1 Defining and Assessing Multilingualism

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1. Introduction

In the Western world, monolingualism used to be considered the rule and bilingualism the exception. This belief, which is also reflected in language policy and the treatment of minorities, is not based on the actual situation. There are 30 times more languages than countries, so although there may be a few countries that are monolingual, many are not. Monolingual countries certainly do not exist if we also take dialect differences into account. In addition, 70% of the world’s population speak 12% of languages; there are thus only a few ‘big’ languages: Chinese, Spanish and English score high, but so too do Hindi and Panjabi/Urdu.

When looking at universal scale, there is every reason to assume that, numerically, multilingualism is the rule, and monolingualism is the exception. Nevertheless, for a large part of the Western population, there remains the perception that monolingualism is the ‘normal’ and desirable situation.

In this handbook, various forms of multilingualism are presented. This chapter focuses on how multilingualism should be defined and how it can be assessed. One of the main points will be that multilingualism should be viewed as a dynamic process rather than a state. Zhao and Li (2010) point to the impact of dynamic language competition as a major force in language development. They view transfer and interaction between languages as dynamic processes, not states. This is a clear break from traditional perspectives on interlanguage (see Bialystok and Sharwood Smith 1985, for a comparison of views).

2. Defining Multilingualism

A distinction should be made between multilingualism at the individual/psycholinguistic level and multilingualism at the group/sociolinguistic level.

Multilingual groups do not necessarily consist of multilingual individuals. A well-known example is Belgium, officially multilingual (Dutch/French/German), yet most
of its citizens are essentially monolingual with only a rudimentary level of proficiency in the other languages. Given the main theme of this volume, the sociolinguistic perspective is not discussed here any further.

There are many definitions of bi/multilingualism. A simple definition could be: ‘use of two or more languages by a language user’. Such a definition faces interpretative problems. An obvious one is: what is one language? Or: what is a language? Is it a set of rules and a list of words, or is it a code in which members of a particular social group communicate with each other, or more fundamentally a symbol of the group to which someone belongs? Actually, it’s all of those things and a definition based on just one is insufficient. What exactly is one language? Is a speaker of a dialect who also uses the standard language according to that definition not bilingual? The same holds for different styles and registers in a language or dialect. One solution might be to ask the linguist to draw up a set of criteria that defines two language systems, so they can be named as different languages. Unfortunately, that is not a solution; there are no hard criteria for determining the difference between languages or between languages and dialects (Otheguy et al. 2015). The boundaries that register within a language, between different dialects of a language and even between languages are not clear. In addition, there is a problem with the amount of knowledge one should have of another language system to count as bilingual. One can count the number of strange words that someone knows or the number and difficulty of grammatical rules that one has learned, but that does not tell us very much about language usage and the language user’s own estimation. A Dutchman who knows 300 English words and five constructions for simple sentences will probably find himself more bilingual and able to do much more with that knowledge than a Dutchman who knows 300 Moroccan-Arabic words and five sentence constructions, mainly because he can borrow from his first language (L1) for English, but hardly for Arabic.

The solution to the problem should not be sought in formal criteria but in conventions. The Dutch language is not what is found in dictionaries or reference grammar, but what the speakers of that language system think is good. When speakers of a specific Dutch dialect consider themselves able to speak a dialect of Dutch, this is the case, even though the dialect researcher may show that the dialect has as many characteristics of German as Dutch. Here we will be following as a definition: multilingualism is the daily use of two or more languages. In the following sections, this will be elaborated by considering why people are of become multilingual, what the role of language contact is, and to what extent multilingualism is a system that can grow or decline depending on the type and amount of use.

3. **Why Is Someone Multilingual?**

Though this is not an issue that comes up frequently in neuropsychological research, a relevant question is ‘Why is someone bilingual/multilingual?’ The answer to this question, the reason for multilingualism, is actually quite simple: ‘Because one language is not enough’. Apart from some polyglots or other language lovers, people do not just add a new language to their repertoire. There is always a pragmatic reason, and almost
always that motive will be socioeconomic in nature: one can improve oneself or one’s children in a socioeconomic sense. In some communities, multilingualism is the norm and children grow up with two or more languages, but even then, there is a motive: with only one language the child cannot participate in daily activities.

The reasons why people become multilingual are also relevant from a neurological perspective: the age at which they learn a new language, the amount of time they invest into learning it, the modality used, the degree to which they lose it (see Bahrick 1984), and the way it is acquired or learned. All these factors have been shown to have an impact on cognitive processing and in the structure of specific parts of the brain. The recent interest in the ‘bilingual advantage’ suggests that multilingualism has a moderating effect on age-related cognitive decline and leads to a delay of onset of dementia by several years. This may have inspired people worrying about cognitive decline with age, to pick up learning a new language just for the benefits mentioned, but whether learning another language at a later age has the same effects as being bilingual or multilingual from birth, is still a matter of debate.

The need for skills in more than one language may also be temporary, e.g. related to a stay abroad or working conditions. On return, there is no need to use that language anymore, it will not be used at all, and will become lost to some degree. This happens with members of the Latter Day Saints congregation: as part of their education, young men and women are sent to foreign countries to proselytize. They are trained to a very high level of proficiency and sent to a country that may not be their own choice at all. They will live in that country for some time and continue their language learning. Once they come back, they will completely stop using the language they used abroad. Research by Lynne Hansen and her colleagues at University in Hawaii has shown that there is indeed substantial attrition in the years after returning, but at the same time, a lot of supposedly lost knowledge is still accessible (Hansen et al. 2002).

4. Language Attrition

In addition to the research on attrition mentioned in Section 3, there has been a significant body of research on first and second language attrition (see also Chapter 7 in this volume). When asked about the remaining skills they have of a school-learned foreign language like French in the Netherlands, Germany or the USA, former learners of that language will indicate that ‘they lost it all’. However, research on attrition shows that there is much more retention than is assumed. A series of studies by Grendel et al. (1993) on French as a foreign language in the Netherlands and the USA show that it is very difficult to prove that there is attrition: only in situations of no contact at all, will there be some signs of attrition in productive language use, while receptive skills appear to be stable.

There are different types of attrition. The two most relevant ones are the slow decline of well-acquired aspects of a language, which is attested by the work of Bahrick (1984) who showed that even after decades, a significant proportion of the foreign language skills are still available. The other type that has so far not been studied extensively is the immediate forgetting in a learning situation. An example could be a speaker of Danish who is learning a difficult and non-cognate language like Hungarian. They may be in a
lesson and may acquire some lexical elements during the lesson, but also during that lesson, elements (words, patterns, pronunciation) that were taught and partly acquired at the beginning of the lesson are gone when tested. It seems as though there is a built-in forgetting mechanism in language learning. Learners need 6–10 repetitions of words before they begin to stick (Nation 2013). Every time it is seen or heard, the level or activation of an element will be elevated and it will be seen as acquired only when it can be produced when tested.

In addition to foreign language attrition, there is also first language attrition (see Chapter 7). This mainly happens in migration settings in which the original language of the home (the heritage language) is taken over by the language spoken in the environment, typically the national language. As with foreign language attrition, research shows that language skills are resilient. Schmid (2010) presented data on German refugees in Britain who emigrated from Nazi Germany in the late 1930s. Some of them gave up using German completely, but when tested decades later, turned out to have kept a considerable part of their German language skills.

In short, a lot of research has been done on first and second language attrition and the data typically shows substantial retention rather than attrition. This is particularly true in settings in which specific languages are not used frequently, but that does not mean that all the skills are completely lost: using a relearning paradigm, it can be shown that some residual knowledge is left which makes relearning easier (Oh et al. 2010; van der Hoeven and de Bot 2012).

5. The Role of Contact

Multilingualism follows from language contact. Wei (2011) mentions a number of factors that play a role in language contact: politics (conquests, colonization, ethnic cleansing), natural disasters (floods, earthquakes, failed harvests or emergencies), religion (conquests, but also a move to the religious home country, like Israel), culture (the need to know certain languages), economy (migration for economic reasons, ex-pats), education (availability of higher education, language of education other than home language), and technology (ICT, internet and English media).

Though the literature on language attrition clearly shows retention of language skills, the amount and type of contact play a role in the development and maintenance of multilingualism. We simply do not know how much and what type of contact is most effective in language maintenance or, conversely, how little leads to decline. This is an issue in the research on the bilingual advantage mentioned in Section 3. The idea is that multilingualism requires the use of certain executive functions, e.g. for code switching and language selection, and that these domain-specific skills are transferred to domain-independent skills. But what constitutes multilingualism is often far from clear: it can be bilingualism from birth or in early childhood, but also languages learned later in life in a natural or an educational setting. The language contact may stop at some point or be continued over the lifespan. It may be intense or sporadic, intimate or public, rich or poor. So, when it is claimed that early bilingualism has a positive effect on age-related decline, the characteristics of the contact should be established.
6. Measuring Language Contact

Measuring language contact is notoriously difficult, mainly because (retrospective) data may misrepresent the real situation. In the Bialystok et al. (2005) study, a parent questionnaire was used to assess amount of input/use of both languages in the home situation. A number of instruments have been used to assess language contact and often questionnaires on contact and use are administered. Informants or their parents are asked to indicate how often and how much they used what language in a given period (e.g. last week/month). For adolescents and adults, language use diaries have been used frequently (Kim and Starks 2005; Helm 2009). More recently, internet-based methods have been used to assess language use and contact. Zhuravleva et al. (2015) collected data on language use through an internet-based application that required informants to provide information online about languages, settings, and conversational partners used at the moment of reporting. A comparison between post hoc questionnaires, language diaries, and online prompted reports shows that the latter provide richer data, but the informants in the study, all of them university students, raised issues of privacy that prevent the wide application of this type of contact data collection. Two more instruments are used frequently: the language history questionnaire (LHQ, Li et al. 2006) and the language experience and proficiency questionnaire (LEAP-Q, Marian et al. 2007). Although they have been used widely, there is no research to show what type of contact is more effective. Contact can range from intimate conversation to stand-up comedian performances. The learner may also bring specific characteristics, such as the ability to focus and pay attention, working memory capacity, and other executive functions, but also motivation to provide extensive data, privacy control, and experience with an appreciation of social media use to research purposes.

When we go beyond the problems associated with the definition described above and focus on someone who is bilingual, for example, German-English, the level of bilingualism is not easy to determine. In language usage, four skills are usually distinguished: reading, writing, listening, and speaking. Within these skills we can distinguish between subordinate skills: knowledge about sounds/letters, grammatical knowledge, word knowledge, and pragmatic knowledge. Amongst the latter, we understand the whole of conversational conventions, stylistic variation, and the like. In addition, language is used in different situations, in sociolinguistics, usually called ‘domains’. These include the work situation, the home situation, but also specific areas such as ecclesiastical activities or special hobbies. Thus, in determining someone’s bilingualism, we have three dimensions that play a role: the four skills, the subdivisions within it, and the domains in which the languages are used. To make it even more complicated, we can also distinguish dimensions of skill related to correctness and fluidity. Someone can speak very fluently but make many mistakes, or say little but do so without error. What should then count as the greater language literacy is not so clear.

A relevant question here is whether a ‘perfect bilingual’ actually exists. In the kinds of research that will be featured in this volume, we look at the relationship of bilingualism with other features, such as intelligence, cognitive functioning, school success, attitude, and the like. Many studies make the assumption of whether or not someone is
bilingual and there is a simple bifurcation between the two. Research that is based on this division has been questioned in recent years. It has become increasingly clear that degree of bilingualism is a continuum rather than a dichotomy. As discussed, one must assume a certain lower limit to indicate someone as ‘non-bilingual’.

7. Models of Multilingualism

7.1. Language Mode Model

Grosjean (1982) suggested a model of multilingualism in which languages can be activated to different degrees. Each of the languages can be activated or deactivated depending on characteristics of the language use situation. For a bilingual, the two languages can be activated more or less equally when there is a setting in which both languages can be used, e.g. a conversation with other bilinguals. But someone who is travelling abroad alone with no compatriots to talk to will be in a monolingual mode, with the native language almost completely deactivated and the other language fully activated. As Grosjean put it: ‘Bilinguals differ from each other in terms of how much they move along the language mode continuum. Some stay at the monolingual end, while others will move right along the continuum, choosing different points on it depending on the person they are speaking with, the topic and so on’ (Grosjean 2010, p. 42). In Grosjean’s model, different languages are seen as separate entities that can be manipulated independent of each other. In the literature on multilingual processing, activation level is often used to describe the state of a multilingual system, but what exactly level of activation is, remains vague. It has to do with accessibility/retrievability and may be related to the amount and type of brain tissue involved or with the degree of effort needed to activate it. In Grosjean’s model, level of activation is the core issue, but it is left ill-defined. More recently Grosjean (2016) has developed his ‘complementarity principle’, according to which, the type and degree of multilingualism will be determined by the individual language user’s communicative needs.

If activation level has to do with effort, the question arises whether the cognitive system has a certain amount of resources available for language use and whether this is the same for monolinguals and for multilinguals. The assumption is that managing multiple languages takes more resources than managing one only. If the amount of resource is limited, then activating an additional language will be at the expense of the other languages in the system. There is some research suggesting that having more languages leads to a slowing down of processing (Mägiste 1979), but the effects are small, in the 20–50 ms range.

With respect to the activation of brain tissue, research comparing incipient learners of a second language and more advanced languages suggests that more brain tissue is activated in beginners (see Chapter 12). However, what that means is also far from clear: is the task more demanding in L2 and therefore is more computational power needed? Does more activated brain areas imply more processing power?
7.2. **Multicompetence Model**

In Cook’s multicompetence model (2016), the languages do not work independently; use of one has repercussions for the others. In the introduction to the Handbook on Multicompetence, Cook mentions three premises:

- Premise 1: multicompetence concerns the total language system (L1, L2, Ln) in a single mind or community and their interrelationships.
- Premise 2: multicompetence does not depend on the monolingual native speaker.
- Premise 3: multicompetence affects the whole mind, i.e. all language and cognitive systems, rather than language alone.

7.3. **Complex Dynamic Systems Theory (CDST)**

A full description of the application of CDST to multilingualism is beyond the scope of the present chapter (for more detailed accounts see, de Bot 2008; Larsen-Freeman and Cameron 2008; de Bot et al. 2013). There are clear links with Cook’s model in that languages are not treated as solitary items, but as part of a larger language system. Language and cognition are embedded and embodied which means that the boundaries between the self and the environment are permeable. CDST looks at development over time and for language and multilingualism, this means that there is no distinction between language use and language learning. Development is dependent on resources and is influenced by initial conditions. Variation is inherent in development and is the motor for change.

Language development is seen as a complex dynamic process which means that many variables play a role in language development, and their interaction may lead to unpredicted and chaotic outcomes. The system is essentially non-modular (Spivey 2007). The claim from a CDST perspective is that it can describe and to a certain extent explain individual patterns of development. CDST also holds that subsystems interact with each other over time. The consequences of a CDST perspective also imply that what applies to the individual mind also applies to the community of users, with the individual embedded in the group.

8. **The Multilingual’s Brain**

A currently prominent question is to what extent multilinguals’ brains are different from those of monolinguals or bilinguals. The literature on the impact of multilingualism on executive functions and other cognitive factors has exploded in the last five years. (See Pliatsikas this volume). There are strong indications that the use of multiple languages leads to structural changes in the brain (Li, Legault and Litcofsky 2014; Abutalebi et al. 2011). A basic question in this context is: Do languages have their own neural substrate? Grosjean’s model would suggest that different languages can be manipulated independently. Functionally, languages may appear independent of each other and this may reflect different locations for different languages in the brain. The evidence for this is slim. There is data on neuroimaging that are relevant for this
discussion. Early studies (such as Kim et al. 1997) suggested that there are different substrates for L1 and L2, but more recent studies have shown that the findings were in fact caused by other factors. Stowe (2006) concludes her review of this literature by stating: ‘There is no consistent qualitative difference between the neural architecture supporting processing of (the) two languages’ (p. 305).

Various factors have been assumed to lead to different localizations in this particular age of acquisition and level of proficiency, but the argumentation has changed. It is likely that anything acquired early is represented differently compared to what is acquired late, and this applies to language as it does for other aspects of memory and cognition. Differences in proficiency reflect frequency differences that are likely to have an effect on representations. So what leads to differences in processing and localization may be the effect of age of acquisition and frequency and tells us little about differences in neural substrates for different languages. As Paradis (1990) has been arguing for quite some time, differences in proficiency may lead to other strategies being used, that may be reflected in different brain areas showing activation, but again, that is not about the localization of L1 or L2 in itself.

Views on representations and their relation to brain structures have changed considerably over the last decade. Hagoort (2006) summarizes the earlier views as follows: ‘Architectural differences in the brain structure are indicative of functional differences and, conversely, that functional differences demand differences in architecture’ (p. 93). In other words, differences in processing reflect differences in representation, and because there are differences in processing, there must be differences in representations. Following Hagoort again, the new views on cognition and the brain focus on the plasticity of the brain on the basis of input. ‘Functional differences between brain areas are in this perspective mainly due to variability of the input signals in forming functional specializations. Domain specificity of a particular piece of cortex might thus not so much be determined by heterogeneity of brain tissue, but by the way in which its functional characteristics are shaped by the input’ (Hagoort 2006, p. 94). This means that use shapes the brain and modularity is not innate but emergent: due to repeated and associated use, certain brain areas will show module-like behaviour. In the same way, it could be argued that different languages in the brain are emergent. Associated use networks will emerge that represent a given language, but these networks are constantly changing and highly individual, because individuals’ experiences and contacts with the language will vary.

A number of studies report data based on cortical stimulation. Bello et al. (2006) presented data on multilingual patients and they squarely conclude: ‘Sites for each language were distinct and separate’ (p. 125), but on the whole, there are mixed findings on localization based on cortical stimulation (Ojemann and Whitaker 1978; Lucas et al. 2004; Cervenka et al. 2011).

So will we ever find evidence for clearly separable networks associated with different languages? It follows from the argument given earlier that this is very unlikely. There is no stable substrate, only instable and constantly varying networks without language labels. Different settings will activate different language forms that have different and constantly changing networks in the brain. It is therefore pointless to continue to try to find the location of different languages. There is an interesting parallel with an earlier
discussion in the area of the bilingual brain. For quite some time, it was assumed that in bilinguals the right hemisphere plays a more prominent role in language processing than in monolinguals. Paradis (2004) in a biting commentary has compared this line of research with the search for the Loch Ness Monster. It must be there. We assume that we just have to search harder and in unlikely places, but it is never found. The same holds for languages in the brain. The data available suggests that the same areas are active for different languages, and there may be language specific subnetworks for different languages, but these are yet to be discovered. An interesting finding reported by Xu et al. (2009) is that spoken language and symbolic gestures seem to be processed by a common neural system, but again, the argument could be that at a finer level of granularity they may be different both in localization and in connectivity.

9. Languages as Separate Entities in our Brain

What evidence is there for stable and language-specific processing and storage? There is a wealth of literature, mainly on the bilingual lexicon in which various experimental techniques have been used to study bilingual processing (for an extensive treatment see de Groot 2011). The discussion has been defined in terms of selective vs. non-selective access (La Heij 2005). The consensus now is that the lexicon is organized in a non-selective way according to Paradis’ subset hypothesis (2004, 2009): In the lexicon subsets are formed based on use. Since words of a given language tend to be used together, they form a network. For speakers who often code switch, subsets may develop that consist of words that come from different languages according to an external norm. It should be noticed that for a particular speaker words need not be defined as belonging to one language or another. Paradis’ model is clearly usage-based and emergent. What the elements in the lexicon are is not entirely clear: They may be single words, but more likely there will be larger units that are ‘sedimented’ on the basis of frequency of use. It may well be that ‘words’ don’t have a separate status in the language system at all, since they are hardly ever used in isolation.

The idea of subsets is not limited to the lexicon, the same principles may be at work for syntactic or phonetic patterns. As argued in de Bot (2004) there may be links between elements at different levels that may coactivate each other: a sound that is associated with a specific language may activate elements that ‘belong’ to that language.

One of the continuing discussions is about whether elements are labelled for language. La Heij (2005) argues that if the conceptual specification is detailed enough, no language labels are needed, while Hartsuiker and Pickering (2007) present a model in which the language tag is an integral part of the conceptual specification. From an emergentist perspective, it is unclear why there should be explicit language tagging, since co-occurrence and associations of linguistic elements with specific settings and interlocutors would suffice to lead to the selection of the right words and thus the right language. This is the general mechanism: language elements are encountered in specific settings and stored as such, and similar settings will lead to the activation of related elements. Elements will thus be associated with language use activities. Elements can be labelled consciously as belonging to a specific language set but language as such does
not act as a cue in selection. For monolinguals the associated linguistic elements will come from one language, for a regular code switcher from two or more languages. But again, such labelling is only done post hoc and at a metalinguistic level and it is not necessarily a selection criterion. This means that there may not be separate languages in the brain, but only situation-specific utterances. Such utterances may at a metalinguistic level be labelled as belonging to a specific language, but that does not mean that they are tagged as such in the brain.

The next question then is: Does code switching exist? If there is only one merged system, and the speaker uses those elements that are associated with the setting, there is no switching in the proper sense. The fact that elements from two languages are used does not mean that there are separate languages in the system of a code switcher: a code switcher simply takes the elements that are most appropriate and accessible. To quote Hopper (1998): ‘Language is not a general abstract possession that is uniform across the community, but is an emergent fact having its source each individual’s experience and life history and in the struggle to accomplish successful communication’ (p. 164).

As already mentioned in this chapter, the idea of separate languages in the mind of the second language learner has been generally accepted in the field of applied linguistics. The use of terms like ‘transfer’ and ‘interference’ reflects this kind of thinking. Data from very early writers in a second language (L2; Dutch learners of English in the first grade of secondary education, Verspoor et al. 2012) show that at least for this very early stage it is difficult to talk about two language systems. Below are short stories by two early foreign language learners:

Hello dis is my school he staat in apeldoorn. he is very big ai have very veel teachers op my school and ik have er to very veeler zijn to very veel kids op dese school de teachers and de kids walking door de school en have very veel lol de englisich teachers says enlisch

(Hello this is my school it is located in the city of Apeldoorn. it is very big and I have very many teachers at my school and there are very many kids at this school the teachers and the kids walk through the school and have a lot of fun the English teachers speak English).

Hello, i am Arnoud. I sit op the grammar school the Driestar College. I found it well funny. I have nu veel more homework dan first. I hate english and techniek. It are very crazy teachers. We have many leerlingen in the new klas. I have veel friends. I moet heel veel biken to school. It is ongeveer ten tot vijftien km biken.

(Hello, I am Arnoud, I am at the grammar school called Driestar College. I found/find it nice. I now have a lot more homework than before. I hate English and Science & Tehcnology. The teachers are very crazy. We have many pupils in the new class, I have many friends. I have to ride by bike a lot to get to school, it is about 10–15 km to my school)

Data such as these cast at least some doubt on the idea that early learners have separate systems. There can be no doubt that these young writers intend to write in English, but they will be well aware of the fact that what they actually write is a mix. But it is the best they can do.
It has been argued in this contribution that the existence of languages as separate entities can be questioned; rather than a set of distinct systems of words and rules, there may be situation specific sets of utterances that at a metalinguistic level could be labelled as belonging to a given language. This requires a fundamentally different conceptualization of what constitutes a language. In most of the research on multilingualism the existence of languages as separate entities is not questioned and accepting this new perspective on language, which is consistent with a CDST approach to language, is so different from the current dominant perspective that it will take time and effort to explore its consequences.

10. Measuring Multilingual Proficiency

Globally two approaches are used to measure language proficiency: standardized, mostly discrete point tests on the one hand and self-evaluations on the other hand.

In a number of studies, the outcomes of self-evaluation and ‘real’ proficiency have been compared. Grendel et al. (1993) looked at proficiency in French as a foreign language and used a number of formal test formats (cloze, repetition, lexical decision, translation) and self-evaluations. Her data showed that there are differences in the accuracy of self-evaluations between languages/cultures: Dutch informants tended to overestimate their proficiency, while American students showed less of a gap between tests and self-evaluation. In particular, in studies on language attrition, self-evaluations have been used based on the ‘Can-Do’ format of the Common European Reference Framework (CEFR). The format used is like the following: ‘I can order a simple meal in language X’, or ‘I can understand an Lx radio news item spoken at a normal speed’.) Can-Do statements have been related to one of six levels: A1/2, B1/2, and C1/C2. C2 is the native-like level, while A1 reflects very simple language skills. The CEFR allows for a comparison on proficiency which can be very useful for a comparison between studies on the impact of proficiency. Studies comparing self-evaluation and standard tests show contradictory findings. In the studies on language attrition the correlation between the two is fairly low (0.30/0.40), but other studies found higher correlations (Marian et al. 2007). In multilingual neurolinguistic studies, language proficiency is typically measured through very simple self-evaluation tests like ‘Rate your speaking proficiency on a scale of 1–10, with 10 as native level, and 1 for very minimal proficiency’. Quite often, language proficiency questionnaires and language use questionnaires are combined in a single instrument, and then statistical procedures are used to find the main contributing factors.

There is a host of instruments and tests to assess proficiency in foreign languages. In addition, there are a number of instruments that look at multilingualism in an integrated way, (i.e. not looking at single languages but looking at the total language system in which, in a traditional approach, the various languages are studied with respect to overlap and difference). A number of instruments have been developed that measure various aspects of languages, but most studies focus on vocabulary. A good example is Lextale (Lemhöfer and Broersma 2012), a five-minute test for English vocabulary knowledge and proficiency. It is based on earlier tests by Meara in which the testees
are presented with letter strings that are or are not legal words in the target language. The scores on illegal letter strings provide information on guessing. Huibregste et al. (2002) provide an analytic method to correct for guessing and response style.

The LexTale test is rather widely used and it has been validated by comparing the outcomes of this test with a number of standard tests for English with Dutch and Korean learners of English. They compared the scores on the LexTale test with various other tests including L1–L2 and L2–L1 translation and with self-evaluations, as mentioned an often used format. Correlations between LexTale and translation tasks were fairly high (0.78) for the Dutch participants but much less so for the Korean group (0.50). The authors conclude that LexTALE is a good predictor of English vocabulary knowledge, it correlates high with general measures of proficiency and is clearly superior to self-ratings in predictive power. LexTale is now available for English, Dutch, German, and Korean.

Marian et al. (2007) developed a questionnaire of bilingual language status: LEAP-Q. The goal of the project was to develop a reliable and valid questionnaire for efficient assessment of bilinguals’ linguistic profiles, so it combines questions on use and contact with questions on language proficiency. The questionnaire provides information about language experience and proficiency. The authors provide an overview of the use of self-ratings to measure language proficiency and – in contrast to Lemhöfer and Broersma (2012) – conclude that: ‘In general, previous research suggests that self-reported language measures are indicative of linguistic ability’ (p. 941). At the same time, they conclude that ‘ratings of proficiency alone are not sufficient to determine bilingual language status and that bilinguals’ language learning and language use experienced play a significant role in shaping their linguistic competence’ (p. 942). Proficiency ratings were obtained for speaking, listening, reading, and writing, and rather than being combined into one single aggregate score, the skills were kept separate in the analyses, since individuals may show substantial differences in levels of proficiency for these skills. There were questions on when informants started learning a language, when they started reading, whether they were immersed in a foreign country setting, and how much language exposure of family/friends/reading/TV/Radio/self-instruction was seen as contributing to language learning. The statistical analyses showed that the LEAP-Q has a high validity and internal consistency. It is available for English/Spanish, English/Mandarin, and English/Russian. The questionnaire cannot be used for the assessments of language ability in children with speech disorders, since it has not been tested in these populations.

Another widely used instrument is the LHQ and its internet-based dynamic version (LHQ 2.0). This is an extensive collection of tests aimed at both language proficiency and language uses and contact. ‘It allows investigators to dynamically construct individualized LHQs on the fly and allows participant to complete the LHQ online in multiple languages’. (Li et al. 2014, p. 673).

A somewhat older instrument to assess language contact and use in relation with learning is the one by Berns et al. (2007). It gathers fairly detailed information about language use in different modalities and different media, including lyrics from pop-songs. An interesting component is the question asking to what extent a particular source contributed to language proficiency. The question had the format shown in Figure 1.
11. Dynamic Assessment

A recent development is the use of dynamic assessment (DA; Lantolf and Poehner 2011). In DA, the focus is on the learning potential of a learner rather than on their (in)abilities. Traditional standardized testing has been criticized for not providing information that is relevant for interventions since it mainly concerns what the learner cannot do. The idea of DA is based on Vygotsky’s zone of proximal development (ZPD), which itself is based on what a learner can or cannot do in interaction with a more proficient peer or teacher. The amount and type of information that is provided to the learner reflects their learning potential. Most of the research on DA is done with children, and some studies have included language disorders, but there seems to be little research on DA and bilingual language disorders, though the focus of potential learning is as relevant for healthy people as it is for people with some sort of disorder. The DA approach deviates strongly from traditional forms of testing in that the focus is more on validity than on reliability and more on individual development than on group means. The usability of DA to test bilinguals with language disorders is yet to be established. Not surprisingly, DA shows characteristics of CDST in that it takes into account change over time and the interaction between the individual and the group. Learning potential is not seen as something fixed, but as something that may change in interaction with other factors, such as additional language learning.

To summarize this section: there is still no clear view on the validity of the use of self-evaluations to assess level of proficiency. The correlations between self-assessment and standard tests range from fairly low (0.25) to high (0.75). Several questionnaires have been developed and tested and they provide profiles of different types of learners, which is in line with the tendency in language studies to take individual differences into account. Finally, a new trend is to focus on potential rather than achievement through the use of dynamic assessment.

12. Conclusion

In this chapter two aspects of multilingualism have been highlighted: its definition and how it can be assessed. Definitions range from a minimal non-balanced level of proficiency to a high-level balanced level. How multilingualism should be defined depends
on one’s model of what constitutes language. Here we define language as a set of situation-specific utterances that only at the metalinguistic level can be labelled as belonging to a given language. There seems to be no reason to assume the existence of languages as separate entities in the brain that have their own demarcated substrates.

The second aspect concerns the assessment of multilingualism. Again, what can be tested depends on what constitutes language and languages. In neurolinguistic research, self-evaluations have been applied regularly. To what extent self-evaluations are valid and reliable to test language proficiency is a matter of debate: there are contradictory findings on the correlation between self-assessments and other forms of assessments. A promising new development is the use of dynamic assessment that takes learning potential rather than achievement into account.

REFERENCES


Defining and Assessing Multilingualism


