

METHODOLOGICAL ISSUES  
OF TESTING LANGUAGE ATTRITION IN CHILDREN  
IN A NATURAL BILINGUAL ENVIRONMENT

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1. Introduction

Population movements between communities speaking different languages lead to the creation of multilingual groups in which people have varying degrees of command of two, sometimes more languages – that of their home culture and that of the host culture or cultures. Members of such communities are often exposed to the influence of larger groups of native speakers of the dominant culture and language. Under these conditions it is only to be expected that they undergo what is known as *language shift*, i.e. a change in either their main language or the dominant language or the language of one or more domains – contextualised spheres of communication – such as home, work, school, church (Clyne 1991: 54).

The shift from the first dominant language (L1) to the second or third language (for simplicity's sake we will call it L2) as the dominant language may be accompanied by a gradual loss of communicative ability in L1. This phenomenon, which is often called *language attrition* has been studied quite intensively since the fifties (cf. e.g., Haugen 1950 and 1953, Weinreich 1953, Burling 1959, Murrell 1966, Arnberg 1981, Grosjean 1982, Sharwood Smith 1983 and 1989, Meisel 1987 and 1995, Saunders 1988, Seliger 1989 and 1991, Sharwood Smith and van Buren 1991, de Bot and Weltens 1991, Olshtain and Barzilay 1991, Kaufman and Aronoff 1991, Turian and Altenberg 1991).

It is interesting to note here that language loss is also known as *aphasia* and has been studied for a much longer period of time than language attrition. The distinction between language attrition and aphasia may be defined in terms of effects as follows: aphasia is "(...) a handicap of language comprehension and/or production caused by specific brain damage." (Crystal 1987: 270), i.e., it is an ailment manifesting itself in partial or full loss of language communication ability, while language attrition is a phenomenon of partial or full loss of the ability to communicate in one

language accompanied by a corresponding gain of such ability in another language. This is a working definition, which does not claim to be very accurate, but it emphasises those elements of the distinction between the two concepts, which we need to be aware of for the purpose of the present paper.

The process of planning and carrying out an experimental study is, basically, a decision making process and, by its nature, involves reversible and irreversible decisions, which influence the general relevance of the project. In this process, decisions relating to data collection and storage tend to be irreversible, whereas decisions relating to data analysis are reversible in the sense that once data have been collected and properly stored, the experimenter as well as other scholars can repeatedly apply quite diversified methods of analysis to the same set of data over a long period of time.

Caution should always be exercised when taking irreversible decisions, but it is especially important in longitudinal projects involving small numbers of young subjects, which is the situation in the area of language attrition studies in children, where all projects so far have been restricted, similarly to the study I am currently conducting at Macquarie University, to one, two, or three children at a time (Kaufman and Aronoff 1991: 1 child from age 2;6 to 4;6, Turian and Altenberg 1991: 1 child from age 3;0 to 4;4, Meisel 1987: 2 children from age 1;0 to 4;0 – good overviews of language attrition studies can be found in Lambert and Freed 1982, and in Seliger and Vago 1991). The main reason for small numbers of subjects involved in longitudinal projects is practical: it is virtually impossible to secure long term access to, and regular testing of, a large group of children brought up in bilingual environments and researchers are often confined to using their own or friends' children as subjects. It follows that one does not usually get an opportunity to repeat such studies.

The paper examines some of the factors influencing irreversible methodological decisions facing researchers in longitudinal studies of language attrition on the example of our own project currently in progress: the question of choice of subjects for a project, the time and manner of assessing language competence, collection of data in one or both languages involved in the process, choice of interviewers for oral tests, storage of data, and relevance of data from periodic rather than continuous testing. Finally, language attrition studies involve analyses of gains, or acquisition, and losses, or attrition in two languages, which raises a number of methodological questions at all levels of analysis. The last section of the paper discusses some problems facing a researcher attempting to compare the acquisition and attrition of lexicons in English and in Polish.

## 2. Assessment of the level of language competence before the onset of attrition

Before we can say that something has been lost, we must be sure that it was there in the first place. It is for this reason that all language attrition studies should begin by determining the level of language competence of the subjects before the onset of attrition. Although this seems to be a fairly trivial statement of the obvious, it must be said that many language attrition studies are based on testing the language under-

going attrition only, done when the process is already well under way (e.g., Weinreich 1953 and Haugen 1950 and 1953). The problem with such studies is that, while they do show what elements are missing from L1 at the time of testing, the assumption that they had been acquired and then lost is a strong one only in case of adult subjects who came under the influence of another dominant language after fully acquiring L1 in their native country. Consequently, the level of competence in their native tongue before the onset of attrition can be determined by referring to the results of studies on monolingual L1 speakers of the same age, education and social status.

Such an assumption would be much weaker in case of children who came under the influence of a dominant L2 during school age, although their placing in a specific year at primary or secondary school immediately before coming under the influence of a dominant L2 does reflect to some extent their general level of achievement in L1 and, again, data from monolingual children can be used for comparison.

By contrast, assumptions about the level of L1 competence would be very weak in case of children who came under the influence of a dominant L2 in pre-school age, even if they spent the first few years of their life in the country where L1 is spoken as native. This is so, because children at this age are known to acquire L1 at differing pace and, what is true for one child, may be quite false for another. Finally, such an assumption cannot be made about children born in the country where L2 is spoken as native, since their L1 acquisition is based on limited use by the parents and siblings at home and L1 speaking friends in selected environments.

As I said above, the level of L1 competence prior to the onset of attrition can be safely determined without a test only in case of persons who have fully acquired that language prior to the onset of language attrition, i.e., adults. All that is necessary in their case is a detailed questionnaire like that developed by Paradis (1987) to establish the linguistic history of a bilingual and reference to the results of existing studies in the country where L1 is used as the native tongue.

For all other subjects of longitudinal qualitative studies this procedure, although it may be helpful in explaining the results, is not sufficient and a test of L1 competence before consistent exposure to L2 must be done – otherwise we will not be able to assess what has been lost during the testing period. In practical terms this means that only subjects whose L1 competence has been tested just before first consistent exposure to dominant L2 should qualify for longitudinal projects in language attrition. Qualitative longitudinal projects, where minor deficiencies in data from individual subjects cannot be corrected by large numbers and statistical analysis should not even attempt to spend a large amount of time and effort on subjects whose L1 competence at the outset is not known accurately.

## 3. Data from one or two languages?

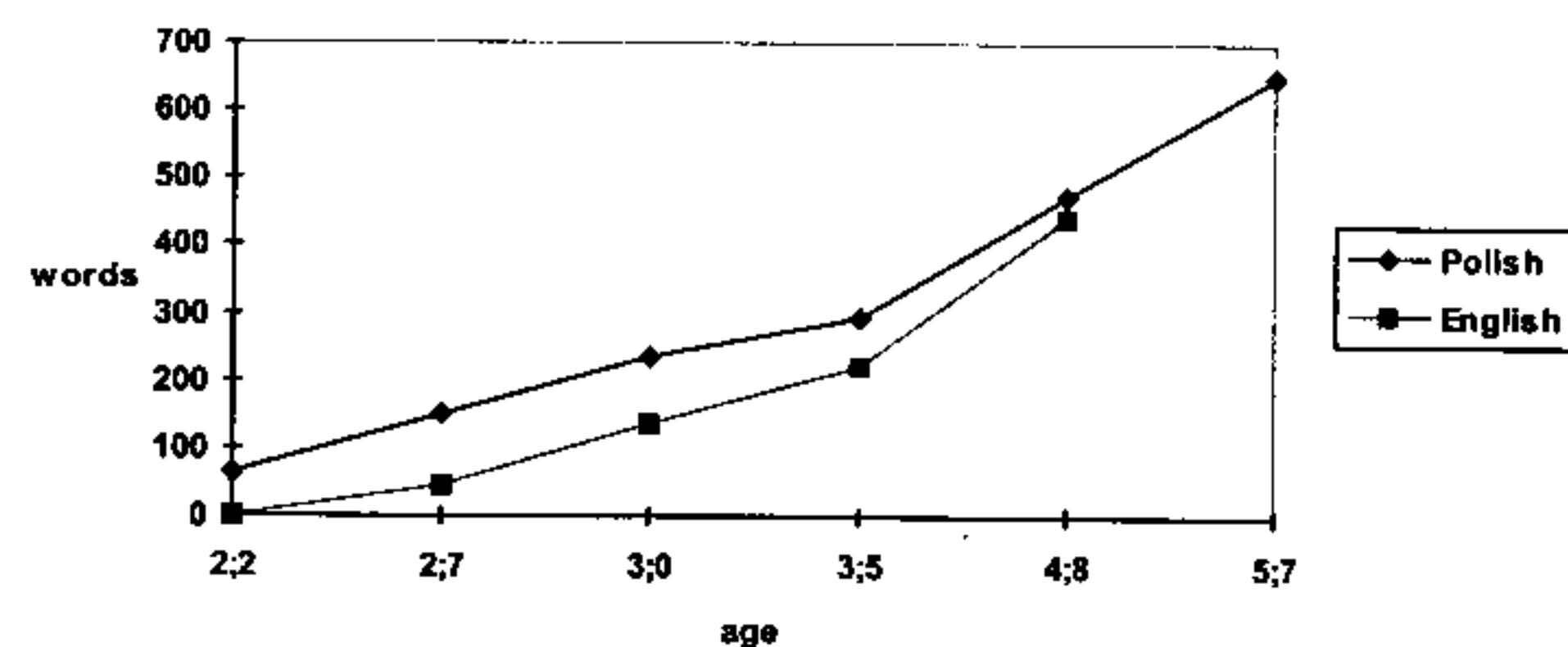
The second important question is whether, once we have selected our subjects and assessed their initial level of L1 competence, we should be testing both languages or only the language undergoing attrition.

I believe that, if we assume our working definition of the difference between language attrition and aphasia to be correct, a very strong case can be made for testing the development (or attrition) of both languages involved in all subjects and in all types of experiments, whether cross-sectional, or longitudinal.

In order to explain this, let us look at two examples. First, let us assume that, like in Weinreich's (1953) study, an elderly immigrant is tested in L1 and found to be unable to use a number of simple lexical and grammatical forms in a conversation about his job, forms, which he would definitely have been able to use at the time of leaving his native country as a young adult. The forms have obviously been lost, but are we dealing with the case of language attrition, or aphasia? In other words, has our subject totally lost the capacity to talk about his job or, has he only lost the capacity to talk about it in his L1, but retained it in L2? In the first case, we are dealing with aphasia, in the second case – with language attrition, since loss in L1 is accompanied by a gain in L2. It follows that, in order to classify the observed phenomenon properly as a case of aphasia or language attrition, we must administer to our subject a test of the same content in both L1 and L2.

Secondly, a full set of data from L1 and L2 may be very useful in explaining the course of development or losses in L1. This can be illustrated well by looking at the overall results of acquisition of Polish (L1) and English (L2) vocabulary and in the acquisition of Polish and English nouns in one of the girls participating in our project. Zuza is the youngest in the group of our subjects and was only 2;2 when the first Polish test was carried out. She was mainly exposed to L1 at that time – it was the dominant communication tool in the home environment both with her parents and her brother. Her total Polish lexicon used during the interview was 62 words, including 34 nouns, i.e. 54.85% of the total. Her English was so limited to a few basic words that it could not be tested.

GRAPH 1 - ZUZA'S OVERALL LEXICAL DEVELOPMENT



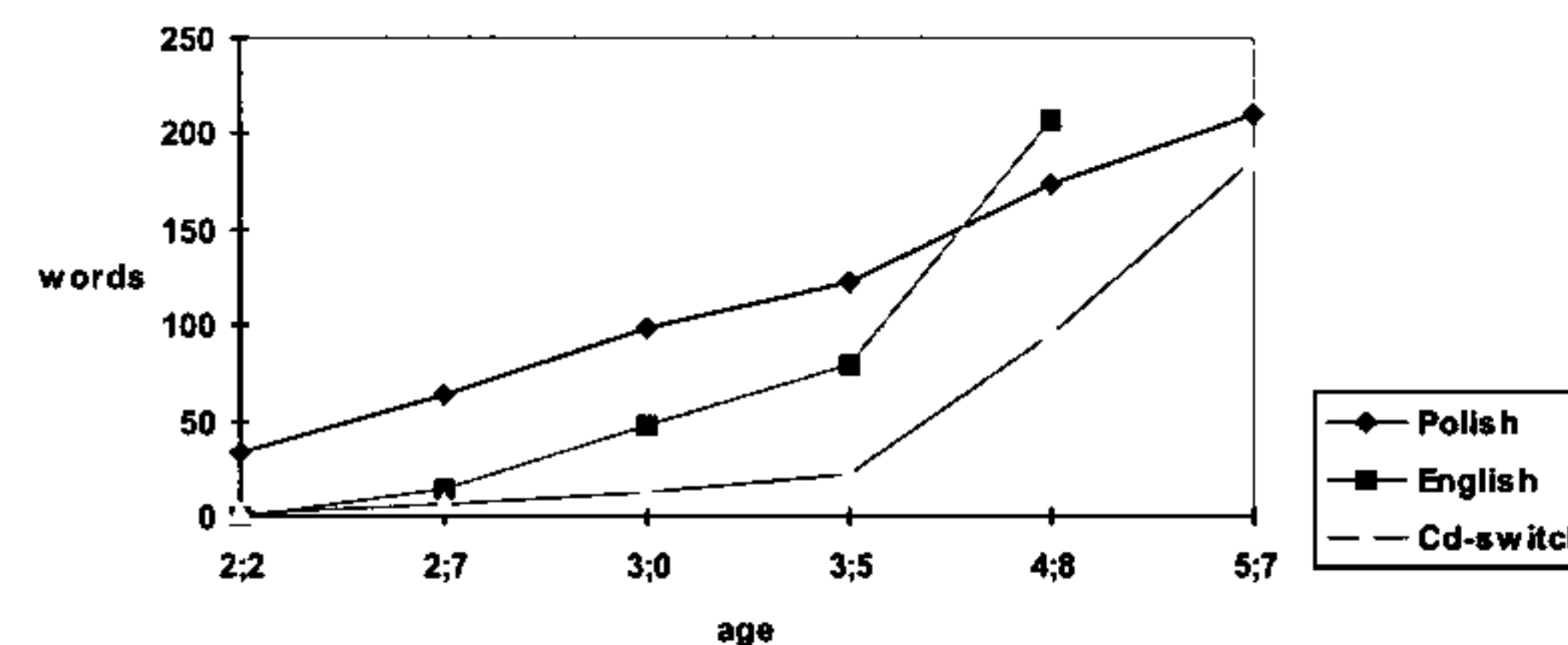
Graph 1. Zuza's overall lexical development.

Graph 1 shows a general summary of Zuza's acquisition of Polish and English lexicons, graph 2 shows the acquisition of Polish and English nouns and, additionally, growth of code-switches to English in Polish utterances. The course of vocabulary acquisition in both languages corresponds well to the amount of exposure to in-

put in the two languages. From age 2;2 to 5;7 Zuza's Polish vocabulary develops steadily thanks to regular exposure to the language at home and in contacts with other Polish speakers. Her English lexicon, which is almost non-existent at age 2;2 due to lack of exposure, begins to grow in a decisive manner soon after the second interview, at about the age 2;9 after the arrival of her English grandmother, and due to growing exposure to English TV programs and gradual increase in contacts with English speaking peers. The development of the English lexicon speeds up at the age 3;5 and develops quicker than the Polish lexicon thanks to another long visit by the English speaking grandmother and regular contact with English speaking peers in a child care centre (4 times a week for 8 hours a day) so that at the age of 4;8 her English lexicon is at almost the same level as Polish. The data from the last English interview have not been properly processed yet, but we already know that the trends continue, so that her English lexicon is now probably larger than her Polish lexicon.

Graph 2, showing Zuza's acquisition of nouns in Polish and in English and increased instances of code-switches demonstrates that the type of input will influence the composition of the lexicon. Zuza's exposure to Polish was restricted to the domain of home and Polish speaking friends, as well as bed-time stories read to her by the parents. Her exposure to English, once it became consistent at about the age of 2;9, was much more diversified, especially during the period between the three last interviews (i.e. ages 3;5 and 5;7). The acquisition of nouns, which usually form 50% or over of monolingual children's lexicons at that age (cf. Zarębina 1968), illustrates well the effect of this. When exposure was limited to the same domains as Polish, the development of the English lexicon proceeded at a similar pace in the two languages, the number of the English nouns lagging behind due to a shorter overall exposure. However, as soon as Zuza begins regular attendance in a child care centre, where she is exposed to a much larger variety of activities and stimuli than home can possibly provide, her English nouns count rises quite dramatically and goes well beyond her Polish repertoire in both raw figures and percentages.

GRAPH 2 - ZUZA'S NOUNS AND CODE-SWITCH COUNT



Graph 2. Zuza's noun and code switch count.

It is also interesting to note that, at the time of her sixth interview (5;7), the drop in the pace of acquisition of Polish nouns is accompanied by a dramatic increase in instances of code-switching, i.e. use of words derived from L2, which constitute 28.88% of her L1 totals. A lot of everyday expressions and concrete nouns representations of the outside world are expressed in L2: swimmers, flippers, bucket, spade, pram, horsie, or showing some interesting L1 – L2 combinations: listbox. In other words, Zuza used the same proportion of approximately 45-50% of nouns in her L1 utterances, only many of them were no longer Polish words, only L2 derivatives. When Zuza had a problem expressing herself in Polish due to lack of a lexical item, she freely resorted to code-switching. We have not processed the data fully yet, but it seems that the process of L1 vocabulary attrition is already under way.

In conclusion it may be said that, had we tested Zuza in Polish alone, a lot of valuable information would have been lost and we would not have been able to make as many predictions or hypotheses on the basis of the data as we have (cf. Ronowicz and Poros forthcoming) and some of the statements would have had much lower validity.

#### 4. Testing language competence during bilingual acquisition and/or language attrition

There is no doubt that the ideal method of testing processes of language acquisition and attrition is that applied in Brown's (1973) study of L1 acquisition, i.e. almost continuous recording of every child's linguistic behaviour. This is, however, not often possible for the same reasons that it is difficult to secure larger groups of subjects for longitudinal projects. Instead, many researchers resort to repeated testing of the same subjects over a long period of time. Since this manner of testing limits the time of the subjects' recorded performance and, consequently, the size and content of language samples that can be obtained, great care should be taken to obtain reliable and valid data by planning the timing, form and content of each interview. This should be done in a way that will not visibly interfere with the natural course of communication during interviews, but some degree of control is unavoidable if we are to secure meaningful data. The controlled variables in our study were:

- (1) the test environment;
- (2) the interviewers' L1/L2 competence;
- (3) the test content;
- (4) test frequency.

These four factors are discussed in more detail below.

##### 4.1. The test environment

Stress and confusion seem to be the two most frequent causes for failed oral interviews with young pre-primary and primary school subjects (by failed interviews I mean interviews which failed to produce a sufficiently diversified and large sample of speech). To minimise the effects of stress all the interviews administered to the

three subjects (7 English and 7 Polish interviews per child) were carried out in the home of the child. In each case at least one of the parents was present, but not an active participant of the interview. The parent (usually the mother) was physically present in the house and thus providing some relief from stress, but moving around, while the child and the interviewer were seated at a table in a manner that made it absolutely clear who were the main participants in the conversation. This arrangement was the main "organised" feature designed to prevent confusion. The other two features of the interviews introduced specifically to prevent confusion were that the Polish and English interviews were always separated by a one to two weeks interval, and that there were consistently two different interviewers carrying out Polish and English interviews.

##### 4.2. The choice of interviewers

In a number of bilingual language acquisition and language attrition studies the interviews or observations and diary notes in one or both languages have been carried out by the researchers (often also parents of the subjects) themselves. This raises the question of whether the subjects were really demonstrating their full communicative abilities in both languages. Bilingual children are known to be very sharp observers and to adjust to their interlocutors very well. Consequently, in conversations with other bilingual speakers (in this case, the interviewers), they will tend to follow the principle of economy, and freely code-switch to L2 whenever they feel they can communicate efficiently and with minimal effort, even if they could still actually use the correct L1 expression, thus giving a false impression that a particular item has not been acquired yet, or has already been lost, when in the actual fact, it was simply not used in the interview, because there was no need to go to the effort of producing the form in L1. For this reason, it is important that, if we wish to examine the actual level of competence in L1 or L2 all interviews or observed situations must be monolingual in character. This can be achieved only if the interviews are carried out by monolingual interviewers in monolingual situations. In case of our study, the English interviewer was truly monolingual, the Polish interviewer was a native speaker of Polish who knew some English, but never used it in front of the subjects.

##### 4.3. The test content

The content of the interviews has to be carefully controlled in order to ensure that adequate samples of language are obtained for analysis. In case of language attrition studies, it is not only important to obtain as much diversity in vocabulary, grammar and discourse types as possible, but also to return periodically to the same situations to check if further acquisition or attrition occurred. In our study the format and content of the interviews has been based on an adaptation of the "Communicative Tasks" and accompanying pictures developed by the Language Acquisition Research Centre (LARC) at Sydney University and similar tasks developed independently by the project team to cater for those elements of language, which could not be

tested using the LARC pictures and tasks. These included collections of pictures accompanied by questions and tasks, story telling on the basis of series of pictures and of a cartoon seen several times during the days preceding the interview. Each of the two (Polish and English) interviews administered at a given time has always been based on exactly the same content, i.e. the same pictures, cartoons, questions and tasks, the main difference being that, if a story was read, or a cartoon seen before or during the interview, it was done in the language of the interview.

#### 4.4. Frequency of interviews

As mentioned above, it is important to obtain as clear a picture as possible of the actual level of our subjects' language competence prior to the onset of language attrition. For this reason, initially the content of each consecutive interview will be different and their frequency will be quite high, so that the subjects are tested in a number of topic areas and given opportunities to use a variety of grammatical structures and discourse techniques in both languages. This is the way we proceeded in our project: the first 3 interviews were all carried out during the first year at 4 months' intervals. After interview 3 the frequency of interviews diminished to one per year, but materials from previous interviews were gradually re-introduced to check whether further acquisition occurred in both L1 and L2 and whether there was any evidence of the beginnings of L1 attrition.

#### 5. Storage of data

I have already mentioned that, while a number of longitudinal studies of language attrition have been done, all of them have been restricted to a very small number of subjects. If we consider that studies of different pairs of languages might bring some different results, the pool of currently available data is very small and it is of vital importance that whatever new studies are made, the collected data are stored in a manner that makes further studies of the same material possible to other scholars than the actual research designers. Ideally, we should attempt to follow the lead of first language acquisition scholars and establish a centre collecting all data in a unified form transferable between softwares used by all or most researchers in the area. To my knowledge, this has not happened yet. Under these circumstances, efforts should be made to observe some basic principles of data storage which, if observed, will make it possible to transfer them to a central corpus. I would like to mention only a few principles of data storage, which I consider to be most important. All tapes, video-tapes, hand-written notes, etc. should be kept and, if there is no storage space, they should not be discarded until all the relevant data have been fed into a computer software, saved and printed out.

In case the data have been collected in recorded interviews, the content of the tape or videotape and all interviewers' remarks concerning the course of the interviews should be transcribed by that interviewer and checked by the researcher for accuracy as soon as possible after the actual interview took place and then fed into the software in raw form, i.e. without any manipulation, changes, adjustments, etc.

The computer software chosen should make it possible to store all the data relevant to the project, i.e. not only the texts of interviews, but also data obtained in questionnaires and other information provided by the interviewer, the researcher and other persons involved.

In order to preserve the original corpus intact, all analytic and other activities on the collected corpus should be done on data taken out of the original corpus of raw data.

These basic principles are known to most experienced researchers, but are often not followed by beginners and postgraduate students and a lot of valuable data is irretrievably lost.

#### 6. On the relevance of data from periodic tests in longitudinal projects

It has already been mentioned that securing access to young subjects for longer periods of time is quite difficult, if not impossible at times. Under these circumstances many researchers must, similarly to our project, resort to periodic rather than continuous testing of the subjects. This raises the question of the degree of relevance of data obtained in explaining language attrition phenomena. I will look at this question from the point of view of our own project.

The project is a qualitative rather than quantitative study and our main aim has been to look for regularities and possible hypotheses that could be tested in larger, cross-sectional studies. It should also be emphasised that, despite the fact that we have conducted a number of tests, a project like ours is based on severely restricted access to subjects and can only cover some areas of language communication. In other words, the totals of lexical items, grammatical structures and communication strategies acquired and actively used in interviews by our subjects should by no means be considered absolute totals of their lexical, grammatical and communicative competence. They should be treated only as indicators of the speed of growth in the areas we tested, which may be generalised to refer to all other areas, but of course then the validity of such statements will be at the level of hypotheses that will have to be tested in larger, cross-sectional studies.

It is only when we look at the proportions of various elements within those absolute numbers for each language separately and when we compare the relative speed of development between the two languages that we can see clear trends, which are probably the most valuable outcome of studies like ours as they indicate directions which, if confirmed in other similar longitudinal projects may produce fairly strong reference points and hypotheses for further studies, possibly, cross-sectional studies of larger numbers of subjects (see also Ronowicz 1996).

#### 7. Methodological problems in bilingual lexical data analysis and comparison

We have only done the lexical analysis of the data in some detail so far and, in the process, we encountered a number of methodological problems in categorising items in our corpus and had to make decisions on the manner of counting entries for statistical analysis. Naturally, both these types of decisions influenced the outcomes

of analysis and hence a brief presentation of our decisions may be of interest to other researchers in the field.

All the collected and transcribed utterances were analysed at the lexical level and lexical categories with appropriate features were assigned to them. Generally speaking, the function of the word in the context was the ultimate deciding factor as to its lexical categorisation. Instances in which we had to either use a solution different from generally accepted analyses of Polish or English, or where choices between several differing analyses were made have been discussed in some detail below. Following this the COALA programme which we use (a MacIntosh based linguistic analysis software developed by Manfred Piennemann and associates in Australia) could generate from its database reports which provided quantitative information about each lexical category for every interview.

The COALA programme uses the following standard lexical categories: 'adjective', 'adverb', 'auxiliary', 'conjunction', 'determiner', 'interjection', 'negator', 'noun', 'particle', 'preposition', 'pronoun', 'question word', and 'verb'. Additionally it uses the category 'word fragment', which we reserved to denote L2 words appearing in L1 texts and L1 words used in L2 texts, i.e. instances of *code switching*.

The *University Grammar of English* by Quirk and Greenbaum (1973) was used as a reference for categorising English lexical items, while in the Polish analysis two publications gave the point of reference: Bąk's *Gramatyka języka polskiego* (1979) and Kaleta's *Gramatyka języka polskiego dla cudzoziemców* (1995). Since the computer program analysed both languages according to its standard lexical categories, and a degree of comparability had to be achieved between the English and the Polish analyses, some items typically classified in Polish under one heading had to appear under a different heading in the analysis. For example, Polish interrogative pronouns have been assigned to the category of question words, as they would have been classified in English, both English and Polish numerals had to be listed under the category of determiner, which actually has a broader scope in the English language, mainly because COALA does not have a standard lexical category of 'numeral'. In order to make linguistic comparison more reliable such items as: *mało, nieco, trochę, wszystko, niewiele* were defined as determiners. They are actually differently defined by various authors. Bąk (1979: 153) classifies them as indefinite (indeterminate) numerals, Kaleta as adverbs of measure.

Also with regards to the classification of adverbs there were some differences. In our analysis: *już, jeszcze, dopiero, chyba, może* were classified as adverbs, Kaleta defines them as particles. Polish *nie*, generally classified as a negating particle, fell into two categories: that of a negator, like English *not*, or of a particle as English *no*. For simplicity, some adjectival pronouns, such as *inny, taki* were classified as adjectives. Also the classification of Polish *by* used for conditional verb forms varies with different authors. Kaleta classifies it as a morpheme, Bąk as an auxiliary. For the purpose of this analysis *by* was put under the heading of a particle.

In our lexical analysis of both English and Polish forms interjections sometimes bore the meaning of nouns, and they were then classified as such, e.g. *ho ho, woof* as

in Ola's second English interview (henceforth we will use the child's name, E for English, P for Polish and a number to indicate which interview is referred to, e.g., Ola E 2). The two older girls were already in the third stage of language acquisition (see Zarębina 1965, 1994) and their use of interjections as nouns was limited. Instead, other forms of exclamations were frequently used: *mhm, oh, uhu, cha, halo, la, hop* in the Polish language and *um, huh, ouch, eh, mmm, wow* in English. Mystkowska (1970) describes them as intercalations ('wtręty') and associates them with speech fluency. They were classified as interjections in both our English and Polish analyses.

To ensure consistency and clarity (intelligibility) of analysis an interim Glossary of all L1 and L2 words appearing in the interviews was created. This provided a list of L2 words with L1 counterparts. Since throughout much of the testing period L1 (Polish) was the dominant language, especially at the time of the first two interviews, there was a list of numerous L1 items that had no L2 representations. Additionally two separate lists of all word fragments were created, one for L1 words appearing in L2 texts, and another for L2 items occurring in L1 texts. The latter list was considerably longer at the time of Interview 4, thus showing a growing dominance of L2 over L1.

Finally, the lexical data were prepared for statistical calculations and comparison of lexicon content. The raw data collected in every interview were added to the previous results i.e. we obtained cumulative figures on the grounds that, if there was no evidence in the corpus that a lexical item from L1 was permanently replaced by an equivalent L2 item, it was still part of the active L1 lexicon of the subject.

We then used the 'dictionary entry principle' in listing lexical items in the lexicon thus reducing the total number of lexical forms actually produced in children's utterances for statistical processing on the grounds that, at this stage of investigation, we were not interested in the subjects' ability to use grammatical structures, only in lexical units count. Thus, in the Polish data inflected forms of the same word were eliminated and *może, możesz, mógł* (Mela P 4) or *szczotkę, szczotki* (Ola P 4) were counted as one lexical entry each. Similarly differently pronounced forms of the same lexical item were reduced to one entry in statistical calculation, e.g., *skace, szkace* were given one model *skakać* (Mela P 3), as were *zimno, dzimno* (Zuza P 1). For pronouns, numerals and adjectives inflected forms were given one underlying form ignoring grammatical gender or plural forms, thus *taki, takie* and any other forms of *taki* were reduced to one entry. The same method of elimination was used for comparing adjectives and adverbs and the perfective and imperfective verbs were treated as separate lexical entries. The same principles were applied in the analysis of the English data. All abbreviated and full forms of verbs and auxiliaries were given one underlying form, e.g., 're, are, and 've, have were treated as *are* and *have* respectively (Zuza E 2,3). In verbs gerund and participle forms were reduced to one entry. Any inflected or differently pronounced form was compared against the infinitive.

Additionally, L2 words appearing in L1 texts and L1 words appearing in L2 texts, which were categorised as word fragments in the initial analysis were not re-

duced, but every occurrence was counted as it was often difficult to decide on one underlying form: e.g. polonised *londra* vs. true English *laundry*, many new formations not having a recognised model.

As a result, statistical analysis of the Polish and English corpora could be made and produce what we hope are meaningful results, which have been presented elsewhere (Ronowicz and Poros, forthcoming).

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