that it has internal structure. Dynamicity involves change and denotes the energy required for a particular situation to exist or continue. The table below clearly illustrates how the inherent lexical aspect of verbs can be classified according to their temporal features.

Table 1. Internal temporal features of verb types

Situations	Telic	Durative	Dynamic
States	−	+	−
Activity	−	+	+
Accomplishment	+	+	+
Achievement	+	−	+
Examples:			
States (internal states):	*believe* in fairies, *know* the answer		
Activities:	*laugh, swim*		
Accomplishments:	*paint a picture, eat an apple*		
Achievements:	*reach* the mountain top, *fall*		

Posture verbs in some languages (e.g. Mandarin Chinese and Tamil) can also be categorized under stative verbs (e.g. *sit, stand*). After doing some language tests and discovering that posture verb types behave like internal states, I used posture verbs instead of internal states in my study because they lend themselves to experimental manipulation better.

Grammatical aspect

"Aspects are different ways of viewing the internal temporal constituency of a situation" (Holt 1943: 6). It is considered a grammatical category and may be expressed by means of the inflectional morphology of that particular language (Comrie 1976: 9). There are two main types of aspectual perspectives, the