# Critical periods and SLI

MONIKA ROTHWEILER

## 1. Meisel's multi-periods-account

The language acquisition device endows human beings with the ability to acquire one or more first languages as long as some relevant conditions like amount and quality of input are fulfilled and the onset of acquisition is early enough. One of Meisel's merits – not only in his target article for this volume of ZS, but also in Meisel (2007, 2008) and other papers – lies in identifying factors relevant for distinguishing between the nature of first and second language acquisition and developing a language acquisition account that allows for the integration of results on first language acquisition and simultaneous acquisition of two or more languages, as well as the successive acquisition of a second language in children and adults. In his target article, Meisel concentrates on the impact of the results from the study on successive language acquisition in children on the topic of multiple sensitive or optimal phases and aims at identifying the relevant features of child L2. The central concepts in his account are the maturational changes in the language making capacity (LMC) (based on maturational changes in the neural system), age of onset of acquisition (AOA) and the grammatical properties of language that are affected by the maturational changes of the LMC/LAD (language acquisition device). Meisel argues for at least two critical periods for grammar acquisition, one around the age of 4 and another between the ages of 6 and 7. During these periods, phases that are optimal for the acquisition of certain grammatical sub-components start to fade out. Various proposals with respect to these subcomponents are discussed in recent studies on child L2 (cL2) (cf. Schwartz 2004, Blom et al. 2006, Rothweiler 2006, among others). According to Meisel, inflectional morphology is subject to change very early in the LMC (around age 4), whereas most parts of syntax seem to be affected later. The different onsets of the fading out of optimal phases thus result in an unbalanced development in the second language compared to L1 acquisition. Meisel presents evidence that supports this pro-

Zeitschrift für Sprachwissenschaft 28 (2009), 49–57
DOI 10.1515/ZFSW.2009.006
0721-9067/2009/028–0049

posal and his claim that it is only after the age of onset at 3;6 that a relevant change in the LAD/LMC starts. Although the argumentation is clear and convincing, I suggest that particularly the following three aspects or questions require some further discussion and investigation.

(1) Meisel presents results for the early successive acquisition of French by German children in Kindergarten. These children acquire French in an immersion setting, but this setting is sub-optimal in the sense that outside of Kindergarten, French has no relevance in the daily lives of these children. Whether this might influence the course of language development in French is an question which remains open; it is clear from Meisel's data that French is acquired slowly compared to L1 French. Meisel himself draws attention to this issue.
(2) How do child L2 learners (AOA 4 to 7) manage to achieve native competence although the LMC/LAD has already changed? Meisel explicitly excludes this issue from the discussion here.
(3) What role does transfer play in child L2? Meisel does not find any evidence for transfer in his cL2 data, hence transfer is not relevant to his discussion. This does not mean that transfer does not occur in cL2 in general.

There is a possibility that the answers to questions (2) and (3) are related to each other. It could be the case that only children (AOA 4 to 7) who use transfer do not achieve a native competence. This would mean that these children resemble adult L2 learners. If child L2 lacks transfer, native competence may be achieved. This suggests that ±transfer is a relevant factor. As long as a change in the LAD/LMC does not prevent the child from accessing UG parameters, transfer is not likely to happen and acquisition will result in L1-like structures.

## 2. Critical periods and language impairments

Meisel's proposal with explicit fixing of at least two of the transition points in the domain of grammar at age 4 and ages 6 to 7 are highly relevant not only for research on successive acquisition in unimpaired children, but also for research on children with impaired language acquisition. Children with serious language deficits, but without other deficits causing the language problems, are specifically language impaired (SLI). A relevant subgroup is the group of children with grammatical SLI. The acquisition problems of these children are particularly prominent in the domain of grammar (van der Lely 2003). In the following, I wish to present some considerations as to how the study of successive language acquisition in children, the critical period hypothesis, and

the claims made by Meisel might help to widen the discussion on grammatical SLI, also with respect to assessment and therapy.

The Fundamental Difference Hypotheses (FDH) claims that the Language Acquisition Device (LAD) becomes partly inaccessible during childhood due to maturational, i. e. neurological changes. As Meisel points out, the results of linguistic and neurological developmental studies complement one another, and therefore maturational changes may well be the crucial factor in explaining substantial differences between L1 and L2 acquisition. Grammatical SLI, on the other hand, is characterised by a partial lack of accessibility to at least some components of the LMC/LAD.[1] Brain studies reveal relevant differences between unimpaired and impaired L1 learners, for example in ERP responses (ERP = event-related brain potentials). Let me give just one example. In a group of SLI subjects (ages 10−21) with severe grammatical deficits, Fonteneau & van der Lely (2008) found that the SLI subjects perform within the range of age-matched controls for semantic processing and for auditory processing speed, but differ significantly in their brain responses to grammatical violations. While these violations raise an ELAN effect (Early Left Anterior Negativity) in the language matched and age matched controls (and even in children under age 3), no such effect is observed in the SLI subjects. The ELAN effect is an indicator for automatic syntactic processing that is obviously affected in the SLI-children. The same holds for cL2, see Weber-Fox & Neville (1996, 1999), as reported in Meisel's paper. The SLI children behave similarly to L2 learners: brain responses to lexical-semantic violations are located within the range of L1 controls, whereas syntactic violations are not. I do not claim that L2 and SLI lead to identical responses in ERP studies or in neuroimaging studies, but there are some similarities. These similarities show that there might be 'vulnerable domains' in the neural substrates as well as in grammar (cf. Platzack 2001). However, the SLI-children in Fonteneau & van der Lely (2008) are beyond the two proposed critical periods (see above: age 10 to 21). For as long as there is a lack of neurophysiological and linguistic studies which produce the same results for SLI children younger than age 4, we must take into account that there is a possibility that the results observed in older children may be influenced by critical period effects. The rationale behind this suggestion is that the reduced language learning capacities of SLI children not only result in a deficient, but also in a delayed and slower grammar acquisition. This might cause an additional problem for SLI children: They are not only

1. Recall that SLI subjects do not constitute a homogeneous group. Different subgroups probably exist in which different aspects of language processing and/or grammatical competence may be affected, possibly based on different neural deficits.

handicapped by the language impairment. Due to their slow language acquisition, these children only approach some relevant grammatical forms and structures after the optimal phases have passed. Since SLI children may miss the optimal phases, they have to rely on more general cognitive learning mechanisms to acquire language – like L2 learners. In this way, asynchronies in development known from SLI as well as from cL2 may (partially) have the same source. This potential overlap of SLI and L2 features in SLI might have influenced the results on similarities between SLI and cL2. Such similarities have been reported by Håkansson & Nettelbladt (1996), Paradis & Crago (2000), Håkansson (2001, 2003), Grüter (2005), Paradis et al. (2008)[2] and Orgassa & Weerman (2008). In some of these studies, the authors briefly address the question of age and maturation (Crago & Paradis 2003, Orgassa & Weerman 2008[3]), and Håkansson (2001) proposes "a common denominator for grammatical problems in L2 children and children with SLI" (Håkansson 2001: 96). The question of whether the observed similarities in these groups may be influenced by the fact that (older) SLI children may be *covert "L2" learners* in addition to having the primary language deficit has not yet been discussed explicitly.

As already mentioned, the proposed blending of SLI and "L2" features in SLI children after the age of 4, and especially in children older than ages 6 to 7, needs to be supported by SLI research in children younger than 4 on the one hand and the consideration of intervening critical period effects in older SLI children on the other.[4] To illustrate this issue, I will briefly present some results from the acquisition of negation in three German SLI children ages 3 to 7.

The position of the sentence negator *nicht* ('not') in German declaratives and questions is fixed and can be assumed to be part of NegP, which is adjoined above VP. German is a V2 language with OV, with the finite verb rising to the C position in all matrix clauses, resulting in V2

2. In contrast to the earlier studies comparing SLI and cL2, Crago & Paradis (2003) and Paradis et al. (2008) concentrate especially on crucial differences between these two acquisition types. Such differences indeed exist in addition to striking similarities.
3. Orgassa & Weerman (2008) offer an account according to which SLI can best be understood in terms of factors that influence the intake. The authors suggest that SLI and cL2 learners are similar in their reduced intake (for different reasons), and that the reduced intake causes the delayed acquisition in SLI that might force SLI children to us L2 learning strategies.
4. The ages of the SLI children in the above mentioned studies range from 4;0 to 8;4 in Håkansson & Nettelbladt (1996), and from 6;6 to 9;2 in Grüter (2005). The mean age in Paradis et al. (2008) is 7;6.

orders. Therefore, finite verbs precede the negator and non-finite verbs follow the negator, see the following examples.

(4) (X) Vfin (Y) Neg (Vfin)

*Peter schläft* *nicht*
Peter sleeps not
'Peter does not sleep'

*Wer hat* *das Hemd nicht gewaschen?*
Who has the shirt not washed?
'Who did not wash the shirt?'

In unimpaired first language acquisition, children adhere to these restrictions. From early on, finite verbs precede *nicht* and non-finite verbs follow it (Clahsen 1990, 1991). This demonstrates the early distinction between finite and non-finite verb forms on the one hand and finite and non-finite verb positions on the other. In adult L2 learners of German, the acquisition of finiteness and verb position are not correlated as in L1 acquisition. Therefore, non-finite elements, especially infinitives, in V2 are characteristic of adult L2, as shown by Meisel (1997) for the acquisition of negation in German. Kroffke & Rothweiler (2006) have found that successive learners of German with AOA 3 behave like L1 learners, whereas successive learners with AOA 6 show characteristics of adult L2, especially in the use of non-finite verbs in the C position (V2).

Infinitives in V2 position are not only a characteristic of adult L2; it has also been claimed that the use of non-finite elements, especially of infinitives, in the C position, is a possible clinical marker for SLI in German (Clahsen et al. 1997). According to Clahsen's account, the major problem of grammatical SLI in German is morpho-syntactic in nature, with the deficit affecting finiteness markings, specifically subject-verb agreement marking and related phenomena like V2 (Clahsen 1991, Clahsen et al. 1997). Thus, German-speaking SLI children produce non-finite verbs in V2 even after the acquisition of CP (Rothweiler et al. 2009).

The acquisition of negation (with *nicht* as a marker for V2 vs. Vfinal) is a relevant domain for investigating similarities between SLI and L2 in German. The data come from the Clahsen corpus.[5] The three children Nil (age 3;2−4;4), Ben (6;6−7;7) and Seb (5;4−6;6) were recorded five

5. The data stem from a research project directed by Harald Clahsen. The project was funded from 1986 to 1994 by the German Science Foundation. I would like to thank Harald Clahson for making the data available to me.

times during a period of about one year (in 3 to 4 month-intervals).[6] All three children produced some finite verbs in V2 in the beginning, but had difficulties with subject verb agreement and verb placement (Rothweiler & Clahsen 1994). Seb did not acquire SVA during the year of observation, but produced V2 in about 90% of the V2 contexts in the last recording. The grammar of the other two children did not improve during the first months (3 recordings of Ben, 2 recordings of Nil). Then, the correctness values for SVA as well as for V2 increase dramatically in the third (Nil) and fourth (Ben) recordings, exceeding the 90% mark (Nil 3;8, Ben 7;4). This developmental step appears similar to what is expected for unimpaired L1 acquisition, the relevant difference being that unimpaired children acquire V2 and agreement features/finiteness before the age of 3.

Looking at the negation results, the picture in the three SLI children is not as clear anymore. As can be seen in the table below, the use of finite vs. non-finite forms[7] in V2 and Vfinal reveals the production of non-finite elements in V2 in all recordings with the exception of Nil 3−5.

Negation and verb placement

| | Neg < Vinf | Neg < Vfin | Vinf < Neg | Vfin < Neg |
|---|---|---|---|---|
| Nil 1−2 / − SVA | 2 | 0 | 10 / 43% | 11 |
| Nil 3−5 / + SVA | 0 | 0 | 0 / 0% | 36 |
| Ben 1−3 / − SVA | 6 | 1 | 3 / 11% | 18 |
| Ben 4−5 / + SVA | 1 | 1 | 4 / 9% | 40 |
| Seb 1−5 / − SVA | 18 | 7 | 5 / 8% | 29 |

Ben and Seb produce non-finite elements in V2 even after the acquisition of generalised V2 (Rothweiler & Chilla 2008). Only the youngest child, Nil, who received therapy before the age of 4, is really successful. The other two children exhibit features typical of (grammatical) SLI in German. The grammars of Seb and Ben do improve, but neither of these two children catches up.[8]

This short presentation was meant to illustrate that critical periods as proposed by Meisel may have an additional impact on impaired language acquisition. This interference should be most influential for sub-

6. The data from Ben and Seb are studied in more detail in Rothweiler et al. (2009) and in Rothweiler & Chilla (2008); the data have also been analysed in Rothweiler & Clahsen (1994) and in Clahsen et al. (1997).
7. Non-finite verbs are defined here as verb forms that do not agree with the subject.
8. We do not have detailed information about the intervention programs. All children of the Clahsen corpus received logopedic therapy and/or attended a special school for language impaired children.

domains of grammar that are affected by the first critical period at age 4 (because of the delay in language acquisition of SLI children). Only early diagnosis and intervention may help SLI children to gain access to the grammatical system. Late diagnosis and treatment will improve the language performance, but since the impaired computational or processing system on the one hand and missed optimal phases on the other interact, the outcome should be more child L2-like than L1-like. Obviously there will not be transfer from an L1, and this might have consequences as well. Studies on SLI in children learning a second language have to answer the question of whether the second language might be an additional disadvantage (see Chilla 2008 for an overview). On the basis of the discussion here, it is even likely that a first language (perhaps because transfer is possible) might be an advantage in some cases. Furthermore, language intervention and therapy programs should take into account that the acquisition endowment of children from ages 3 to 4 differs from that of children ages 5 to 7 and this again from that of even older children. Language intervention and therapy programs for young SLI children should integrate learning devices that mimic natural acquisition, while programs for older SLI children may make use of second language learning programs. Finally, we need more detailed studies on child L2, since only these studies will highlight the forms and structures affected by the fading out of optimal phases as well as the relevant age ranges. Language therapy for monolingual and bilingual SLI children should focus on these forms and structures in addition to those that are primarily affected by the specific language impairment.

## 3. Closing remarks

The critical period hypothesis, and especially an elaborate account like Meisel's, is relevant for numerous acquisition scenarios in addition to child L2. If Meisel is right and critical periods occur around age 4 and between ages 6 and 7, each individual or social condition that influences the input or intake of language and that slows language acquisition or delays it in a way that affects critical periods will definitely result in an unbalanced or even deficient language acquisition. This holds not only for children with SLI, but also for children who are hard of hearing or socially deprived, among others. The old discussion about "pure language delay" versus "qualitatively deviant acquisition" might become obsolete, since a developmental delay lasting throughout the relevant critical period(s) necessarily causes qualitative differences in acquisition – even if the LAD/LMC is not primarily affected as in SLI. The consequences for diagnosis and therapy are obvious: only early assessment and early intervention will enable the child to acquire language as close to native-like as possible.

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*rothweil@uni-bremen.de*
*Universität Bremen*