

## Chapter 10. Comparing L1 children, L2 children and L2 adults

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### 1. Introduction

This paper reviews some of the conceptual and methodological issues involved in comparisons between different groups of non-impaired learners, namely monolingual first language children, bilingual first language children, second language children and second language adults. It illustrates how the various two-way and three-way comparisons between these different learner groups may inform our understanding of some of the fundamental questions in language acquisition research.

The paper is divided into two sections. The first addresses theoretical and applied issues, including how to define different learner groups and using cross-group comparisons to determine whether there are age, transfer and input effects. The second deals with methodological issues, including controlling for cognitive maturity and proficiency in order to ensure a clean comparison is made.

### 2. Theoretical and applied issues

Much research on language acquisition, and in particular on non-native (L2) language acquisition, revolves around comparisons between different groups of learners.

Although such comparisons may vary in terms of the researcher's theoretical approach, the target language (TL) property under investigation, and how the results are interpreted, they usually address the same core question, namely whether the language acquisition process is in some sense similar for the learner populations in question. Comparisons may involve, for example, monolingual first language (L1) vs. bilingual L1 (2L1) children (see e.g. studies in Meisel 1994) or L2 children vs. L2 adults (e.g. Snow & Hoefnagel-Höhle 1982).

This section outlines some of the conceptual and theoretical issues involved in making such comparisons. Section 2.1 discusses how to define the different learner groups. Section 2.2 addresses one of the central questions in many cross-group comparisons, that is, whether there are age effects in L2 acquisition, and section 2.3 deals with the question of whether and how the amount and type of input to which a learner is exposed affects the acquisition process and what this means for comparisons between different groups of learners.

### 2.1. Defining groups

As will become clear in the course of this section, how to make the distinction between (monolingual/bilingual) L1 children, L2 children and L2 adults is for a great part dependent on the locus of interest of the researcher. In all cases, it is important to be conservative and apply criteria that directly relate to the goal of the research. In addition, criteria, once chosen, should be applied consistently.

Various definitions of child L2 acquisition have been adopted in the literature. They include children with age of first exposure sometime after birth but before age seven (e.g. Johnson & Newport 1989), sometime after birth but before age nine (Penfield & Roberts 1959), and sometime after birth but before puberty (e.g. Lenneberg 1967). Which criterion is adopted may in part be determined by the aim of the study. If this is to compare the child and adult L2 acquisition of a certain linguistic feature, a conservative strategy would exclude participants exposed to the TL between the ages of say, seven and 13, because this period may be considered to mark the fuzzy boundary between children and adults. However, a study that aims to pinpoint where that boundary lies should include such participants because, otherwise, it is possible that the crucial age will be missed and the research question cannot be answered. In short, it is important to think carefully about how the different learner groups relate to the study's research question.

It is not only the boundary between child and adult L2 acquisition which is not clear-cut. The distinction between what counts as L1 and what counts as L2 acquisition is not always evident either. It has been argued that a child who has been regularly exposed to another language within the first two months after birth constitutes a case of 2L1 acquisition (De Houwer 1995: 223). Genesee, Paradis & Crago's (2004) definition includes children exposed to another language up to one year, whereas McLaughlin (1978), assuming an even broader category, stipulates that the age of three is crucial (see also Meisel 2008). A valid criterion to qualify as L2 (instead of 2L1) acquisition may be that the basic properties of the L1 grammar are in place before regular exposure to the L2 begins (Schwartz 2004a; Unsworth 2005).<sup>i</sup> Although there is some variation across linguistic phenomena and languages, we can assume that a child at the age of four knows the basic properties of the first language

grammar (Guasti 2002). Some discourse-related and more complex TL properties may be acquired later than this, however. The lexicon also develops beyond this age. It is important to bear this in mind when investigating the acquisition of such properties by L2 children, as it may have consequences for (i) the age (at testing) of the children to be tested and (ii) the possibility of transfer of an equivalent property in the L1.

## 2.2 Maturational effects

On a maturational view, the patterns observed in L1 and L2 acquisition are accounted for by the maturational state of the learner's brain, which – as a consequence of neurological changes – may result in e.g. certain principles of Universal Grammar (UG) being momentarily or permanently unavailable. For both L1 and L2 acquisition, this may result in certain developmental effects, and for L2 acquisition, this may (also) result in fossilization. In this section, we will discuss the extent to which comparisons of child L1 acquisition, child L2 acquisition and adult L2 acquisition can contribute to maturational theories of language acquisition.

Maturational effects are probably most well-known in relation to the Critical Period Hypothesis (CPH). There are numerous interpretations of this hypothesis (see DeKeyser & Larson-Hall 2005; Hyltenstam & Abrahamsson 2003, for recent reviews), but, in general, the hypothesis posits that there is a biologically pre-determined period which is optimal for the acquisition of grammar (Lenneberg 1967; Penfield & Roberts 1959). This is claimed to explain the relative ease with which children successfully acquire language and the seemingly much more effortful and less successful language acquisition at later ages. The existence of a critical period

(CP) has been proposed for both L1 and L2 acquisition; it is important to note, however, that even if age effects are observed in both L1 and L2 populations, they may not have the same causes.

All maturational accounts share the premise that there is at least one maturational point T that marks a transition: grammatical knowledge acquired before T is different from grammatical knowledge acquired after T. Comparing different groups of learners may shed light on the validity of such accounts (see Schwartz 2004b, for relevant discussion). Thus, if T marks the end of the purported Critical Period, then learners exposed to the TL in question before T should pattern differently from those whose age of first exposure is after T. When investigating the CPH for L2 acquisition, such comparisons may for example involve L2 children and L2 adults (e.g. McDonald 2000), monolingual L1 children and L2 adults (e.g. Clahsen 1986), bilingual L1 children and L2 adults (e.g. Möhring & Meisel 2003) or a combination of several of these groups (e.g. Granfeldt, Schlyter & Kihlstedt 2007). Which groups are included in the comparison will of course depend on the definition of the CP which is adopted (cf. sections 2.1 and 3.1).

One drawback of comparing monolingual L1 children directly with L2 adults is that any observed differences may follow from L1 transfer rather than the L2ers' later age of onset (e.g. duPlessis, Solin, Travis & White 1987; White 1985, 1989). One approach to avoiding such a confounding effect between age and L1 transfer is to compare L2 adults with L2 children rather than with L1 children, while holding the L1 constant (Blom, Polišenská & Weerman 2007; Schwartz, 1992; Unsworth 2005). The rationale behind this comparison is that if there is transfer, this will be the same for both L2 groups (see section 3.3), and thus any differences between the children and adults should – assuming all other factors to be (more or less) equal – be due to

age.<sup>ii</sup> The effects of L1 transfer can be determined by including monolingual L1 children in this comparison (see e.g. Unsworth 2005). More generally, when comparing monolingual L1 children and L2 adults (or children), there may also be an effect of bilingualism, which should be treated separately from the effect of L1 knowledge. For this reason, it may be more appropriate to compare the child/adult L2ers to bilingual instead of monolingual L1 children (Meisel 2008). In the same vein, it is not clear that monolingual adults should be considered the yardstick by which targetlikeness should be measured for any L2 learner, given that knowledge of another language means that L2 learners / bilinguals will essentially always differ from monolinguals (Grosjean 1992; Cook 2002).

Cross-group comparisons investigating maturational effects in L2 acquisition have focused on the route learners take in their acquisition process, the rate at which they progress, and the end state which they reach, with the focus largely being on the latter. Rate studies (e.g. Slavoff & Johnson 1995) have largely fallen out of fashion, possibly because, as Hyltenstam & Abrahamsson (2003) note, it is not clear what they can tell us about the CPH: speed of acquisition does not say anything about the epistemological status of the learners' grammar.

Rate studies are however relevant in assessing the effects of age in instructed L2 contexts with a view to determining educational policy (see Herder & De Bot 2005; Singleton & Ryan 2004, Chapter 6 for reviews). In such foreign language contexts exposure to the TL is restricted in terms of domain, e.g. exposure occurs at school only, in amount, i.e. usually just a few hours per week, and in type, e.g. input in the school environment typically comes from non-native speakers. Replicating findings from earlier studies (e.g. Burstall, Jamieson, Cohen & Hargreaves 1974), recent studies by Cenoz (2003) and García Mayo (2003), amongst others, demonstrate

that when length of exposure is held constant, later starters (age 11) consistently outperform younger starters (age four and eight) on a variety of tasks and TL phenomena. Note, however, that because length of exposure is held constant in these studies, there is a confound between age at time of testing and age of exposure. Consequently, as Cenoz notes (2003: 89), the late starters may have more developed test-taking skills and this may have facilitated their performance on the experimental tasks. The problem of comparing groups of learners who differ in terms of age at testing is discussed in more detail in section 3.2. Another factor which could account for differences between early and late starters is type and amount of input (Carroll 1969; Larson-Hall 2008; Singleton 1992) – see section 3.4 for relevant discussion.

Most studies on maturational effects in L2 acquisition focus not on rate but on ultimate attainment. A typical study, such as that of the frequently cited Johnson & Newport (1989), collects data from early and late starters that have been immersed in the TL environment for a long period time (often 5 (e.g. Johnson & Newport 1989) and sometimes 10 years (e.g. Birdsong & Molis 2001)). The advantage of this method is that the participants' age at the time of data collection is held constant. However, because both groups of learners are usually adults at time of testing, there is consequently a potential confound between age of onset and length of exposure. The way to avoid such a confound is of course to hold length of exposure constant. This will however mean that early and late starters differ in terms of age at time of testing. The extent to which this is a cause of concern may depend on the methodology being used: whereas it is unlikely that properties of e.g. spontaneous speech production will depend on age differences between adults, this may well be the case with reaction times (see section 3.2).

The question whether or not maturation influences language acquisition can also be addressed from a developmental perspective. It is possible that despite reaching different end states, early (child L1, child L2) and late (adult L2) learners may follow the same developmental route on their way to that end state. Developmental sequences can be determined on the basis of longitudinal data (Dimroth 2008) or inferred from cross-sectional data from learners at different developmental stages (Thomas 1994; Unsworth 2005). On the assumption that a developmental stage S is characterized by a certain error profile, the comparative analysis could also focus on the types of errors a particular learner group makes (Blom et al. 2007; Gilkerson 2005; Meisel, 2008). It has been argued that if child L2 and adult L2 learners pass through the same developmental stages, this may indicate that both groups make use of the same language acquisition mechanism, and assuming that this is the same for L1 and L2 children, namely (from a generative perspective at least) UG, this would constitute evidence for UG constraining adult L2 development (Schwartz 1992, 2003, 2004b; Unsworth, 2005). Conversely, different developmental sequences for L2 children and adults would suggest the two groups of learners make use of different language acquisition mechanisms, which may or may not lead to the same end state. The advantage of examining the question of maturational effects from a developmental perspective is that crucial information may be become available that may otherwise have been missed. In principle, examining development in L2 children and adults allows length of exposure to be kept constant across groups. However, there is a potential confound between age at first exposure and age at time of testing. The implications of this confound are discussed in more detail in section 3.2.

The occurrence of certain “errors” in L1 acquisition has been explained by the unavailability of certain linguistic categories and principles until a certain maturational point (Wexler 1999). For example, researchers (e.g. Rizzi 1993/1994,) have linked the existence of so-called Optional Infinitives to the lack of certain grammatical principles. During this stage of development, (L1) children fail to mark verbs with finite morphology, regularly producing non-finite verb forms in contexts where a finite form is required in the adult grammar. For example, instead of saying He eats bananas, an English-speaking child may produce He eat banana. More specifically, Wexler (2003) relates children’s problems with tense-marking morphology to a grammatical constraint which gradually fades and as it does, children’s utterances become more targetlike in this domain. Suppose we want to test whether this maturational point T really exists. The prediction would be that L2 children, who are by definition beyond T, should not produce Optional Infinitives. If they do, this could constitute evidence against the maturational approach (for a more elaborate explanation of this logic, see Schwartz 2004b), although it is of course possible that the same observable behavior may have different explanations in the two populations.

### 2.3. Transfer effects

It is generally accepted that adult L2 acquisition is characterized by L1 transfer, although there is some debate as to just how much of the L1 grammar is transferred (cf. e.g. Epstein, Flynn & Martohardjono 1996; Hawkins & Chan 1997; Schwartz & Sprouse 1994; Vainikka & Young-Scholten 1994). Like L2 adults, but unlike L1 children, L2 children come to the acquisitional task with knowledge of another

language. Child L2 data can therefore provide an extra testing ground for theories on the effects of transfer. In other words, it is expected that theories on transfer that have been tested against adult L2 data should also hold for child L2 acquisition (e.g. Grondin & White 1996).

There is mounting evidence that the initial stages in child L2 acquisition are indeed also characterized by L1 transfer. Support comes from differences between child L1 and child L2 acquisition (Gavruseva 1998; Haznedar 1997), from differences between child L2 learners who contrast in their L1 background (Haberzettl 1999; Whong-Barr & Schwartz 2002; Zdorenka & Paradis 2008), and from differences between child L1 acquisition, on the one hand, and child L2 and adult L2 acquisition, on the other hand (Unsworth 2005).

A number of recent studies have however failed to find evidence for L1 transfer in child L2 acquisition (Blom et al. 2007; Meisel 2007; Paradis 2005; Paradis, Rice, Crago & Marquis 2008). There are at least three issues worth considering in this regard. Firstly, it may be impossible to disentangle the effects of L1 transfer from properties of a given developmental stage which may occur irrespective of L1 transfer. Consider, for instance, the observation that Turkish L2ers of Dutch show a tendency to omit definite articles. Such omissions may indicate that L2ers pass through the same developmental stage as L1 children. However, given that Turkish lacks definite articles, such omissions may also be caused by L1 transfer. Secondly, according to many researchers, transfer typically occurs in the initial stages of L2 acquisition. The absence of effects of L1 transfer may result from testing children who are beyond such a stage. Alternatively, on a Basic Variety approach (Klein & Perdue 1997), such a finding might be expected (although whether this approach is

intended to extend to child as well as adult learners is not explicitly stated). Finally, not all linguistic variables may be equally sensitive to L1 transfer (e.g. Montrul 2000).

Note that the second issue raises a potential problem of unfalsifiability. In order to find transfer effects, one needs to examine data from the earliest possible stages of development. For instance, in her longitudinal study of a Turkish child acquiring English, Haznedar (1997) found effects of L1 transfer on word order in the first three months of exposure only (cf. Haberzettl 1999). It may however be impossible to collect data from such an early developmental stage, especially if the selected data collection procedure involves participation in a controlled experiment.

## 2.4 Input effects

The role of the input in the linguistic development of young (L1) children has long been a topic of considerable debate in the field. On a generative approach to language acquisition, the input to which the L1 child is exposed is considered inadequate to acquire many properties of the TL and consequently, children are attributed with innate linguistic knowledge, which is claimed to constrain the acquisition process. In contrast, on usage-based approaches (e.g. Tomasello 2003; Robinson & Ellis 2008), children are thought to induce properties of the TL from the input, using general cognitive processes to build up abstract categories and schemas in a piecemeal fashion. Comparisons of different learner groups can be used to test the predictions put forward by these two approaches because the amount of input available often differs and can sometimes be manipulated systematically. Whereas usage-based approaches predict significant input effects, these are predicted to be weaker (and they may not exist at all for some TL properties) on a generative account.

Bilingual L1 children, L2 children and L2 adults (may) differ both from each other and from monolinguals in terms of the quantity (and sometimes also quality) of the input to which they are exposed. Monolingual L1 children will almost always be exposed to quantitatively more TL input than children who are acquiring the same TL simultaneously with another, or than children or adults who are acquiring the TL as a L2 whilst at the same time maintaining their L1 (Paradis & Genesee 1996; Gathercole 2007). Much of the research investigating the role of input comes from children acquiring two languages at the same time. Such children are the perfect natural experiment when it comes to testing for input effects. Child-internal factors, such as IQ and age, are held constant, as are many child-external factors, such as social class. In this section, we briefly review the findings of some of the studies which have used cross-group comparisons to test theories of language acquisition. The methodological issues concerning input in cross-group comparisons are dealt with in section 3.4.

The existence of input effects in the acquisition of the lexicon is well attested (see Hoff & Naigles 2002 for review). One finding replicated across several studies is that children's linguistic development is directly related to the amount of exposure they hear in that language. For example, in a study on the lexical development of Spanish-English bilinguals, Pearson et al. (1997) observed a clear relationship between amount of exposure and vocabulary acquisition: the number of words which children acquired in Spanish was proportional to the amount of input they received.

More recently, a number of studies have also observed input effects in the acquisition of morphosyntactic phenomena by bilingual children. For example, Gathercole (2002a, 2002b, 2002c) has found input effects in both languages for Spanish-English bilinguals living in the U.S. for a number of TL properties, namely mass/count structures in English, grammatical gender in Spanish and that-trace

structures in English and Spanish (see also Gathercole & Thomas 2003 on Welsh-English bilinguals). She observes a direct relation between the amount of input to which the children are exposed and their linguistic development, and this, she claims, is consistent with usage-based approaches to language acquisition: if children learn grammatical constructions gradually as a result of inducing abstract properties from the input, children exposed to less input should experience delays relative to those exposed to more input. Furthermore, Gathercole (2007, amongst others) argues that it is those structures which are more opaque in terms of form-function mappings and formal cues that will be subject to input effects as they require more input for acquisition to take place. For example, grammatical gender in Spanish, which is transparent, is acquired early, whereas the opaque grammatical gender system in Welsh is acquired much later (Gathercole & Hoff 2007: 115). Likewise, Paradis et al. (2007, 2008) note that the input effects they observe in the acquisition of verbal morphology by 2L1/early successive English/French children are selective, with irregular past tense forms being affected more than regular.

To summarize, cross-group comparisons can be used to pinpoint to what extent and for what TL properties input effects exist. In particular, by comparing groups for whom the amount of input systematically varies – and for whom, in the case of 2L1 children at least, many other factors are held constant – it is possible to test the differing predictions made by nativist vs. usage-based theories of language acquisition about the role of the input.

### 3. Methodological issues

In order to guarantee the validity of its results, any study comparing different groups of L2 learners, e.g. to determine the role of age (cf. section 2.2), must ensure that the various groups are as comparable as possible on as many different extraneous variables as possible. In this way, if the two (or more) groups are found to perform differently on the dependent variable(s), one can be more certain that this difference is a result of e.g. age of first exposure, rather than some other confounded variable. This section reviews the most important variables which need to be taken into account in this regard. The first section concerns how to determine age of first exposure and the subsequent three sections deal with how to control for cognitive development (section 3.2), proficiency (section 3.3) and input (section 2.4), respectively. Other factors which should be controlled for, insofar as they are not the focus of the study and as far as is feasible, include: knowledge of other L2s, socio-economic status and acquisitional context (e.g. instructed vs. naturalistic, in the home country vs. in the country of the L2).

### 3.1. Determining age of first exposure

In section 2.1 we discussed the conceptual issues surrounding the definition of (2)L1, child L2 and adult L2 acquisition. Once a certain working definition has been chosen, the question is how to ensure that it is applied accurately and consistently. This section deals with the problem of determining the starting age of any bilingual/L2 participants, in particular that of children.

Age of first exposure is probably most easily determined for cases when there is a clear-cut age of immigration, and hence of first regular exposure to the TL (as in e.g. Haznedar 1997). For many cases, however, this is less obvious. In particular,

ethnic minority children who are born in the country where the TL is spoken but who only have their first regular exposure when entering school may still come into contact with the TL before this point (e.g. Blom, Polišenská & Weerman 2008; Cornips & Hulk 2008). For children who are adopted, the immersion in the TL will generally be more complete, given that the L1 is typically not maintained. In order to determine age of first exposure, and therefore whether such children should (at least a priori) be classed as L2 or 2L1 children, it is important to collect information on how much exposure the child has at home, whether the child has attended day-care (and if so, how frequently and which language or languages were used there) and what the child's level of active and passive knowledge of the TL was when regular exposure began. It should also be borne in mind that the situation may be complicated even further for children with older siblings, who may also be a source of TL input; for this reason, if a study's focus is on ethnic minority children who have had minimal exposure to the TL during the first years of their lives, it may be worth considering first-born children only. It is also important, especially for L2 adults, to consider whether the input is in a naturalistic or instructed setting and whether it occurs in the learner's home country or the country of the L2. Determining age of first exposure may also be complicated when a learner's stay in the country of the TL has been interrupted (e.g. as in McDonald 2000). Ideally, such subjects should be excluded. However, this is not always possible, for example because this may considerably reduce the number of available subjects. If such learners are included in a study, it is essential to check – wherever possible – that any group results do not disguise individual patterns of behavior which may result from inconsistent exposure to the TL, especially if this occurs at an age which is crucial to the study's research question.

To collect all the relevant information, parental questionnaires may be helpful (see Blom et al. 2008; De Houwer 2007; Gutiérrez-Clellan & Kreiter 2003; Jia & Aaronson 2003 for readily usable examples). However, parents may be difficult to reach or hesitant to participate. Their responses may be unreliable, especially if they are asked to report on language patterns from several years previously; they may also reflect social expectations rather than actual input situations. In order to facilitate the completion of parental questionnaires, it is advisable that the researcher (or research assistant) speaks the parents' native language. One could, in addition, consider asking the child him/herself questions on the input situation, or consult the teacher, provided that the teacher is well-informed of course. It goes without saying that many of the issues raised thus far in this section in relation to 2L1/L2 children also hold for L2 adults.

### 3.2. Controlling for cognitive development

Many studies comparing child and adult L2 learners focus on ultimate attainment and consequently, the L2 children are often adults at time of testing, which means that both groups of learners will have reached cognitive maturity and consequently, participants in both groups will be comparable in these terms. This is not the case, however, when the focus of investigation is development, because examining development requires child learners to be children at time of testing. As a result, the learner groups to be compared may differ in terms of cognitive maturity; differences may exist between younger and older children, on the one hand, and/or between children and adults, on the other. Cognitive maturity in the present context should be understood as maturational constraints on information processing capabilities and

other cognitive processes relating to and including memory (e.g. Gavens & Barrouillet 2004; see Schneider 2002 for overview). Child and adult groups may also differ in the amount of metalinguistic knowledge they have at their disposal (Bialystok 1993). Older subjects, if they have had language instruction and perhaps even if they have not, will have metalinguistic knowledge which they could potentially employ in certain data collection procedures. The aforementioned differences restrict the type of task and TL properties which can be used as the basis for cross-group comparisons. This section considers different ways to deal with this issue.

When comparing either groups of child learners (be they L1, 2L1 or L2) with each other, or groups of child learners with adult learners, it is important that the chosen experimental methods should not be too cognitively challenging for the younger subjects, nor, on the other hand, should they be too easy for the older subjects. Striking a balance between L2 children and adults or younger and older children in these terms, trying to ensure that one group is not favored over the other, is a challenge. One option to address this problem is to tailor a particular task to the different (cognitive) abilities of each age group, i.e. use different versions of the task with the different age groups. Although this would address the problem, using different tasks with the different age groups (at least without careful piloting and validation) could make results difficult to interpret as it introduces another variable to the comparison. Disparate outcomes for the different age groups could potentially be due to the differences in the task as well as any differences in the subjects' developing grammars.

A general rule of thumb is to design the experimental task with the youngest subjects in mind. For one, it is often easier to explain to older subjects that the task is

designed for younger children (e.g. for younger brothers and sisters) and that they are being asked to 'play along' rather than trying to simplify a more complex task designed for older subjects such that it can also be used with younger subjects. Furthermore, if numerous changes are required in order to do this, there is a risk that the task will essentially be different for each group, and as noted above, this may have consequences for cross-group comparability. Thus, whereas a task can be presented as a game to younger children, to older children and adults it is possible to explain how the 'game' works but not present it as such (e.g. by omitting the use of a puppet). In such a way, the essence of the task remains the same for all groups, but it is tailored to meet the needs of each. For the selection of tasks and linguistic variables in a cross-group comparison including young children, it is important to note that Theory of Mind develops between ages 3 and 4 (Wellman 1990). For example, the ability to refer to referents outside of the here and now can be tested with L2 children and adults, but this may be more difficult with young L1 children (Gopnik 2009).

Older children and adults may also have metalinguistic knowledge at their disposal which younger children do not (Bialystok 1993; following Karmiloff-Smith 1986). In addition, older children and adults are also likely to have more developed test-taking abilities (Appel 1984:139). It is important to ensure that the use of such metalinguistic knowledge and test-taking abilities is minimized because this might introduce an unwanted variable (or variables) into the cross-group comparison which would at least partly co-vary with age, the latter of course often being an independent variable in such comparative studies. One way to address this problem would be to select a TL property which is sufficiently abstract or complex to reduce the chances of metalinguistic knowledge being applied. Furthermore, selecting a task which is not too testlike may also help.

Further differences between younger and older learners relating (at least indirectly) to their cognitive abilities relate to attention span and working memory, literacy, and vocabulary. Attention span differences between younger and older subjects restrict the length of the data collection procedure as a whole; with younger subjects, it is advisable to spread data collection over several test moments, being careful to – as far as possible – keep external factors (e.g. time of day, time between test moments) as constant as possible throughout. Another option is to reduce the number of test items for the younger group(s). Note, however, that in this case, any statistical analysis will have to be on the basis of percentages (e.g. of correct responses) rather than raw numbers. Using fewer items with younger subjects will of course mean that less information will be available for this group, but this may be inevitable. As with so many of the factors discussed in this chapter, it is up to the individual researcher to evaluate the impact of any decision in the context of his or her own interests. Differences between children and adults in terms of attention span in part relate to working memory capacity. Working memory capacity has been shown to continue to develop into early adulthood (Gathercole & Baddeley 1993), which may complicate any child/adult comparisons, especially on tasks where working memory effects have been observed, e.g. grammaticality judgment tasks (McDonald 2008).

Differences in literacy between older and younger subjects may also constrain the types of tasks which can be employed in cross-group comparisons. Younger children are unlikely to be literate and consequently will not be able to complete tasks which involve reading or writing.<sup>iii</sup> The self-paced listening task discussed in Marinis (this volume) provides a suitable alternative which can be used with groups of all ages.

Finally, as a result of their potentially different learning environments and areas of interest, younger and older learners may differ in terms of the lexical items which they know. It is important to bear this difference in mind when designing tasks for use with multiple populations. Although it is advisable to gear the overall complexity of the task towards the youngest group, it may be possible, depending on the goal of the experiment, to adapt the vocabulary such that it is appropriate for the different age groups. Age-related word lists such as MacArthur-Bates Communicative Development Inventories can be used to check the age of acquisition for L1 children.<sup>iv</sup>

### 3.3. Controlling for proficiency

The construct of language proficiency and how it should be defined and subsequently measured has been the source of considerable debate (see Hulstijn, this volume for discussion of relevant issues). For the purposes of this section, proficiency is understood in its most general sense as a general indicator of an L2er's general abilities in the TL. As Thomas (1994) notes, proficiency measures are necessary when a researcher wishes to compare different groups of L2ers in their acquisition of a given phenomenon. Thus, when a comparison is made between two groups of L2ers with different L1s, it is essential – assuming one wants to make claims about the role of the L1 – that these two groups are comparable in terms of proficiency level. It would be incorrect to, for example, compare a group of L1 Spanish learners of German with a group of L1 Japanese learners of German and claim that the Spanish learners do not transfer their L1 whereas the Japanese do if the Spanish are at an intermediate level and the Japanese are just beginners. Likewise, when comparing different age-based groups of L2ers, e.g. L2 children with L2 adults, it is also

essential to control for proficiency level. To reiterate, if one wants to make claims about the role of age in L2 acquisition, it is vital to control for as many extraneous variables as possible across groups. This section deals with the ways in which one can control for proficiency level.

General measures of proficiency include standardized tests and other accepted measures such as cloze tests. As noted in the previous section, cloze tests are only appropriate when comparing populations with comparable literacy levels. Where available and appropriate, standardized tests are probably the easiest way to establish a learner's general proficiency level. However, such tests are usually designed for a specific age group, e.g. the Reynell Development Language Scales for English (Reynell & Huntley 1985) is normed for children from 1;0 to 6;11, and consequently, if the age (at testing) of the groups to be compared falls outside of this range, different tests will be required. As noted in the preceding section, using a different test with each population may undermine cross-group comparability. To obviate this problem, one might consider comparing learners in different groups in terms of how they score relative to their own norming group. In doing so, however, it is essential to verify that proficiency is operationalized in (more or less) the same way in each of the standardized tests. Ideally, one should use one and the same standardized test normed on various populations. The CYCLE (Curtiss-Yamada Comprehensive Language Evaluation) test (Curtiss & Yamada 1985) is one such test for English. However, for many languages, such a test does not exist. An alternative to using standardized general proficiency tests is to use self-assessment. This method is often employed in studies on L2 adults; it is however inappropriate for learners who are children at the time of testing.

A further alternative to standardized proficiency tests is to take a task which measures a more specific aspect of a learner's linguistic proficiency and use this to extrapolate to a more general level. On the lexical level, this might consist of a standardized vocabulary test like the Peabody Picture Vocabulary Test (Dunn and Dunn, 1997) or if spontaneous speech samples are collected, a lexical diversity measure such as Guiraud's index ( $V/\sqrt{N}$ ) (Guiraud 1960) or Malvern et al.'s (2004).

D. On a morphosyntactic level, measures include MLU, rate of verbal utterances (Valian 1991), rate of subordination (e.g. Hunt 1970) and verbal density, i.e. the number of finite and non-finite utterances per T-unit (see Unsworth 2005, Chapter 5, 2008 for relevant discussion).

Whatever option the researcher chooses, it is important to ensure that the proficiency measure should be independent of the dependent variable measured in the experimental task. Furthermore, one should also bear in mind that many of the measures mentioned in the previous paragraph develop with age and that this will complicate any cross-group comparisons. For example, MLU has been shown to increase into late childhood (e.g. Loban 1976). Given that cognitive maturity thus constrains the production of lengthy and complex utterances (Berman 2007), it is likely that groups of L2 learners with different ages at time of testing, e.g. L2 children and L2 adults or older and younger children, will inherently differ in terms of their MLU. In other words, older learners may have a longer MLU than younger learners not because they are more proficient in the TL but because they are more cognitively mature. It is important to bear this in mind when making cross-group comparisons. One way to deal with this problem is to standardize each group's scores separately and use these scores to compare the groups with each other (see Unsworth 2005, 2008, for more details).

### 3.4. Controlling for (quantity and quality of) input

As noted in §2.4, research on 2L1 and L2 children indicates that being exposed to less TL input than monolingual children may affect linguistic development. This should be borne in mind when making cross-group comparisons, both when comparing monolinguals with bilinguals and when comparing bilinguals who have (had) different amounts of input. It is not only the quantity of input which may differ between (and also within) groups; differences may also exist in terms of the quality of input to which they are exposed. If a study's goal is to determine the role of input in the acquisition process, e.g. as in the studies reviewed in section 2.4, between-group differences will be necessary but within-group differences should be minimized. If input is not an experimental variable, then both within- and between-group differences should be controlled for. This section highlights some of the ways in which learner groups (and learners in general) may differ in terms of input and it outlines several ways in which input may be measured.

The type of input a learner is exposed to may depend on the relationship of the input-giver to the learner, e.g. as parent, teacher, colleague, etc.. It may consist of a standard or non-standard variety of the TL, and it may predominantly come from natives or non-natives. If input is primarily from non-natives, its quality will depend in part on their proficiency level. Furthermore, the type of input to which a learner is exposed may in part depend on the fact that a bilingual's two languages are often context-bound, such that for example one language may be used/acquired at school or work and the other is used/acquired at home. In addition, learners may differ in the extent to which they are exposed to naturalistic and/or instructed input.<sup>v</sup> In order to

avoid introducing a confound into any cross-group comparison, the type of input should ideally be held as constant as possible across the groups to be compared, although the extent to which this really matters may depend on the TL property under investigation. For example, if one group of learners (e.g. L2 adults) have had instruction and the other group in the comparison (e.g. L2 children) has not, selecting a TL property which is the subject of considerable instruction (e.g. verbal paradigms) may not be desirable.

As noted above, the type of input a learner is exposed to may depend on their relationship to the input-giver. For example, unlike adults, young children may be exposed to the special register 'caretaker speech' (Snow & Ferguson 1977) and this has been used to explain certain patterns in children's linguistic development (Schaerlakens & Gillis 1987). Using cross-group comparisons is one way to determine the validity of such claims: 'caretaker speech' is not used with older children or with adults, so if one were to observe patterns in these two learner groups which are similar to young children, this would undermine the claim that 'caretaker speech' is responsible for the pattern found in this latter group. L2ers may also be exposed to non-native input from other L2ers, especially in ethnic minority communities where several generations of immigrants live together. It has been claimed that exposure to such non-native input may have an impact on the linguistic development of 2L1 and L2 children (Cornips & Hulk 2008).

The significance of reduced input or non-standard/non-native input may depend on TL phenomenon under investigation, or on the interaction between TL and age or prior knowledge of another language. That is, L2 learners may display steeper learning curves than L1 learners because they bring more linguistic maturity to the task. For instance, with respect to learning vocabulary, it has been found that L2

children catch up with monolingual peers, in spite of less input both in terms of length and intensity (Golberg, Paradis & Crago 2008). Consequently, it is important to take input quantity and quality into consideration in both the planning and analysis stages of any cross-group comparisons. If input effects are the locus of investigation, then it is precisely those linguistic properties which are subject to input effects which should be selected; however, if this is not the case, care should be taken to select TL properties where input effects are less likely to complicate matters. It is also important to consider a potential role for the input when drawing conclusions about between-group differences. For example, imagine that bilingual children (or adults for that matter) are found to perform significantly worse than monolinguals. Given that a learner's linguistic development may be a function of input quantity, it is important not to be too hasty in drawing conclusions concerning any underlying causes (e.g. the availability of similar language acquisition mechanisms) for this difference.<sup>vi</sup> Let us take another example: suppose that older L2 learners are found to perform better than younger L1 learners, in spite of having been exposed to less input. Such a result does not necessarily imply that usage-based accounts are unfeasible, because input may interact with other factors that are not held constant in the study (e.g. age, L1/L2).

Whether one seeks to investigate or avoid input effects, it is necessary to have at least a rough estimate of the input to which the various learner groups are exposed. Clearly, the input can be documented most precisely by measuring it directly (e.g. via recordings and transcribing these using the tools available at CHILDES), but this requires additional resources. A less direct and probably more common method is to use a questionnaire to be completed by either the (adult) participant, a parent and/or teacher (see e.g. De Houwer 2007, for an example of a simple questionnaire, Gutiérrez-Clellen & Kreiter 2003, for a more detailed one). Various other options

exist for a more general estimate of the kind of input to which a particular learner group will be exposed. These include analyzing input in already existing corpora such as those available via CHILDES and determining the input on the basis of a review of the literature on the relevant ethnolect or on the typically errors made by L2ers who may serve as non-native input-givers.

#### 4. Dos and don'ts

- Do think carefully about how best to define different groups. Remember that definitions may vary depending on the hypothesis being tested and the languages and target language properties involved.
- Do try and collect as much information as possible from subjects and their families in order to provide an accurate a picture of e.g., their age at first exposure, the quantity and quality of input to which they are exposed, their knowledge of other languages, etc..
- Do take into account the cognitive maturity of any groups to be compared and how this might affect the tasks which can be used. Think about differences in working memory, attention span, metalinguistic awareness, Theory of Mind and literacy.
- Do wherever possible use the same data collection techniques and methods with each group in order to ensure cross-group comparability.
- Don't make any far-reaching claims about differences between groups of learners until as many potentially confounding factors as possible have been controlled for. Think about the amount and type of input that learners in the

different groups are exposed to, their cognitive maturity and for the L2 groups, their level of proficiency.

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<sup>i</sup> The difficulties involved in how to determine this are discussed in section 3.1.

<sup>ii</sup> On a construction grammar approach to L1 transfer, where the L1 grammar becomes more entrenched with age, L1 transfer may not be the same for L2 learners of different ages (see e.g., Ellis 2008, for relevant discussion).

<sup>iii</sup> It is of course also possible that some L2ers will not be literate in their L2, regardless of their age.

<sup>iv</sup> There are versions of the CDI adapted for a range of languages. Specific information can be found here <http://www.sci.sdsu.edu/cdi/cdiwelcome.htm>.

<sup>v</sup> Those who have been instructed may have received explicit and/or corrective feedback; an overview of the different types of instruction is beyond the remit of this article (see DeKeyser 2003; Doughty, 2003).

<sup>vi</sup> Paradis et al. (2007, 2008) make a similar point concerning the over-diagnosis of bilingual children as being language-impaired (see Paradis, this volume, for relevant discussion).