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The defective tense hypothesis: on the emergence of tense and aspect in child Polish*

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ABSTRACT

Longitudinal and cross-sectional designs were combined in this analysis of the evolution of children's capacity to represent deictic relationships. The longitudinal component contained the naturalistic observation of three relatively young children (1;7–1;9) and three somewhat older children (2;0–2;2). These children were tape-recorded in caretaker–child interactions. The analysis of the corpora from these children revealed: (1) imperfective activity verb phrases in the past tense, (2) telic verb phrases in the past tense used independently of resulting states, (3) moderately remote past references, and (4) deictic future references. The cross-sectional component contained an experiment in which elicitation procedures were used to obtain past and future references to atelic and telic situations. Nine $2\frac{1}{2}$- and nine $3\frac{1}{2}$-year-old children were tested. Generally high levels of performance reinforced the outcome of the longitudinal analysis.

INTRODUCTION

The development of the capacity to think about situations which occurred prior to the present situation or anticipate situations which may occur subsequent to the present situation constitutes a major conceptual breakthrough ranking in importance with object permanence. In language, tense

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marks the temporally deictic relationship of an event time prior to, subsequent to, or concurrent with speech act time. During an early phase of development, child language has correctly been characterized as a 'here and NOW' communication system. In cultures which have a tensed language, children will eventually express deictic relationships in their evolving morphology. We would like to be able to conclude that when child language is tensed, children have developed an abstract concept of time which they can represent in their language. Unfortunately, the problem is complicated by the concept of aspect, which also may be coded in the morphology of a language. Aspect refers to the internal dynamic properties of situations such as completion, repetition and duration.

Antinucci & Miller (1976) have argued that young children from about 1;6 to 2;6 can ONLY encode a prior situation 'if it resulted in a present state' (p. 183) and this is because 'the child lacks an abstract conception of time' (p. 183). They proposed that early tensed utterances express aspectual not deictic relations. Hence tense is defective in its normal function at this phase of development.[1] This proposal will be identified as the defective tense (DT) hypothesis. The DT hypothesis has the following semantic, syntactic and temporal components: (1) only telic verbs will receive past-tense inflections, (2) tense distinctions will be redundant and only accompany aspectual distinctions, and (3) only references to immediate past situations will be made. In fact, all three components have some support: (1) Antinucci & Miller (1976) found NO activity verbs with past tense inflections in children learning Italian and English; (2) Stephany (1981) found that between the ages of 1;8 and 1;11 children learning Modern Greek NEVER used imperfective past forms, and (3) Szagun (1979) found that when German children began to use past tense inflections at about 2;3, NONE of their utterances referred to the remote past. The words *no*, *never* and *none* were stressed here to emphasize that the DT hypothesis is not a frequency argument. According to the DT hypothesis, these events do not occur because they cannot occur. Furthermore, the DT hypothesis is not simply an aspect priority hypothesis. The hypothesis does not simply claim that certain aspectual distinctions will emerge prior to tense distinctions. The DT hypothesis states that emerging tense morphology is defective in its function since it does not code deictic relationships.

The general research picture is not as tidy as it initially appears. Instead of failing to detect any activity verbs with past inflections, any imperfective past forms, and/or any remote past references, it is often the case that these behaviours are simply infrequent. While Aksu (1978: 200) claimed strong support for the semantic component of the DT hypothesis, the three children

[1] Bloom, Lifter & Hafitz (1980) have argued that both tense and aspect morphology are defective in English at this phase of development, but the argument was based on an equivocal verb classification system and circular argumentation.

(1;9–2;0) in the longitudinal phase of her study of Turkish all produced activity verbs with *-di* past inflections starting with the earliest samples (pp. 44–8). However, Aksu explained away these observations with the argument that activity verbs were used only in the context of 'ritualized' responses to questions or in statements about completed situations with the verb *bitmek* 'to finish'. Stephany (1981) has reported that during an early phase of the acquisition of Modern Greek, children used activity verbs as well as telic verbs in the past tense. The activity verbs were simply used less frequently with 3 per cent activity verbs versus 11 per cent telic verbs inflected for past tense (see Table 3, p. 50).

Regarding the syntactic component of the argument, Radulović (1975) observed that during his acquisition of Serbo-Croat, 30 per cent of Damir's (2;0–2;2) past forms were imperfective, and these included activity verbs. In Gvozdev's (1961: 424–7) discussion of the emergence of the past tense in Russian, he explained that at age 1;10, 'there are clear cases of the use of both aspects' (trans. Slobin), and Gvozdev cites examples of both activity and telic verbs. Imperfective activity verbs in the past tense can also be found in the early corpora of children learning Polish (Smoczyńska 1978). Concerning remoteness, Szagun's (1979) observations of British children showed that a few remote past references occurred simultaneously with the more frequent immediate past references. Hence a careful examination of longitudinal data demonstrates that support for the DT hypothesis is sporadic.

In addition to the longitudinal analysis of the corpora of young children, there is a set of relevant experiments which have utilized elicitation procedures within a cross-sectional design. The three most relevant studies, i.e. Bronckart & Sinclair (1973), Di Paolo & Smith (1978), and Harner (1981), all used a similar procedure. The experimenter acted out goal-directed and non-goal-directed situations with toys and then asked children to describe the situations. Notice that the test question does not provide the obligatory linguistic context for the past tense. Hence, the context which the experimenters provided was ambiguous. These experiments showed what children DO do in ambiguous contexts, not what children CAN do in an explicit context.

In their experiment with children learning French, Bronckart & Sinclair (1973) found that children were more likely to use the 'perfective' past form (*passé composé*) with situations having an end result, and present tense (*présent*) with situations lacking an end result. The 'imperfective' past form (*imparfait*) was seldom used by children from 3 to 6. The authors concluded that before the age of 6 aspectual relations were 'more important' (p. 126) than temporal relations. Smith (1980) attributed the 'strong decentration' hypothesis to Bronckart & Sinclair (1973). The strong decentration hypothesis claims that pre-operational children (about 2–7 years) are not conceptually ready to express deictic relationships. In my opinion, Bronckart & Sinclair

(1973) did not make such a strong claim (cf. Sinclair 1971) and furthermore, given their procedure, they could not have made such a strong claim. Nevertheless, the research raised the possibility that the DT hypothesis extends into the seventh year of conceptual development.

Di Paolo & Smith (1978) and Harner (1981) used a similar experimental design with American children, but they included a more balanced set of stimulus situations. They found that even 3-year-old children have some capacity to use past tense morphology even when the situations have no end result. While Harner (p. 504) did NOT do so, one could interpret Harner's results as consistent with the DT hypothesis. Harner's tables 1–3 showed that in general three-year-old children used past tense inflections (simple past and past progressive) to describe only 50% of the prior situations. This weak performance improved with age. In the goal-orientated situations, older children produced a larger number of both simple past and past progressive forms, and in the non-goal-orientated situations, the increased use of past forms was restricted to the past progressive. If the DT hypothesis applies at 2;6, Harner has demonstrated the expected trend at 3;0. Hence, previous research has produced some evidence to support the DT hypothesis from 1;6 to 2;6 and has left open the possibility that the hypothetical temporal constraint on conceptual development extends into the third year.

The purpose of this research was to determine how tense and aspect interact in the development of the child's capacity to represent temporally deictic relationships. Our primary goal was to discover the point at which the child's communications system changes from a here and now system to a truly tensed system. Our secondary goal was to evaluate the child's understanding of aspectual distinctions and to explore the development of verb categories which are particularly relevant to the concept of aspect. The research project had two components, a longitudinal and a cross-sectional component, and the target language was Polish because of the relatively transparent manner in which aspectual and deictic relationships are coded in the morphology (for an excellent review of the research on the acquisition of Polish, see Smoczyńska (in press)).

THE LONGITUDINAL STUDY

METHOD

In this phase of the research, we classified the verb phrases produced by six children during four observation sessions. Three of the children were approximately two years old (2;2, 2;1, 2;0) and three of the children were just beginning to use the past tense (1;7, 1;7, 1;9). The verb system of child Polish begins with two frozen forms, the third person singular present tense form of imperfective verbs, and the second person singular imperative of both imperfective and perfective verbs (Zarębina 1964). The three younger

children were observed from the initial period of productive tense morphology.

All of the children lived in Poznań. The children were tape recorded in their home environment during 45-minute interactions with their mothers and/or fathers. These interactions were recorded by two observers. One observer tape recorded the interaction, and the second observer made extensive context notes. The context notes were then integrated with the transcriptions of the tapes. The four sessions extended over a period of two to four months with at least two weeks between sessions.

Classification system

The verb phrases were classified from a syntactic and a semantic perspective. The major syntactic classification was that of tense and aspect. Since the full range of tense and aspect distinctions are made only in the indicative mood, imperative, conditional and infinitive forms were omitted. Since ostensive statements such as *to jest X* 'it is entity' and *nie ma X* 'not have (or there isn't) entity' can occur in only one cell of the tense–aspect matrix, ostensives were recorded but not included in the overall analysis. Memorized routines such as *proszę* 'please' and *dziękuję* 'thank you' were also excluded. The Polish verb system can be partitioned into past, present and future tense and perfective and imperfective aspect. In fact, the adult aspectual system is more complex and includes at least an iterative aspect. The perfective aspect identifies a completed situation, i.e. a situation with a beginning, continuation and termination. The imperfective aspect is neutral but typically refers to an incomplete situation (Comrie 1976, Ferrell 1951). The perspective of the perfective aspect is external to the situation and the perspective of the imperfective aspect is internal. The perfective–imperfective distinction is coded in the morphology by prefixation, suffixation or suppletion, e.g. *przeczytać/czytać* 'to read', *rozwiązać/rozwiązywać* 'to untie', and *wziąć/brać* 'to take'. There are two fundamental sets of inflections, past and non-past. The past tense is formed with the past tense inflections regardless of aspect, e.g. *zbudował/budował* '(he) built/(he) was building'.[2] With imperfective verbs, non-past inflections produce the present tense, e.g. *buduje* '(he) is building'. There is no present perfective. With perfective verbs non-past inflections produce future meaning, e.g. *zbuduje* '(he) will build'. The future tense for imperfective verbs is periphrastic. The imperfective future is formed with the future form of *być* 'to be' and a proper form of the verb, e.g. *będzie budował* '(he) will be building' (see Schenker 1973, Tokarski 1973).

[2] Depending on the context, perfective forms may be translated with simple or perfect forms in English and imperfective forms may be translated with simple or progressive forms. Whenever possible we have tried to explicate aspectual distinctions and to simplify the presentation by translating perfective with simple forms and imperfective with progressive forms. Deleted personal pronouns are in parentheses.

Semantically, the verb phrases were classified as state (St), activity (Act), achievement (Ach), and accomplishment (Acc) (see Vendler 1967). We adopted two tests for each type of verb phrase from Cochrane (1977), Dowty (1979) and Miller (1970) in order to operationally define the categories and avoid the risk of circularity in our definitions (see Fletcher 1979: 272). The verb phrase categories are more readily understood if we begin with Comrie's (1976: chapter 2) review of the situations to which the verb phrases refer. A state remains in the same state unless something happens which changes the state. In contrast, a dynamic situation is maintained by continued input. An activity (or atelic situation) involves pure action as opposed to a telic situation which requires a terminal point. Achievements and accomplishments both involve a process which leads up to a well-defined terminal point, but achievements involve a process which is 'intimately bound up with' the terminal point such that once the process is under way, the event cannot be prevented from occurring. There is a hierarchical relationship between these situations. The set of situations can be partitioned into state versus dynamic. Dynamic situations are divided into activity versus telic situations, and finally telic situations include achievements and accomplishments. The following are examples of verb phrases which refer to these situations: (*a*) state (*love*, *know* and *be nervous*), (*b*) activity (*cry*, *run* and *walk*), (*c*) achievement (*reach*, *notice* and *find*) and (*d*) accomplishment (*build*, *walk to* NP and *read the* NP). The following objective tests were developed to classify verb phrases according to Vendler-type schemas.

St 1. The imperfective form cannot occur as a complement of *namówić* 'persuade'.

St 2. The perfective form has ingressive (or inchoative) meaning.

Act 1. The imperfective present entails the perfective past.

Act 2. Sentences with *prawie* 'almost' mean that the action did not start.

Ach 1. As complements of *przestać* 'stop', *skończyć* 'finish' and *zacząć* 'begin', imperfective forms have iterative meaning.

Ach 2. Perfective forms cannot be used with the adverb *stopniowo* 'gradually'.

Acc 1. As the complement of *przestał* 'stopped', the imperfective infinitive does not entail the perfective past.

Acc 2. When the perfective form is used with the preposition *w* 'in', it has the meaning that the process took place through the interval.

The final classification decision was based on a pattern of pass/fail outcomes as shown in Table 1 (cf. Dowty 1979: table 1, p. 60). To be classified, it was necessary but not sufficient for the verb phrase to pass both tests designed for a category. Normally verb phrases passed one test designed for another category and achievement verb phrases passed both activity tests as well as both achievement tests. However, achievement verb phrases were the only verb phrases to pass both achievement tests. Before we pass on, four

TABLE 1. *Pass/fail patterns for four types of verb phrases on eight tests*

Verbs	Tests	Sample verb phrases			
		po-/znać 'know'	za-/płakać 'cry'	zauważ-yć/ać 'notice'	z-/budować 'build'
St	(1) Comp. persuade	Pass	Fail	Pass	Fail
	(2) Ingressive	Pass	Pass	Fail	Fail
Act	(1) Entailment	Pass	Pass	Pass	Fail
	(2) Almost	Fail	Pass	Pass	Fail/Pass
Ach	(1) Comp. stop	Fail	Fail	Pass	Fail
	(2) Gradually	Fail	Pass	Pass	Fail
Acc	(1) Entailment	Fail	Fail	Fail	Pass
	(2) Prep. *w* 'in'	Fail	Fail	Fail	Pass

controversial categories require a comment. In the intransitive context, one set of verbs have imperfective activity verbs and perfective accomplishment verbs, e.g. *czytać/przeczytać* 'to read', *pisać/napisać* 'to write', *robić/zrobić* 'to do/make', *jeść/zjeść* 'to eat', etc. (see Cochrane 1977). Miller's (1970) static verbs, e.g. *siedzieć/posiedzieć* 'to sit' and *leżeć/poleżeć* 'to lie' and perception verbs, e.g. *widzieć/zobaczyć* 'to see' and *słyszeć/usłyszeć* 'to hear' failed our stative tests and passed our activity tests. Semelfactive verbs such as *gwizdać/gwizdnąć* 'to whistle' were also categorized as activity verbs (see Cochrane 1977).

RESULTS AND DISCUSSION

The semantic and syntactic components

The results of the verb phrase classification are shown in Tables 2 and 3. The verb phrases were classified syntactically according to tense and aspect and semantically according to the categories St, Act, Ach and Acc. The single most important finding is that imperfective activity verb phrases with past-tense inflections were observed in all children starting from an early phase of tensed communication. The following examples show that a variety of prior situations were referred to with imperfective activity verb phrases in the past tense: (1) Marta (1;7), *Lecial samolot* 'was flying plane = The plane was flying', (2) Bartosz (1;8), *Pływała się* '(She) was swimming', (3) Paulina (1;11), *Jadłam* '(I) was eating', (4) Kasia (2;0), *Bawiła się* '(She) was playing', (5) Kubuś (2;1), *Czytałem o Soczewce* '(I) was reading about Soczewka', (6) Wawrzon (2;2), *Tam kręciły maszyny* 'There were turning machines = Machines were turning there'. These and other imperfective past forms were predominantly references to actual events. Hence, there was NO support for Antinucci & Miller's (1976) claim that, 'the meaning "non-actual" is the core of the development of a "past" meaning for imperfective' (p. 187). Considering

TABLE 2. *The number of verb phrases produced during one 45-minute caretaker–younger child interaction*

Aspect and verb phrase categories

	Marta									Bartosz[a]									Paulina[b]							
	Imperfective				Perfective					Imperfective				Perfective					Imperfective				Perfective			
Tense	St	Act	Ach	Acc	St	Act	Ach	Acc	Tense	St	Act	Ach	Acc	St	Act	Ach	Acc	Tense	St	Act	Ach	Acc	St	Act	Ach	Acc
			Age (1;7)									Age (1;7)									Age (1;9)					
Past	0	4	0	0	0	1	6	17	Past	2	1	0	0	0	4	3	0	Past	2	0	0	0	0	0	1	0
Present	11	44	1	1	—	—	—	—	Present	79	29	0	5	—	—	—	—	Present	6	12	1	0	—	—	—	—
Future	0	1	0	0	0	0	8	15	Future	0	0	0	0	0	0	6	2	Future	0	0	0	0	0	0	0	0
			(1;8)									(1;7)									(1;9)					
Past	0	2	0	1	0	4	3	4	Past	0	0	0	0	0	1	1	0	Past	0	0	0	0	0	0	6	0
Present	10	8	0	5	—	—	—	—	Present	8	12	0	0	—	—	—	—	Present	1	10	0	0	—	—	—	—
Future	0	1	0	0	0	2	2	4	Future	0	0	0	0	0	2	0	1	Future	0	0	0	0	0	1	1	1
			(1;8)									(1;8)									(1;10)					
Past	0	1	0	1	0	0	2	5	Past	1	2	0	0	0	7	4	2	Past	1	3	0	1	0	0	4	0
Present	11	23	0	1	—	—	—	—	Present	1	12	1	0	—	—	—	—	Present	6	22	0	0	—	—	—	—
Future	0	0	0	1	0	2	1	1	Future	0	0	0	0	0	2	9	5	Future	0	0	0	0	0	0	1	0
			(1;9)									(1;8)									(1;11)					
Past	1	1	0	1	0	2	5	12	Past	0	1	0	1	0	0	3	9	Past	2	4	0	0	0	1	4	4
Present	7	26	0	1	—	—	—	—	Present	1	18	1	0	—	—	—	—	Present	14	2	0	0	—	—	—	—
Future	0	0	0	0	0	0	2	1	Future	0	0	0	0	0	24	1	11	Future	2	1	0	0	0	1	4	0

a The high frequency of St verb phrases at 1;7 was due to the repeated use of one verb, *palić się* 'to be on (burning)'.

b During the preceding month Paulina produced one spontaneous past form: *chała* = *jechała* or *pojechała* '(she) went', an imperfective or perfective activity verb phrase.

TABLE 3. *The number of verb phrases produced during one 45-minute caretaker–older child interaction*

Aspect and verb phrase categories

	Wawrzon								Kubuś								Kasia							
	Imperfective				Perfective				Imperfective				Perfective				Imperfective				Perfective			
Tense	St	Act	Ach	Acc	St	Act	Ach	Acc	Tense	St	Act	Ach	Acc	St	Act	Ach	Acc	Tense	St	Act	Ach	Acc	St	Act	Ach	Acc
			Age (2;2)									Age (2;1)								Age (2;0)				
Past	2	4	0	1	0	1	11	5	Past	5	4	0	1	0	1	11	3	Past	4	2	1	0	0	0	15	9
Present	11	20	2	1	—	—	—	—	Present	2	13	6	1	—	—	—	—	Present	26	12	1	2	—	—	—	—
Future	0	2	0	0	0	2	4	10	Future	4	1	0	0	0	5	0	1	Future	1	3	0	0	0	7	2	10
			(2;2)									(2;2)								(2;1)				
Past	6	3	0	0	3	3	5	5	Past	0	1	1	0	0	0	6	0	Past	0	1	0	0	0	4	9	7
Present	6	20	0	0	—	—	—	—	Present	1	2	0	1	—	—	—	—	Present	36	20	3	0	—	—	—	—
Future	1	0	0	0	0	5	1	0	Future	0	0	0	0	0	1	2	0	Future	4	3	0	0	0	4	2	7
			(2;4)									(2;2)								(2;2)				
Past	1	0	0	0	0	1	7	4	Past	0	1	0	0	0	4	2	1	Past	2	4	0	0	0	3	4	3
Present	4	22	5	7	—	—	—	—	Present	1	25	2	4	—	—	—	—	Present	21	27	0	1	—	—	—	—
Future	4	2	0	1	0	4	8	5	Future	0	1	0	0	0	4	2	0	Future	0	9	0	0	0	4	2	10
			(2;5)									(2;3)								(2;3)				
Past	0	0	0	0	0	0	2	0	Past	3	2	0	4	0	5	17	16	Past	0	4	0	0	0	3	6	9
Present	5	7	1	1	—	—	—	—	Present	4	27	0	8	—	—	—	—	Present	15	11	0	0	—	—	—	—
Future	1	3	0	2	0	3	0	0	Future	0	0	0	0	0	5	2	3	Future	3	3	0	0	0	4	5	4

TABLE 4. *Type-token patterns*

		Tense and aspect				
		Past		Pr.	Future	
Child	Verb	Imp.	Perf.	Imp.	Imp.	Perf.
Marta (1;7–1;9)	Eat	√	√	√	—	√
	Phone	—	—	—	√	√
	Put	√	√	—	—	√
	Hide	—	√	√	—	√
Bartosz (1;7–1;9)	Do/Make	—	√	√	—	√
	Write	√	√	√	—	√
	Walk	—	√	√	—	√
	See	√	—	—	—	√
Paulina (1;9–1;11)	Go by car	√	—	√	—	√
	Do/Make	√	√	√	—	—
	Walk	—	—	√	—	√
	Buy	—	√	—	—	√
Kasia (2;0–2;3)	Draw	—	√	√	√	√
	Bathe	√	√	√	√	—
	Wash	—	√	√	√	√
	Lose	√	√	—	—	—
Kubuś (2;1–2;4)	Go by car	√	√	√	√	√
	Eat	√	√	√	—	—
	Throw	√	√	√	—	—
	Record	—	—	√	√	√
Wawrzon (2;2–2;5)	Turn on	—	√	√	—	√
	Eat	√	√	—	—	—
	Do/make	—	√	√	√	√
	Build	—	—	—	√	√

all of the tense–aspect combinations, the most frequent categories were: (*a*) past perfective achievement and accomplishment verb phrases, e.g. Marta (1;7), *przyjechał* '(He) came' and *otworzyła* '(she) opened'; (*b*) future perfective achievement and accomplishment verb phrases, e.g. Marta (1;7), *wyjmę* '(I) will take out' and *zamkną* '(They) will close'; and (*c*) present imperfective activity and state verb phrases, e.g. Marta (1;7), *skacze* '(He/She) is jumping' and *kocha* '(He/She) loves'. Finally, imperfective future forms were almost totally absent in the corpora of the younger children.

A second important finding is that contrasts in aspect emerge simultaneously with contrasts in tense. This fact is revealed most clearly in a type-token analysis. For any lexical type, there are as many as five potential tokens (excluding iterative forms), i.e. imperfective and perfective past and future and imperfective present. Table 4 contains the type-token patterns for four

lexical types for each of the six children. All of the children contrasted the imperfective with the perfective past, e.g. Marta (1;7–1;9), *wkładała/włożyła* 'was putting in/put in' and Paulina (1;9–1;11), *robiłam/zrobiła* 'was doing/did'. In addition, all of the older children produced the distinction between imperfective and perfective future, e.g. Kasia (2;0–2;3), *będę rysowała/narysuję* 'will be drawing/will draw'. The younger children had difficulty formulating the imperfective future, and they sometimes deleted the future form of *być* 'to be', e.g. Paulina (1;11), *skakał* (*będzie skakał*) '(he will be) jumping'. All of the children contrasted the imperfective present with the perfective future, e.g. Bartosz (1;7–1;9), *czytasz/przeczytam* 'are reading/will read' and Wawrzon (2;2–2;5), *idzie/pójdę* 'is walking/will walk'. The varied patterns produced by each child show that neither tense nor aspect morphology can be viewed as redundant information.

The temporal component

The resultant state requirement. Antinucci & Miller (1976) claimed that a resulting state at the time of the speech act is required for the use of past-tense morphology. While it is possible to find examples of situations which fit this prescription, counter-examples abound. Resulting states are present during the time interval of the speech act in discourse segments (DS) 1 and 2, but they are clearly absent in discourse segments 3 and 4. In the following discourse segments, all verbs will be coded for tense (past, present and future) and aspect (imperfective and perfective) and the speakers will be coded as follows: parent (or relative) P, child C, and experimenter E, with proper names in the context notes.

DS 1	C:	Zjadłem czekoladkę. '(I) ate [past perf.] chocolate.'	[*Wawrzon (2;2) and Hanna are looking at an empty box.*]
DS 2	C:	Takie kółko oderwałem. 'Such a wheel (I) tore off [past perf.].'	[*Kubuś (2;1) shows Ewa a broken toy.*]
DS 3	P:	A co panowie robili? 'And what were the men doing [past imp.]?'	[*Marta (1;7) is talking to her grandmother about a walk with her grandfather along the beach during a recent visit to the seaside.*]
	C:	Łowili. '(They) were catching [past imp.].'	
	P:	Łowili? Co łowili? 'Catching? What were (they) catching?'	
	C:	Rybki. 'Fish.'	

DS 4	C:	Bam zrobiłem. 'A fall (I) made [past perf.].'	[*Everyone is standing and Bartosz (1;8) comments on what happened 10 turns earlier in the conversation.*]

Even in the prototypical cases such as DS 1 and 2, the existence of present evidence for a prior telic situation does not exclude the possibility that the past reference is actually deictic. In DS 1 and 2, the children were probably commenting on a prior situation. If the children had been commenting on the resulting state, it is likely that they would have used the expression *nie ma* 'all gone/not have' plus the object plus the genitive case, e.g. *nie ma czekoladki* 'not have chocolate'. In contrast, children DO produce speech acts which contain the past tense but do not refer to an actual prior situation. Children make up stories, tell lies, hypothesize, and ask questions, but these uses of the past tense may very well show a greater awareness of deictic relationships than simple statements of fact, as discourse segments 5 and 6 demonstrate.

DS 5	C:	Zrobiłem. (I) did/made [past perf.].'	[*Father puts Bartosz (1;8) on the chamber pot. After a short while Bartosz stands up pretending that he is finished.*]
	P:	Co? C: Zrobiłem 'What? (I) did/made.'	
	E:	Nie, nie oszukuj! 'No, don't cheat [imperative, perf.].'	
DS 6	C:	Żarówki, przepaliły może. 'The bulbs, blew out [past perf.] perhaps.'	[*Wawrzon (2;4) is talking with his father about a radio which doesn't work.*]

Remoteness and spontaneity. We divided all past tense utterances into four categories. Distinctions were made between modelled and spontaneous and between immediate and moderately remote utterances. A verb phrase was considered to be modelled when the verb occurred in a different form in the preceding utterance of an adult, e.g. Mother, *Widziałeś już*? 'Did (you) just see?' Bartosz (1;7), *Widziałem*. '(I) saw.' When the child introduced the verb into a segment of the discourse it was defined as spontaneous (see DSs 1–6). A verb phrase was considered to be moderately remote if two turns in the conversation occurred between the speech act and the prior situation. DS 7 was moderately remote and modelled and DS 8 was moderately remote and spontaneous.

TABLE 5. *The percentage of past-tense verb phrases in four discourse contexts*

		Context			
	Child	IM	IS	MRM	MRS
Younger	Marta	7	45	6	42
	Bartosz	24	35	16	24
	Paulina	13	45	13	29
Older	Wawrzon	8	20	8	63
	Kubuś	4	32	12	51
	Kasia	6	16	5	73

DS 7	P:	Bartusiu, a ty spałeś już? 'Bartosz, and were you sleeping [past imp.]?'	[*Bartosz (1;7) took a nap about 1½ hours ago.*]
	C:	Spałem. '(I) was sleeping [past imp.].'	
DS 8	C:	Tatuś już wypił. 'Father just drank [past perf.].'	[*Wawrzon (2;2) and his father drank, and then there were three turns.*]

Table 5 contains the percentage of verb phrases in the four categories: immediate and modelled (IM), immediate and spontaneous (IS), moderately remote and modelled (MRM), and moderately remote and spontaneous (MRS). While it is possible that the verb phrases in all of these categories express deictic relations, the utterances expressing an MRS past reference are the most convincing. This category constitutes a reasonable proportion of the overall past forms. In the final analysis, the argument that tense expresses deictic relationships rests on the quality of individual examples. The individual DSs can be evaluated on the basis of the numbers of components of the past situation that the children relate. DSs 3, 4 and 8 contain spontaneous utterances which make a moderately remote reference. Yet DSs 3, 4 and 8 contain only a single proposition, i.e. 'They were catching fish', 'I made a fall', and 'Father just drank'. In contrast in DS 9, Kubuś (2;4) talked about eating sand, getting spanked, going home, and showing the result of his adventure. In DS 10, Wawrzon (2;2) recalled the turning brushes and sitting quietly in a closed car.

DS 9	C:	Ja zjadłem piasiek, wiesz? '(I) ate [past perf.] sand, (you) know [pres. imp.]?'	[*Father asks Kubuś to tell about his activities the day before.*]
	E:	Smakował ci?	

'Did it taste [past imp.]
good to you?'

C: Nie. P: Co było później?
'No. What was [past imp.]
there later?'

C: Tatuś mnie zbił, wiesz?
'Daddy me spanked [past perf.],
(you) know?'

E: A co było później?
'And what was there later?'

C: Pośłem do domu i pokazałem jak
buzia wygląda.
'(I) went [past perf.] home and
showed [past perf.] how mouth
looks [pres. imp.].'

DS 10 P: Kto mył samochód?
'Who was washing [past imp.]
the car?'

C: Tatuś.
P: W myjni.
'Daddy' 'In the car wash.'

C: Tam kręciły maszyny.
'There were revolving
[past imp.] machines.'

P: Szczotki się tam kręciły?
'Were brushes there revolving
[past imp.]?'

C: I zamykały, siedziałem,
zamknięty, pokojnie, w myjni
'And (they) closed [past imp.],
(I) was sitting [past imp.],
shut quietly in the car wash.'

[*Wawrzon (2;2) has just been talking about going to visit a friend, and grandmother tries to change the topic.*]

Future tense. With the future we not only have the temporal conceptual question of a deictic relationship, but we also have a linguistic information-processing problem with periphrastic forms. The imperfective future is formed by the concatenation of a unique future form of *być* 'to be', e.g. *będę* 'I will be', in contrast to *jestem* 'I am', and *byłem* 'I was', and either the infinitive or the third person singular past form of the main verb, e.g. *będę czytać/będę czytał* 'I will be reading'. The third person singular past form is inflected for gender, e.g. *on będzie czytał* 'he will be reading' versus *ona będzie czytała* 'she will be reading'. Hence, the helping verb is marked for tense and person and the main verb is marked for gender. Children have problems producing this form with the two required components and they

sometimes omit the helping verbs, e.g. Marta (1;7) *pisała* instead of *będzie pisała* 'she will write'.[3] This resembles the acquisition of perfect in German and progressive in English. Polish children have additional problems. They must locate the inflections for person with the proper form of *być* and the inflections for gender with the proper form of the main verb, and they must also use this periphrastic form only with imperfective verbs. In spite of all these problems, errors are not frequent.

The claim that young children cannot express deictic relationships, of course, applies just as much to the future tense as it does to the past. According to Stephany (1981), Modern Greek children 'do not yet differentiate between a deictic category to express posteriority to the speech event and a modal category, for what is expressed by the formal category aorist stem plus present inflectional ending are intentions, wishes or obligations' (p. 49). While Polish children (like Polish adults) use future forms to express present intentions, wishes, etc., they also express posteriority. There are at least four different ways in which children use the future. First of all, the future expresses present intentions, e.g. in DS 11, Wawrzon intends to hold the batteries. Secondly, children use the future to express a command like a subdued imperative, e.g. in DS 12, Marta describes what she wants her mother to do using the future tense. Thirdly, children use the future to code the predicted completion of a present action as shown in DS 13. Finally, children use the future to propose (or anticipate) a future situation, i.e. to express a deictic relationship as shown in DS 14 and 15.

DS 11	E:	Czekaj, nie, nie, nie! 'Wait [imperative, imp.] no, no, no!'	[*Wawrzon (2;3) takes the car and wants to 'repair' it. Kasia tries to stop him.*]
	C:	Będę trzymać baterie. '(I) will hold [fut. imp.] the batteries.'	
DS 12	C:	Mamusia wyjmie. 'Mother will take out [fut. perf.].'	[*Marta (1;7) wants her mother to take some pencils out of a box. Mother responds sarcastically to the subtle command.*]
	P:	Mamusia wyjmie, oczywiście. 'Mother will take (them) out, certainly.' Proszę bardzo. 'Here you are.'	
DS 13	C:	Uniesie. '(She) will lift [fut. perf.].'	[*Marta (1;7) is lifting up a box.*]

[3] In the classification of verb phrases in child Polish, one must be careful not to classify reduced imperfective future forms as past forms, e.g. Paulina (1;11) said *skakał* meaning *będzie skakał* '(he) will jump' not '(he) jumped'.

DS 14 P: Pomachamy mamusi.
'(We) will wave [fut. perf.] to mom.'
C: Pijdzie mamusia.
'Will come [fut. perf.] mother.'
E: Przyjdzie?
'(She) will come?'
P: Jest mamusia?
'Is mother there?'

[*Bartosz's (1;7) mother goes out of the apartment. Bartosz and his father go to the window to wave goodbye and Bartosz predicts that his mother will come out where she can be seen.*]

DS 15 C: Ja jestem za mały,
to ja nie umiem ciągnąć.
'I am [pres. imp.] too small so I am not able [pres. imp.] to pull [imp.].'
E: Aha, ja tak myślałam, właśnie.
'Oh, I thought [past imp.] so, of course.'
C: A jak ja urosnę
[fut. perf.] to będę ciągnął za sznur
aż będzie dzwonił dzwon.
'And when I will grow up (I) will pull [fut. imp.] the ropes, and will ring [fut. imp.] the bell.'

[*Relating to his recent visit to Sosnowiec, Wawrzon (2;8) says he saw a man pulling ropes to set bells in motion.*]

The first two categories are both modal, i.e. expressing intentions and commands. The third category relates to a future situation, but it is tied to the present. It is only the fourth category that contains the deictic future. We put all future references into three categories, modal (M), future termination (FT), and anticipated future (AF). The results of this classification are recorded in Table 6. While the modal usage was dominant, anticipated futures were consistently found. Like deictic past references, the quality of these future references also varied. The older children as well as the younger children made relatively brief references to the anticipated situations. In the next session with Wawrzon, which was outside of the scope of this paper, in DS 15 Wawrzon (2;8) put together a number of different ideas about a predicted situation. At this age level, DS 15 represents one of the infrequent examples of a high-quality future reference. The heavy modal usage and the limited quality of the anticipated future references indicate that the deictic

TABLE 6. *The percentage of future tense verb phrases in three categories*

Age	Child	Categories M	FT	AF
Younger	Marta	73	12	15
	Bartosz	75	18	7
	Paulina	73	9	18
Older	Wawrzon	88	4	8
	Kubuś	90	6	3
	Kasia	87	4	9

future is somewhat more difficult for children to represent than the deictic past.

In summary, the longitudinal component of the research provides evidence that early tensed utterances express a deictic relationship, i.e. tense is not defective. The following sources of evidence were revealed: (1) imperfective past activity verb phrases were found in the corpora of early tensed language, (2) imperfective verbs in the past tense were used to make reference to actual situations, (3) the children contrasted imperfective and perfective forms of the same verb, (4) the children produced telic verb phrases without the aid of observable resulting states, (5) the amount of moderately remote and spontaneous past references ranged from 24 to 73 per cent, and (6) from time to time the children expressed deictic future references. During the period from about 1;6 to 2;6 children clearly improve their ability to represent prior and subsequent situations. The younger children seem to be limited to a single comment on displaced situations. The older children can retrieve a representation from memory and relate a variety of facets of the prior situation. One of the older children was just beginning to examine anticipated future events in some detail at 2;8.

THE CROSS-SECTIONAL STUDY

This research project had two components employing very different methodologies. In our longitudinal design the method of investigation was naturalistic observation, and in our cross-sectional design the method was experimentation. Both methods have advantages and disadvantages. Since the naturalistic observations are unrestricted, children at any age can be observed, and the method is sensitive to the emergence of tense and aspect. However, there is practically no control over the situation. We have argued that infrequent use of imperfective activity verb phrases in the past tense does not mean that tense is defective or that children are conceptually limited. The behaviour is simply less likely than some other forms. This is, of course, an empirical question which can be tested with experimental techniques which

establish the obligatory context for specific verb forms. While stringent control can be achieved within the experimental situation, the procedures place non-linguistic requirements on the children. Children can fail a test because of a failure to attend, remember, respond as instructed, etc. In our preliminary investigations, we determined that the youngest group which could reliably cope with procedural requirements was about $2\frac{1}{2}$ years old.

METHOD

Subjects

Two groups of nine children with an average age of 2;6 (range 2;4 – 2;8) and 3;6 (range 3;4–3;11) were tested. All the children were tested and tape recorded in their home environment in Poznań. In addition to recording the experimental session, the children were also recorded for 45 minutes in natural caretaker–child interactions.

Procedure, design and stimulus materials

Past tense. There were two types of problems, past and future tense. In the past-tense problems, the experimenter acted out a sequence of two events with toys, e.g. problems 1 and 2 below. While acting out the two events, the experimenter described the action using verbs in the present tense. The experimenter then tried to elicit a description of the first event in the sequence. The experimenter asked, *co X robił/robiła najpierw*? 'What was the individual masculine/feminine doing first?' The verb *robił/robiła* 'was doing' in the question has the past imperfective form. One-half of the verb phrases in the first event in the sequence were activity verb phrases, e.g. problem 1, and one-half were telic verb phrases, e.g. problem 2.

Problem 1. Chłopiec biega po pokoju, potem kładzie się. 'The boy runs [pres. imp.] around the room, then he lies down [pres. imp.].'

Problem 2. Chłopiec łamie kij potem rozmawia z dziewczynką. 'The boy breaks [pres. imp.] the stick, then he talks [pres. imp.] with the girl.'

The experimenter used varied elicitation questions, but the verbs were imperfective in aspect and in the past tense. Hence the experimenter created both the linguistic and non-linguistic obligatory context for a past-tense response. This fact marks an important procedural difference between this and previous experiments by Bronckart & Sinclair (1973), Di Paolo & Smith (1973) and Harner (1981). All of these investigators used the neutral elicitation question, 'Tell me about X!' Thus the context which they provided was ambiguous. In our experiment we are not asking what children DO do in ambiguous contexts but what children CAN do in an explicit context.

Future tense. In the future-tense problems the experimenter acted out a sequence of events which led up to an anticipated event, e.g. problems 3 and 4. The events were described in the present tense. After acting out the

sequence of events, the experimenter asked the elicitation question, *co się stanie*? 'What will happen?' and then the children were persuaded to continue the action with the toys and to demonstrate for the experimenter what they said will happen. The verb in the question is in the future tense and perfective aspect. The perfective aspect was used because it conveys the meaning that the anticipated event will be completed. Hence the linguistic and non-linguistic context required a future-tense response. The procedure does not control the type of verb phrase which will be elicited, but some of the event sequences were designed to motivate activity verb phrases, e.g. problem 3, while others were more likely to produce telic verb phrases, e.g. problem 4. There were 12 past and 12 future tense problems, and all of the past tense problems were presented first followed by all of the future tense problems.

Problem 3. Pan wsiada do samochodu, zapala silnik a potem... 'The man gets [pres. imp.] into the car, starts [pres. imp.] the engine, and then...'

Problem 4. Chłopiec i dziewczynka ciągną spodnie, każde w swoją stronę aż... 'The boy and the girl pull [pres. imp.] the pants each in their own direction until...'

RESULTS AND DISCUSSION

General findings

The past-tense problems produced either present- or past-tense responses, and the past-tense responses could be divided into three categories: reference to event 1, event 2 or a related event. Given the problem, *Pani idzie na spacer potem znajduje psa* 'The lady goes for a walk then finds a dog', the children either gave answers related to the first event, e.g. *szła, poszła* or *chodziła* 'She walked/was walking', or they referred to the second event, e.g. *znalazła psa* 'She found the dog', or the children introduced a related verb, e.g. *goniła psa* 'She chased the dog' or *kochała psa* 'She loved the dog'. In the first analysis, all verbs with past-tense inflections were counted. The responses to the future-tense problems were simply classified as future or non-future.

The mean percentage of correct responses (past or future) was as follows: (1) $2\frac{1}{2}$ years, 92 % past and 66 % future, and (2) $3\frac{1}{2}$ years, 99 % past and 83 % future. The mixed 2×2 design was evaluated with the analysis of variance. The older children were not significantly more proficient than the younger children ($F = 2{\cdot}06$; d.f. 1, 16; $P > 0{\cdot}10$). The future-tense problems were more difficult ($F = 13{\cdot}9$; d.f. 1, 16; $P < 0{\cdot}01$).

The relatively poor performance of the $2\frac{1}{2}$-year-old group on the future-tense problems was due entirely to two children. One child failed all 12 problems and the other child failed 9 problems. Both children made legitimate errors and used present or past forms, but more than half of the failures occurred when the children said only the word *bam* 'a fall or crash'. Since both of these

children (e.g. see Agatka in Table 8) used the future forms freely in the natural setting, part of the problem can be attributed to a failure to understand or to co-operate with the task requirements. On the other hand, the longitudinal data indicated that the deictic future usage is not frequent, and the capacity to formulate a future prediction is probably still developing at $2\frac{1}{2}$ years.

In the most relevant experiment for comparison, Harner (1981) found that 3-year-old children learning English chose to shift to the past tense on 50% of the past problems and shifted to the future tense on about 60% of the future problems. Since Harner did not present the obligatory context for past or future tense, her experiment demonstrates the preference of children for tense shifting, not the capacity.

Past tense problems

Semantic component. For half of the problems, the verb describing the first event in the sequences was an activity verb phrase, e.g. swimming in a pool, dancing, running around a room, etc.; in the other half of the problems the initial verb phrase in the sequence was a telic verb phrase, e.g. spilling the water, breaking a stick, building a bridge, etc. When the problem contained a telic verb phrase, the product of the event, e.g. the broken stick, remained in the situation when the elicitation question was presented. In contrast, the activities left no trace which could be found during the temporal interval of the child's responding speech act. Hence problems with telic verb phrases provide the conditions under which Antinucci & Miller (1976) argued that tense-like morphology can be used to code an aspectual distinction which is resultative in nature. Since these conditions do not obtain for problems with activity verb phrases, these problems should make it difficult if not impossible for the children to meet the obligatory contexts of the elicitation question. Those who claim that tensed utterances do not express deictic relations at two years must at least predict difficulty with activity verb phrase problems at $2\frac{1}{2}$ years.

In this analysis, the children were given credit only for past-tense responses which referred back to the initial event in the sequence. The average percentage of past-tense initial responses was as follows: (1) $2\frac{1}{2}$-year-old group, activity 70% and telic 57%, and (2) $3\frac{1}{2}$-year-old group, activity 94% and telic 91%. Thus the semantic component of the defective-tense hypothesis received no support.

Syntactic component. If tense morphology is redundant, the expectation is that children will use only perfective past forms. The elicitation questions were formulated in the imperfective aspect in order to encourage imperfective verbs in the responses of the children. On average, the $2\frac{1}{2}$-year-old group produced 84% imperfective verbs and the $3\frac{1}{2}$-year-old group produced 91%. The high percentage of imperfective verbs was somewhat surprising. The experimental situation was unusual in the telic verb phrase problems. The

TABLE 7. *The average number of verb phrases within a 45-minute caretaker–child interaction*

Average age	Tense	Imperfective				Perfective			
		St	Act	Ach	Acc	St	Act	Ach	Acc
					Longitudinal				
1;8	Past	0·8	1·6	0	0·4	0	1·7	3·5	4·4
	Present	12·9	18·2	0·3	1·1	—	—	—	—
	Future	0·2	0·2	0	0·1	0	2·8	2·9	3·4
2;2	Past	1·9	2·2	0·2	0·5	0·2	2·1	7·9	5·2
	Present	11·0	17·2	1·7	2·2	—	—	—	—
	Future	1·5	2·2	0	0·2	0	4·0	2·5	4·2
					Cross-sectional				
2;6	Past	3·8	5·4	0·1	0·9	0	1·2	4·6	5·0
	Present	16·7	25·1	2·6	6	—	—	—	—
	Future	3·3	2·3	0	0·8	0·1	3·3	4·3	6·9
3;6	Past	5·2	11·0	0·6	0·8	0·1	1·3	6·7	6·0
	Present	15·6	13·7	1·4	1·6	—	—	—	—
	Future	2·0	1·0	0	0·2	0	2·2	3·7	4·2

situation was completed when the test question was asked, yet the questioning verb was imperfective in aspect. Aspect in the linguistic context had more control over the form of the reply than the aspectual properties of the situation.

Two points can be added to the general findings regarding future tense problems. The verb in the elicitation question was perfective in form, and the majority of responses contained perfective verbs, i.e. $2\frac{1}{2}$ years, 87% and $3\frac{1}{2}$ years, 91%. Secondly, most of the verb phrases were telic verb phrases with only 23% and 10% activity verb phrases in the $2\frac{1}{2}$-and $3\frac{1}{2}$-year-old groups, respectively.

Naturalistic observations

Each child in the cross-sectional phase of the research was tape-recorded once for 45 minutes in a normal caretaker–child interaction. The verb phrases found in these corpora were classified in the manner described earlier in the longitudinal phase of the research. The average number of verb phrases in the four categories St, Act, Ach and Acc is shown in Table 7 for all combinations of tense and aspect. Table 7 has the same format as Tables 2 and 3 except that the entries are averages not frequencies. For the cross-sectional data, the values that occur in each cell of Table 7 were found simply by averaging over one score for each of the nine children. For the purpose of comparison, a related measure was obtained from the longitudinal data. In the longitudinal phase, there were four 45-minute interactions for each

TABLE 8. *The percentage of different verbs used in the four verb phrase classifications*

Child	Tense	Imperfective				Perfective			
		St	Act	Ach	Acc	St	Act	Ach	Acc
					Longitudinal				
Marta (1;8)	Past	0	7	0	3	0	7	10	7
	Present	16	20	0	10	—	—	—	—
	Future	0	3	0	0	0	7	3	7
Wawrzon (2;2)	Past	2	6	0	2	0	2	12	10
	Present	10	24	4	2	—	—	—	—
	Future	0	2	0	0	0	2	6	16
					Cross-sectional				
Agatka (2;8)	Past	2	11	0	0	0	2	11	6
	Present	9	22	6	3	—	—	—	—
	Future	2	2	0	2	0	3	9	9
Agnieszka (3;8)	Past	4	16	0	0	0	0	10	14
	Present	6	22	2	2	—	—	—	—
	Future	2	6	0	0	0	2	6	8

child. The scores found in Table 7 are averages over four scores for each child and over three children. The younger and the older children were identified in Table 7 by the average age during the observation period.

The basic trend was the same in all of the data. The high-frequency categories were past and future perfective telic verb phrases and present imperfective state and activity verb phrases. The number of imperfective activity verb phrases used in the past tense increased steadily with age. This type of verb phrase became just as common as past perfective telic verb phrases by 2;6.

The frequency data presented in Tables 2, 3 and 7 most directly reflect the children's behaviour. However, frequency data could distort the overall picture if some of the categories contained the high-frequency usage of only a few verbs. To ensure that the pattern shown in Table 7 was indeed representative, we found the number of different verbs that the children produced in each verb phrase category for all possible combinations of tense and aspect. The number of different verbs produced was then converted to percentages in order to obtain a relative measure. Table 8 contains the single most representative session from one of the younger and from one of the older children in the longitudinal component of the study, and it contains the data from the two most representative children from the 2;6 and 3;6 groups in the cross-sectional component. Table 8 demonstrates the same basic pattern seen in Table 7, and we conclude that the frequency data present an accurate picture. Table 8 is important because it demonstrates that there was reasonable productivity in all of the key categories.

GENERAL DISCUSSION

Sensorimotor development

Previous investigators of tense and aspect have tried to relate their work to Piaget's observations of conceptual development. Curiously, researchers arriving at very different estimates of the emergence of tensed language (Antinucci & Miller 1976, Bronckart & Sinclair 1973) find their results equally compatible with Piaget's findings. Part of the problem is that the critical developmental period for the acquisition of tense and aspect is between about $1\frac{1}{2}$–2 and $3\frac{1}{2}$–4 years of age, but this early period of pre-operational development received the least attention from Piaget. Furthermore, the concept of time was the most difficult one to evaluate during the earlier sensorimotor period of development. As Flavell (1963) points out, 'Usually willing to risk a fair amount of ambiguity and shaky conjecture in most areas which he studies, [Piaget] seems ready to tolerate even more here in an effort to gain some rudimentary understanding of how temporal phenomena are cognized in infancy' (p. 147). In spite of the ambiguity, the intersection of Piaget's analysis of the conceptual development of objects, space, time and causality produced a reasonable picture of temporal conceptual development. We can conclude from Piaget's work that during the sensorimotor period children acquire the capacity to recall prior events and to anticipate future events, and the capacity to recall prior events becomes steadily more remote as children enter the final stage of sensorimotor development. During the pre-operational period, children acquire the capacity to represent temporal concepts symbolically, and language is an important component of the overall symbolic function. Hence we can learn from Piaget that children are conceptually ready to express deictic relationships during the early phases of language acquisition, but we cannot determine how that acquisition process will unfold. We would not want to leave the impression that Piaget's contribution to this issue is trivial. Piaget's work demonstrates that pre-operational children (from $1\frac{1}{2}$–2 years on) do NOT lack an abstract concept of time. It is our problem to determine how linguistic representations of conceptually abstract thought are constructed.

Aspectual distinctions

According to the DT hypothesis, tense-like morphology does not code deictic relations. We cannot find any support for this idea in child Polish. On the other hand, the distinction between imperfective and perfective aspect appears to be primitive in child Polish, i.e. we cannot find any error. Children do not use the perfective aspect to make reference to situations which are not completed. While the imperfective is neutral for the adult, it appears to be more limited for the child. In the natural setting, it is difficult to find any clear example of children referring to a completed situation with the imperfective

aspect. However, in the experimental setting children did use imperfective forms to refer to completed situations while under the influence of imperfective test questions. Children represent the imperfective/perfective aspectual distinction at the same time as they represent tense distinctions. If this was not the case, i.e. if tense preceded the imperfective versus perfective distinction, there would be nothing to stop children from using perfective forms with non-past inflections to refer to ongoing activity, or imperfective forms with non-past inflections to refer to future situations. These errors DO NOT occur at all. We have found failures to match the tense used by adults, e.g. Kasia: *Już się ukłułeś*? 'Have you already pricked [past perf.] yourself?' Wawrzon (2;2): *Nie kłuje* 'I am not pricking [pres. imp.]', but this kind of mismatch is a plausible reply and not an aspectual error.

The aspectual distinction which is primitive in Polish is the distinction between perfective and imperfective. Polish also has an iterative aspect, but there is very little evidence for the iterative aspect during the formation of tense distinctions. The point is that not just any aspectual distinction is primitive. Many properties of situations are coded in languages by aspect. Along a dimension which might be called completion, a language may code prospectiveness (about to occur), ingressiveness (beginning), progressiveness (ongoing), terminativeness (ending), resultativeness (consequence), etc. Some languages code frequency of occurrence, e.g. semelfactive (occurs once), and others duration of actions, etc. What properties do children code first? Aksu (1978) has proposed that 'the opposition between punctual and durational events' (p. 201) may be the earliest distinction made in Turkish. The durative versus non-durative distinction is not the basic opposition in child Polish. It may be more accurate to propose that children can take different perspectives. They can view situations internally and externally. When a situation is viewed internally, features like incomplete, durative, and continuous are salient and when viewing the situation externally, the salient features are completed, punctual, and discontinuous. Depending on the language a child is learning, one or more of these feature oppositions will characterize the fundamental aspectual distinction. In Polish, the perfective versus imperfective distinction is transparent in the morphology and children can readily process the relevant affixes (Weist, 1983).

Tense distinctions

The semantic argument. When children begin to use the tense morphology of their language productively, they produce activity verb phrases in the past tense at least in the following: (*a*) Slavic languages: Polish (Smoczyńska 1978), Serbo-Croat (Radulović 1975), and Russian (Gvozdev 1961); (*b*) Spanish (Eisenberg, in prep.); (*c*) Modern Greek (Stephany 1981); (*d*) Japanese (Rispoli 1981); and (*e*) Finnish (Toivainen 1980). When children learning Mandarin begin to use the *le* particle at 1;10 to code 'bounded events', they use the perfective inflection with activity verbs as well as telic

verbs (Erbaugh 1982). It is difficult to explain why children learning Italian (and possibly English) avoid past-tense inflections when commenting on prior activities. It is not because Italian children lack an abstract concept of time. Antinucci & Miller (1976) themselves noted that Italian children do make reference to prior activities, but in doing so 'they tend to mention only the participants in the event and do not use a verbal form at all' (p. 174, fn. 3). Furthermore, Ruth Miller (personal communication) has pointed out to us that Italian children can and do make reference to prior telic situations without the speech time evidence of a resulting state,[4] e.g. Claudia (1;10): *La signora ha chiusa la porta* 'The woman closed the door' [Claudia was making reference to the previous day] and Massimo (2;2) *Papa comprati tanti gioccatoli* 'Papa brought many toys (for Massimo)' [Massimo was referring to a time when he had been sick].

The syntactic argument. When children learning Slavic languages shift to the past tense, they use both imperfective and perfective verbs. The only conflicting data come from a non-Slavic language and were reported by Stephany (1981) in her study of Modern Greek. While Stephany did not find imperfective past forms during the initial period of tense shifting, Dimitra Kontou (personal communication) has found imperfective past forms in a similarly early phase of morphological development; e.g. John (2;2), *évepa* (= *évlepa*) *tieóasi* '(I) was watching [past imp.] T.V.' [*John answered his mother's question 'What were you doing, John?'*], or *étexé* (= *etreχe*) *to páko* '(She) was running [past imp.] into the park' [*An answer to the question 'What was Helen doing?'*]. Furthermore, Stephany (in prep.) has observed the deictic use of past tense during the period which was void of imperfective past forms. Stephany found that children reported a completed situation and then made reference to the event that preceded the completed situation. At about 1;8, for example, Spiros reported that the tape recorder was broken, and then he made the following comment on the event which led up to the broken tape recorder; *fónatse* (= *fónakse*) 'It yelled [past perf.].' Here Spiros was referring to the fact that he had caused a loud noise. Hence, there is evidence from Modern Greek that tense is NOT defective even when the full range of aspectual forms have not yet been observed in the evolving tense–aspect system.

CONCLUSIONS

The aspectual distinction between imperfective and perfective aspect and the deictic relationship between present and past tense evolve simultaneously in child Polish. A modal form of future and possibly a deictic future emerge at

[4] However, Ruth Miller maintains that at this stage children can conceptualize 'a concrete effectual relationship between a resultant state and a past process', and they can build upon this necessarily asymmetrical relationship to encode a deictic tense relationship.

a similar point in development. We estimate that children acquiring Polish break out of their earlier (here and) NOW communication system between 1;6 and 2;0. The capacity to represent prior and subsequent events in their language develops rapidly but gradually. During the early period of tensed language, references to prior experiences typically involve a single proposition. During the period from about 1;6 to 2;6, children improve upon their descriptions of displaced situations. Between 2;0 and 2;6, the children are capable of recalling a prior event and holding the event in memory while they talk about different components of the event. The capacity to produce multi-propositional descriptions of subsequent events develops more slowly, and we found no example of this type of description before 2;6. From the outset, children make reference to the full spectrum of prior and subsequent situations including static as well as dynamic, activity (atelic) as well as telic, and achievement as well as accomplishment.

Assuming that a full temporal system requires the coordination of three times – speech time, reference time and event time – we agree with Smith (1980) that the child's initial tense system is limited to speech time and event time. Reference time is always established at speech time. Adults use temporal adverbs, e.g. *tomorrow* or *yesterday*, and adverbial clauses, e.g. *when I lived in Poland* etc., to establish reference time at a point which differs from speech time, and then adults relate event time to the reference time. As Smith has correctly argued, for young children the point of orientation is 'fixed' at speech time. In child Polish, the period of limitation extends through the first year of tensed language from about 1;6 to 2;6.

Based primarily on Cromer's (1968) analysis of two children learning English, Smith estimated that reference time emerges as an independent concept at about 4;6. In fact there is considerable evidence that reference time is a productive component of child language about two years earlier. Children begin to use temporal adverbs such as *yesterday* and *tomorrow* between 2;6 and 3;0 in a variety of languages including: (*a*) Italian at 3;0 and Spanish at 2;6 (Clark, in press), (*b*) Polish at 2;8 (Weist 1982), and (*c*) Mandarin at 2;8 (Erbaugh, personal communication). Temporal adverbs often do NOT emerge without errors. From 2;6 to 2;8, Wawrzon used *jutro* 'tomorrow' and *wczoraj* 'yesterday' to mean past time (maybe yesterday) and *w poniedziałek* 'on Monday' to refer to non-present time. This kind of behaviour is typical of the initial use of temporal adverbs. Clancy, Jacobsen & Silva (1976) have shown that *when* temporal clauses are found in English, German, Italian and Turkish between 2;8 and 3;4. In Polish, *jak* meaning 'when' adverbial clauses emerge at a similar point in time, e.g. DS 15 above. When reference time becomes part of the child's temporal system, reference time provides a context and event time always occurs within this context. Children do not use temporal prepositions such as *before* and *after* at this point in their development. Most of the research

has concerned the acquisition of *before* and *after* as subordinate conjunctions, but there is some evidence that *before* and *after* are produced (Clark 1970) and understood (Coker 1978) as prepositions between about 4;0 and 4;6. Hence we can identify a sequence of stages in the evolution of the reference time concept. When event time emerges as an independent concept from speech time, reference time remains frozen at speech time. When reference time becomes independent of speech time, event time is always located at reference time. Finally, at about 4;0 to 4;6 speech time, event time and reference time are related as independent concepts in a wide range of temporal configurations.

Within the scope of the present research, we have concentrated on the initial tense system. We have argued that while the initial system may be limited in the sense that Smith (1980) described, it is not defective as Antinucci & Miller (1976) proposed. Our findings have important implications for conceptual development. The emergence of deictic relations in language during this early period confirms Piaget's argument that children are conceptually ready to think about prior and subsequent situations as they reach the end of the sensorimotor period of development. The speed at which this conceptual breakthrough is reflected in a tensed child language will depend on how tense is coded in the morphology of the language. In English, for example, past tense is typically found a few months later than it is in Polish (see Fletcher 1979, 1981). Grammars of the early phases of child language (see Brown 1973) have typically omitted an analysis of tense and aspect. In the future, tense, aspect and other properties such as mood will have to be incorporated into any universally relevant grammar of child language.

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