

Methodology in Bi- and Multilingual Studies

From simplification to complexity

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Research methodology is determined by theoretical approaches. This article discusses methods of multilingualism research in connection with theoretical developments in linguistics, psycholinguistics, sociolinguistics, and education. Taking a brief glance at the past, the article starts with a discussion of an issue underlying the choice of research methodology: the distinction between bilingualism and multilingualism. This is followed by an account of the way in which traditional methods of research diverge and have expanded to include additional methodologies, which are shown to accommodate new theories and the most recent data in the field. Special attention is paid to the emerging research directions employing methods of *conceptualization*. Overall, the paper presents a review of the current state-of-the-art including an account of the latest trends in research methodology on bilingualism and multilingualism, as well as a looking-forward analysis of the challenges and potential future methodological developments in the field.

Introduction

Interest in the study of bilingualism and, especially, multilingualism has grown considerably over the last decades. Therefore it seems that now is the opportune moment to explore the current state of the research methodology and potential research avenues for the coming years.

Early approaches to the study of bilingualism were grounded in a monolingual view on language acquisition and use. Today's scientific conceptualization of bi- and multilingualism has a strong focus on multicompetence, and the bi-multilingual speaker as a language user in his/her own right with emerging qualities, which clearly differ from those of a monolingual speaker. Still, research in the field often includes a streamlined view of multilingualism as a case of bilingualism. The authors of this article see bilingualism as a case of multilingualism. Therefore, in

this article the term 'bilingualism' will only be used when the distinction between bilingualism and multilingualism is pertinent for the argument.

Research methodology on multilingualism is remarkably open in that it allows for a wide range of approaches. Various specific perspectives on bi- and multilingualism, such as psychological, educational, social, cognitive, emotional, or political, contribute to a broad-spectrum range of methods. Acknowledging the remarkably wide variety of methods and approaches available to those interested in the field of multilingualism, we recognize a great diversity of referents and processes in formal and informal settings, in individual and communal life, and refer both to learning experiences and a practical use of languages.

A wide diversity of traditional methods of psycholinguistic and sociolinguistic research continue to be intensively employed by researchers of bi- and multilingualism. In this paper we do not intend to delve into the discussion of time-honoured methods (see Li Wei 2013; Li Wei & Moyer 2008). Along with that, a significant change is taking place as new methods are developed as well as borrowed from both neighboring and distant disciplines. Not less important is that methods in bilingualism and multilingualism research have lately been undergoing scrutiny as to their reliability, adequacy, and appropriateness for these disciplines.

Two important tasks are, therefore, essential if we wish to understand the current and future state of research methodology in bi- and multilingualism: (1) to untangle the similarities and commonalities in bilingual and multilingual phenomena and processes, as well as where bilingualism and multilingualism significantly diverge; and (2) to elucidate the issue of mutual appropriateness of methods for bilingualism and multilingualism.

The aim of this article is to present an overview of research methods in the field, paying special attention to those that, rather than being mainstream methodologies, represent promising developments from various angles.

In particular, rather than dwelling on the traditional important quantitative and qualitative methods, in this article we will highlight the role of methods that use "conceptualizations" of various kinds. We will also unravel the rapidly increasing recognition of dynamic systems and the complexity theory (DCT) approach, which is particularly important for multilingualism as it is compatible with the highly complex nature of the phenomenon of multilingualism, as fully discussed in a later section.

Following these general aims, the first section is dedicated to a review of the past, which is the precursor of the present situation and emerging developments. The second section deals with the DCT approaches, that are increasingly recognized as fruitful and apposite for the nature of multilingualism, together with methods based on conceptualizations of different kinds. Section three of the

article and the conclusions analyze the challenges and trends in current research methodology, opening the horizon for the future.

1. Looking at the past: Research on bilingualism and multilingualism

The time-honored methods of research in the field of bilingualism have been discussed in a number of publications (Hornberger & Corson 1997; Li Wei 2013; Li Wei & Moyer 2008). The areas of interest in multilingualism research have been identified as stemming from linguistics, psycholinguistics, neurolinguistics, sociolinguistics and educational linguistics (see Jessner 2015a), and they have been investigated using both qualitative and quantitative methods. Methodology in traditional and current bi- and multilingualism research includes research approaches and instruments that range from questionnaires, observations, and elicitation techniques to corpus work, and also involves specific criteria for the analysis of a given phenomenon, for instance criteria for the classification of code-switches, as done by Gardner-Chloros (2008) on bilingual speech data (see Li Wei & Moyer 2008). In multilingualism studies similar methods and techniques are used, but the greater complexity of the field of research, study design, identification of groups, individuals, etc., all present methodological challenges for researchers. In practice, multilingualism is still often approached from a bilingual or even monolingual perspective, and its appropriate study is frequently avoided, due to perceived difficulties.

The most outstanding and influencing result of past research has been the increasing realization that, bilingualism and multilingualism, despite obvious common traits, might differ in significant ways. While the study of multilingualism may be rightly thought of as stemming from the study of bilingualism, at the same time, at present, multilingualism is a separate field of study with its own populations to study and research methods to employ. Accordingly, research methodology has undergone adjustments. As discussed below, systemic differences between bilingualism and multilingualism exist and these are significant because they carry crucial implications as to how we deal with the phenomena of societal and individual bi- and multilingualism. The implications of recognizing these important differences for research methodology concerns is hard to overestimate.

An increasing number of studies attest to the dissimilarity of bilingualism and multilingualism from a variety of disciplines. For instance, in applied linguistics, Strik's (2012) work on syntax acquisition compared how Dutch-French bilinguals and trilinguals –Dutch-French-Italian- children acquire interrogative structures of three languages. Strik concluded that “the mere presence of a third language creates a different situation compared to bilingual acquisition; more precisely, an

additional potential source of cross-linguistic influence” (Strik 2012: 49). Results pointing to the variation between bilingualism and multilingualism have been reported in pragmatics studies as well. In her longitudinal case study on the pragmatics of interaction between the participants’ three languages, Catalan, Spanish and English, Safont-Jordà (2012: 112) found “quite a different pattern” in the use of politeness strategies in the third language. Jessner and Cenoz came to the conclusion that “multilingual learning is not bilingual learning” (Cenoz & Jessner 2009: 122).

Neurolinguists consider multilinguals “[u]nique in their ability to learn an additional language, and their ability to activate or inhibit their other languages while communicating in one” (Goral 2012: 721). They report that “[c]ertain unique properties of multilinguals are beginning to be noticed, particularly regarding early language representation, gray matter density, and speed of lexical retrieval” (Higby, Kim & Obler 2013: 68). Similarly, the experiments on switching cost (measured in response times when switching from one language to the other) show unexpected results regarding switching cost asymmetry in multilingual participants (Costa et al 2006; Kroll et al. 2008, in Goral 2012).

The data obtained by Kemp (2007) also point to a possible threshold effect for grammar learning strategies, which “may mean that, compared to L2 learning, augmentation in number and frequency of strategies used, occurs to a greater extent during the acquisition of the third language, increasing more gradually in additional languages” (Kemp 2007: 257). De Angelis (2005), in her research in cross-linguistic influence declares a “system shift” in her study of *non-native* lexical transfer “a type of behaviour that speakers of two languages do not display, highlighting the uniqueness of multilinguals’ behaviour, and the need to view multilinguals as unique learners and speakers, rather than as bilinguals with additional languages” (De Angelis 2005: 14). She asserts that “the interaction between non-native languages cannot be assumed to be governed by the same principles that govern the interaction between the native and one non-native language” (De Angelis 2005: 14). The puzzling additional qualities, “threshold effect”, “system shift” and switch cost oscillations amount to what Herdina and Jessner (2002) labelled as the M(ultilingualism)-factor.

Importantly, these findings also suggest that specific methods should be applied to study multilingualism that would be consistent with its very nature. As Flynn, Foley and Vinnitskaya (2004), researchers in the field of multiple language acquisition, put it, “investigation of third language (L3) acquisition by adults and children provides essential new insights about the language learning process that neither the study of first language (L1), nor second language (L2) acquisition alone can provide” (Flynn, Foley & Vinnitskaya 2004: 3).

The main difference between bilingualism and multilingualism is their respective degrees of complexity (Aronin & Jessner 2015; Aronin & Singleton 2008, 2012b). Not all the systems are complex in the same way. It is the interaction, not the mere number of agents, factors, or parts that matters in complexity. “Complex” (not to be confused with ‘complicated’, which means ‘compiled of many elements’, and therefore not necessarily complex) involves multiple active interactions between the parts which lead to countless, often unpredictable, outcomes.

The criteria for defining lower or higher level of complexity can be seen in terms of the number of items involved, such as the number of steps, algorithms, symbols, parts, etc. The quantifiable measures that testify to a higher or lower degree of complexity are the intensity of a phenomenon, the amount of effort required, and the rate and density of the items under review. All these factors lead us to posit that multilingualism is more complex than bilingualism (see more on this in Aronin & Jessner 2015).

An additional language beyond two [languages] crucially raises the level of complexity of learning and using them. Compared to research in bilingualism, the range of findings, outcomes, and interconnections in multilingualism increase exponentially as, importantly, the variation does. This has important implications for research methodology.

It should also be added that bilingualism and multilingualism are close and overlapping in many ways, but as a bilingual turns into a multilingual, quantitative and qualitative differences become deeper, to the extent that the nature of the emerging linguistic, social, economic, political and educational phenomena changes (Aronin, Fishman, Singleton & Ó Laoire 2013). This theoretical understanding has led to realization that (1) research methodology on bi- and multilingualism partly overlaps, but also diverges. Both feed each other; (2) not all the methods useful for research on bilingualism are equally suitable for studying multilingualism; and (3) multilingualism research is in need of its own, distinctive methods, appropriate for the study of its distinct nature. There are also methods used in multilingualism research that are not applicable to bilingualism, due to the fact that bilingualism lacks features that a multilingual system has. In short, bilingualism and multilingualism are distinct in a number of ways and hence not all bilingualism research methods are appropriate for the study of multilingualism, this being the reason why multilingualism employs specific methods of its own (see also Aronin and Hufeisen 2009).

1.1 New trends in research methodology: Dynamic Systems and Complexity Theory (DCT)

Multilingual development is both a dynamic and complex process and, as can be seen from the above discussion, nowadays scholars are realizing more and more that, the interaction of a variety of factors needs to be taken into consideration in the study of multilingualism. The investigation of the complexity of multilingualism seems to lend itself to being approached from a dynamic systems theory/complexity theory (DST/CT/DCT) perspective, a recently much discussed approach in the field of (second) language acquisition research (see e.g. De Bot et al. 2007; Dörnyei 2014; Larsen-Freeman & Cameron 2008). In the Dynamic Model of Multilingualism (DMM) (Herdina & Jessner 2002), DCT is applied to multilingual acquisition and use. Based on DCT principles, the development of a multilingual system is characterized by its non-linearity, reversibility, stability, interdependence, complexity and change of quality. Multilingual systems are adaptive and dynamic, which means they are able to change depending on the perceived communicative needs of multilingual individuals. This means that language choices are psychologically and socially determined and are the driving force of language learning and use. The language development of multilinguals includes both acquisition and attrition processes (see also Jessner 2015a).

Larsen-Freeman and Cameron (2008) rightly argue that when we work with a DCT-approach “...the nature of explanation changes, cause and effect no longer operate in the usual way, and reductionism does not produce satisfying explanations that are respectful to the interconnectedness of the many nested levels and timescales that exist” (2008:241). They also provide a number of methodological perspectives to be followed from a DCT-perspective and suggest the adoption of modified research methodologies ranging from ethnography, formative experiments, and action research as well as longitudinal, case-study, time-series approaches, micro-developmental studies and computer modelling, brain imaging and the combination of a number of methodologies in order to be able to provide valid answers to new research questions (241–50; see also De Bot, Lowie and Verspoor 2011). Examples of DCT-methodology-driven studies in the field of bilingualism and SLA would be studies on individual variability in development in learners of English by Verspoor, Lowie and Van Dijk (2008), Meara (2007) on the application of Boolean networks to the growth of vocabulary, and Larsen-Freeman (2013) on how to combine CALL and design-based research. A longitudinal study on the development of linguistic awareness in multilingual attrition (LAILA) is currently under way at Innsbruck University.

We will now turn to the new methods other than those used in research framed in DST and complexity.

1.2 New trends in research methodology: Conceptualizations

Along with DCT, there are other streams of research progressing current multilingualism and addressing it from different vantage points. The methods employed can all be gathered together under the umbrella term of *conceptualizations*.

Conceptualizations. The methodology of conceptualizations has evolved gradually and has grown exponentially in recent years. Conceptualizing, or applying theoretical thinking, entails interpretation of data from a number of view points. This can include clarifying terms, developing new concepts and constructs, applying novel perspectives to already studied phenomena. The whole field of multilingualism, and specific areas within it, are being conceptualized. First of all, there is a group of concepts and constructs in bilingualism and multilingualism *per se*, which can serve as methods or lenses of examination. Of these, we can name the affordances perspective (Gibson 1977, 1979), multi-competence (Cook 1992, 1996, 2013) and Dominant Language Constellations (Aronin 2006, forthcoming). Using metaphors as a way of exploring bilingual and multilingual reality proved to be useful (e.g. Hornberger 2002). The lines of research, in themselves, act as a methodology for the wider area of multilingualism. This means that the concepts, the theories, the particular methods and techniques of the disciplines involved, are applied to multilingualism studies. In addition, the main subject of a line of research, as, for instance, focusing on material objects in ‘the material culture of multilingualism,’ allows an unorthodox approach and research questions to deal with established issues in multilingualism. It also injects a wealth of additional data previously deemed irrelevant. In other words, a line of research which previously might have been thought of as unrelated or tangential to multilingualism studies, contributes what adds up to a methodology (approach, concepts, terms, theories, research questions, methods and techniques, and research subjects).

In this way, historical multilingualism studies serve as a methodology of research and use historical and linguistic methods and techniques. The material culture of multilingualism perspective draws on ethnology, anthropology, sociology, and linguistics and, consequently, employs the methods and techniques of all the disciplines involved and also has the material objects as subjects of research. Finally, the philosophy of multilingualism is an overarching, global methodology of conceptualization in multilingualism (Aronin & Singleton 2013).

In what follows we will briefly characterize each of these lines of research.

Affordances perspective

This perspective originated in works by Gibson (1977, 1979) in the area of biopsychology. It has been successfully continued by his wife Eleanor, who extended the approach in the theory of perceptual learning in infants and toddlers (Gibson &

Pick 2000). Various called a construct, a concept, or perspective, the affordances approach is employed in various fields of knowledge, such as design (Norman 2002), aviation and technology (Gross et al. 2005; Hutchby 2003; Warren & Owen 1982), psychology, pedagogy (Good 2007; Heft 2001), SLA (Segalowitz 2001) and now in multilingualism.

The perspective was adopted in studies of multilingualism comparatively recently and it is slowly but increasingly receiving more attention (Andrason & Visser, forthcoming; Aronin 2013; Aronin & Singleton 2010, 2012a; Dewaele 2010; Singleton & Aronin 2007, 2009; Visser 2012, 2014).

Further theoretical development of the concept in one area of research can be projected to other domains of human interest. In this way, categorizations of affordances into *surefire affordances* and *probability affordances* (Scarantino 2003:959–160) *goal affordances*, and *happening affordances* (Scarantino 2003:958) have explanatory power and have allowed Aronin and Singleton (2012a) to attribute different outcomes in language acquisition to different kinds of affordances. Happening and surefire affordances seem to be stronger predictors of success in language learning. Visser (2012, 2014) applied the perspective of affordances to the exploration of the multilingual educational scenarios in South Africa. Her goal was to determine optimal circumstances for the development of plurilingual competences across school and university contexts, with implications for language policy in South Africa.

Most recently, a study by Andrason and Visser (forthcoming) demonstrated that insights from the affordances perspective can contribute to developing a more comprehensive model of grammaticalization. Notably, Andrason and Visser point out that “scholars who conduct their research within different frameworks and ‘schools’ of linguistics may communicate and collaborate if they work under an overarching umbrella of affordances.”

In all these studies the use of the abstract concept of affordances allows for a fresh view of circumstances often already explored by more traditional methods. The construct of affordances directs the attention of researchers in such a way that some new previously not noticed characteristics are visible; data deemed not significant, now count as supplying important evidence toward some goal.

Multi-competence

The perspective of multicompetence, born within the bilingual perspective (Cook 1992, 1996, 2013; Cook & Li Wei forthcoming), is highly appreciated in research on language acquisition and use. It originated in SLA research, and it has proved increasingly valid in the studies of multilingualism. In accordance with the views accepted at that time and stage of societal awareness in language and languages, the methods used for studying multi-competence were for a long time the traditional ones used in applied linguistics.

Multicompetence approaches to the development of language proficiency in multilingual education have turned out to cover a range of new perspectives in learning and teaching multiple languages. The link between SLA and bilingualism has also paved the way for the so-called multilingual turn in current publications on multilingual teaching (cf. Jessner 2015b, May 2014).

More recently a Dominant Language Constellation concept was suggested in order to further exploration of the phenomenon of multicompetence. As we explain next, multi-competence is expressed and can be studied via Dominant Language Constellations.

DLC. Dominant Language Constellation

Dominant Language Constellation refers to a group of one's most important (vehicle) languages, functioning as an entire unit, and enabling an individual to meet all needs in a multilingual environment (Aronin 2006; Aronin & Ó Laoire 2004). DLC is not the same as a person's language repertoire. A language repertoire includes all the languages known to a person. In contrast, a Dominant Language Constellation includes only the most expedient languages for a person, those which together perform the most vital functions a human language performs (see Figures 1 and 2)



Figure 1. DLC Arabic community Israel. 5-point stars and — languages of language repertoire; 'planets'/ rounds — repertoire languages with weaker knowledge or seldom in use. 4-point stars: languages a person is exposed to in her close environment and often understands — whether separate words and phrases, or more. It can be either a heritage language in a family or a language often heard due to social proximity, whether, by wish, or by circumstance.

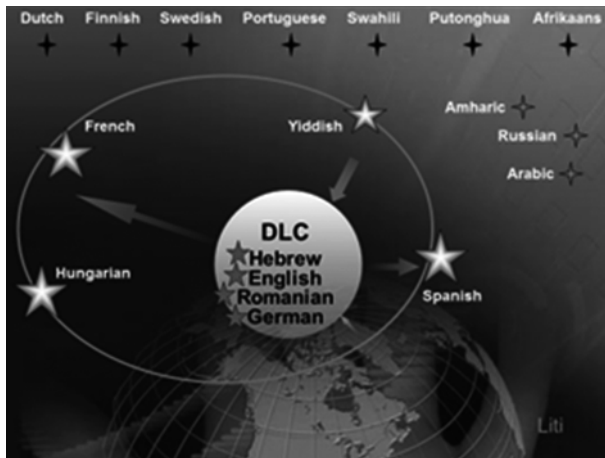


Figure 2. Israel DLC Jewish sector Hebrew/English/Romanian/German 5-point stars and — languages of language repertoire; ‘planets’/ rounds — repertoire languages with weaker knowledge or seldom in use. 4-point stars: languages a person is exposed to in her close environment and often understands — whether separate words and phrases, or more. It can be either a heritage language in a family or a language often heard due to social proximity, whether, by wish, or by circumstance.

Like affordances, a DLC is not a tangible phenomenon, but rather a mental construct allowing for thinking of multilingualism from a different angle (conceptualizing). Researching language acquisition and use through a DLC means “considering whole sets of languages as units, rather than focusing, one by one, on the specific languages used by given individuals or groups.” (Aronin & Singleton 2012b:69). The DLC approach shifts the study of language acquisition and use away from the monolingual perspective, by re-setting the point of departure from one to several languages. A DLC approach thus works as a methodology because it enables shifting the focus from the investigation of separate languages, to the exploration of their constellations.

Moreover, the concept of the Dominant Language Constellation can serve as an abstract model in research into language acquisition and language use (Aronin forthcoming). A DLC, perceived and investigated as a system, which it certainly is, is manageable and allows specifying and organizing previously obtained knowledge. In this way, it is possible to assemble data, either in language policy, applied linguistics, or language acquisition, in a single resource, in a way that is efficacious for further analysis in a language acquisition and social context (For more on a DLC as a method for exploring multi-competence, see Aronin forthcoming).

Depending on particular interest of a researcher and the demands of the situation, it is possible to study the same DLCs in their various facets with the desired amount of detail. For instance, the knowledge about a DLC used by a large group

of people, could be most useful in language acquisition. Studying cross-linguistic influences in typical DLCs would be welcome, as this work on CLI would be more focused on particular populations. When several DLCs are active in the same country, or in the neighbouring countries, the exploration of their interactions will be informative, both for language contact studies and for the sociology of language.

To this end, descriptive studies of language constellations, followed by correlation and comparison studies will be useful. Gradually, communal DLCs will be studied synchronically, and also diachronically, in their dynamics and changes. Mapping the DLCs and defining patterns that are common and rare, patterns that 'work' for career, or integration into a community, or for mobility or any preferred style of life, will contribute to multilingualism research.

Both as an abstract model, and as the lens through which a particular real multilingual situation is perceived, DLC carries out the functions of systematizing, organizing, specifying and collecting the data regarding how multilinguals deal with multiple languages in parallel, and how societal multilingualism occurs in real places and communities.

Using metaphors as a method of thinking

Metaphors are employed not only in poetry and belle lettres as rhetorical devices; they have long been used to understand the world around us, and later in science as a tool to facilitate the grasp of abstract conceptual ideas in various domains of knowledge. By providing a particular type of comparison by analogy, metaphors capture the essence of the phenomenon under exploration, and open up researchers' mind to generating new solutions.

Focus established by the choice of a particular metaphor determines seeing some real things as highly important, and others as irrelevant for scholarly attention (see also work by Condamines and Narcy-Combes, 2013, on applied linguistics as a situated science).

Conceptual metaphors work as models for abstract phenomena and processes, and provide insights for their understanding. Metaphors define the focus of exploration, direct scholarly vision, delimit the content of the research and, in a way, pre-determine research outcomes, as well as forming attitudes of laypeople and intellectuals towards phenomena of life.

In multilingualism the most common and productive metaphors are those of mobility, flux, exchange and network. Among the new ones, most recently, Aronin and Politis (forthcoming) propose a metaphor of 'edge' for the study of multilingualism, employing the metaphor for granting insights, while drawing on findings and approaches in the natural sciences for understanding multilingualism better. In biology, geography and adjacent disciplines, it was discovered that

natural edges, such as boundaries between forest and grassland or between ocean and continent (coastline), are no more than just mysterious places. They appear and behave differently to centers. The transitional zones attract, harbor or trigger intensive activities and are no less important than habitats, communities or ecosystems which they separate.

The finding that “edges is where the action is”, applies to multilingualism too. It is easy to project the following specific features of edges to bilingual and multilingual phenomena: (1) the borders are both abrupt and gradual at the same time; (2) edges differ considerably from non-edges in appearance and structure. The boundary habitat allows for greater diversity, and changes in population or community structure take place; and (3) borders have considerable impact on the inner areas that they separate. All these characteristics are collectively called *the edge effect*.

Understanding “edge” as the border, boundary, margin, and verge, or the intersection of two planes shows how metaphorically suitable this concept is for multilingualism. In fact, multilingualism studies describe recognising and experiencing boundaries of all kinds, fixing them, crossing them, and breaking them.

Fundamentally important discussions in linguistic, bilingual and multilingual research revolve around boundaries, transitional zones and intersections. In bilingualism and multilingualism edges increasingly become accepted and treated as a norm (think of the interlanguage concept, L2 and L3 user each — as a language user in his or her own right).

Even if the issues that are crucial for bilingual and multilingual discussions are not explicitly labeled as such, the lengthy disputes of linguists, educators and other stakeholders in multilingualism, depend on decisions regarding borders for answers. Disputes on terminology such as “who is a bilingual” or “what is a language” largely rest on where the boundaries are set.

Another area of multilingualism where considering and examining boundaries is essential is the field of language contact. Its traditional emphasis is on the connection and interface of people and groups; researchers are interested in how languages come in contact, and what makes them interact in various ways, it is about limits and boundaries in the first place.

The metaphor of edge can reveal how distinct territories or groups of language speakers deal with the fact of division and separation, and the impact of borders, when it comes to managing or handling them. Consider the community of Irish speakers in the Republic of Ireland. The physical border between the Gaeltacht areas, and the English-speaking rest of Ireland, is meaningful for the country in many ways other than simply marking the physical territory. This border is also symbolic, and concerns national and ethnic identity, history, and the current rise of the national aspiration to learn Irish better, and use it in more domains.

Sociolinguistically, the Gaeltacht areas and Irish language users may be thought of as displaying an edge effect, in the sense that they have their own distinctive properties which differ considerably from mainstream English speakers.

In multilingualism, where a researcher encounters both physical and intangible, human-imposed edges, we might wish to search for signs of a meaningful divide. Drawing on the natural sciences, specific indicators for edges in multilingualism, such as between communities and groups, or between monolinguals, bilinguals and multilinguals, could be worked out. Further investigation into the ethics of multilingualism and language policy would open up, if we were able to detect the invisible and symbolic edges. The metaphor of edge provides one more way of understanding multilingual experience by suggesting the coherent structure of the metaphor. It provides new meaning to the knowledge accumulated on multilingualism and re-directs researchers' attention to yet unexplored edges.

In studies of multilingualism, where the disciplines of sociology, linguistics, ethnography, political thought, among others, come together, accepting the ubiquity and 'normalcy' of edges in complex reality, eases the unnecessary tension of multiple lines of research trying to exactly define the undefinable, and encourages admitting the reality of transitional entities.

Research avenues serving as research methodology

The avenues of research by themselves serve as research methodology, supporting and modifying the general way a discipline develops.

As mentioned in an earlier section, the historical perspective on multilingualism is in itself a methodology for research. Within this framework, the studies on the history of multilingualism use the methods of history and of linguistics. Scholars engage in the study of documents of the past, events, governmental, and regional requirements and strategies. They examine texts, analyzing and comparing language forms and detecting code-mixing. Scholars in the history of multilingualism study and develop methods to see societal, lexical and structural traces of change (Braunmüller 2007).

A historical exploration of the way individuals and communities used their languages, as well as the roles of the languages themselves, throws light on the present and future (Hernández-Campoy & Conde-Silvestre 2012). Researchers rightly note that different forms of historical multilingualism lead to differing consequences, such as receptive multilingualism, productive multilingualism, convergence due to language contact, and linguistic stability, despite language contact (Braunmüller 2007; Braunmüller & Ferraresi 2003). An article by Rindler-Schjerve and Vetter (2007) with a tell-tale title, "*Linguistic diversity in Habsburg Austria as a model for modern European language policy*" (Our italics) spells out not only the practically useful implications of the past experience, but also demonstrates

how historical research works as a method; in this case a model for the present situation.

The historical method broadens the view on multilingualism to inform the future, with the help of what Braunmüller (2007) calls 'a looking forward perspective'. It provides a rich store of information on how, and under which conditions, socio-linguistic changes take place, and which multilingual scenarios are likely to occur (see also Hernández- Campoy's contribution to this volume).

Close to the historic approach and overlapping with it, are the emerging methods of the material culture of multilingualism. The difference from the methods in anthropology and history is that the quantitative and qualitative methods of material culture research are aimed, not only at the past, but, mainly, at the present.

The material culture of multilingualism is an emerging branch of multilingualism studies. It complements the overall research methodology of multilingualism, and modifies it. It moves the outlook on language and society from accepting the stance of purely linguistic, psychological and other domains, studying mostly intangible ephemeral subjects, to a view that includes the material circumstances of acquiring and using languages individually and in society (Aronin 2012; Aronin & Ó Laoire 2012, 2013).

Investigating bilingualism and multilingualism is notoriously challenging due to the elusiveness and complexity of factors such as attitudes or languages. In an effort to capture multilingual reality traditionally, sociolinguistic research has to accept 'soft data', mostly based on self-reports, questionnaires, interviews, recollections and surveys. These may be biased or inaccurate, and thus not reliable (see Hernández-Campoy, this volume).

Unlike these, material objects and artefacts, being part of everyday experience, represent solid evidence. The physical environment is rich in cues about the use and acquisition of languages. Material culture is the world of objects, artefacts, commodities and other physical items, produced by humans, interconnected by, and with local and global mentality, culture, tradition and social life. These include buildings, domestic utensils, books and memorabilia, instruments, and tools, jewelry and metal street manhole covers, as well as events and spaces.

In multilingualism the aim of the investigation of materialities is to find out how they are connected with, and how they influence language learning, teaching, and the identity of multilinguals, as well as the multilingual community on the whole. The subject matter is material culture in its interaction with and influence on whatever we choose to explore — learning strategies, early multilingual development, classroom research, and maintaining a heritage language in a minority group, socio-cultural research (see e.g. Jessner, Megens, Unterthiner & Baur forthcoming; and the papers presented at the 26th international conference on Second Language acquisition and Foreign Language Learning, dedicated to

the Material Culture of Multilingualism Szczyrk, Poland, 22–24 May 2014. Bielska 2014, Gabryś-Barker 2014; Komorowska 2014; Niżegorodcew 2014).

Materialities provide a unique insight into multilingualism due to their nature and properties; they are corporeal, physical and concrete; things have odour, volume, texture, width, size, etc. They are mostly solid, often portable, dynamic in space and time, and may be changeable in form and value. Material artefacts present “hard”, three dimensional evidence for research.

Permeating both public and private realms, materialities reach deeper into everyday life. How, when and why, in which manner particular items are used, or placed, or moved, gives additional data for multilingualism research. Calculating and interpreting the density of material objects offer additional opportunities for measurement.

All these qualities provide plentiful opportunities for research. Material culture studies can contribute to the investigation of multilingualism by (1) serving as essentially representative evidence; and (2) offering additional opportunities for measurement. The material culture research perspective is also usable as an additional method, a tangible basis, for triangulation.

The field of the ‘economics of language’ has developed more intensively recently and it is one of the ‘emerging’ topics of multilingualism (Grin 1999). Gorter and Cenoz (2009) introduced the research method used in environmental economics. In exploring the economic dimension of the linguistic landscape, which is informative in multilingual settings, they deployed the contingent valuation method as a way to assess the economic value of various languages. Economics of language studies are met with appreciation in the scientific community, but are still scarce on the ground.

Finally, there is a philosophical level of conceptualization of multilingualism: the philosophy of multilingualism. The realm of philosophical examination of issues of bi- and multilingualism is the highest level of conceptualization. The philosophical conceptualization is distinct from other research methods in its scope and ways of research. The philosophical method of research “avoids using the senses and relies on reflection” (Lacey 2001: 252).

To engage in the philosophical level of investigation requires that enough empirical data are collected in a research discipline. By now, multilingualism has arrived at a situation appropriate for engaging in philosophical concerns. In common with other fields of research, multilingualism studies already make use of concepts which are employed by philosophers, such as dichotomy, inherent qualities, form and content, quantity and quality, relativism, and determinism. Likewise, multilingualism actively employs cognitive notions, which are crucially important and also fall within the scope of philosophy, such as belief, understanding, reason, judgment, sensation, perception, intuition, guessing, learning and forgetting. But

most importantly, research on multilingualism has amassed an impressive and diverse treasury of empirical data. All these call for reflection and commentary, drawing on both the traditions of philosophy, and the fruits of the recent empirical research into multilingualism. The time has come to subject multilingualism in its entirety to philosophical scrutiny.

2. Challenges and potential future developments in research methodology

The problems and the advantages of multilingualism are interconnected, in the same way as in the rest of human life, benefits and losses come hand in hand. Methods of research are no exception.

Today's research can enjoy opportunities from a diverse range of disciplines. With that, a number of new research methods, and the opening up of traditional methods of adjacent disciplines, have impacted the realities of research methods decisions. There is the problem of proper choice of methods from the vast range of those available. This is quite a new challenge. The decision-making process becomes less straightforward, and requires knowledge and scholarly maturity from a researcher to arrive at the appropriate decision, regarding the choice of methods and techniques.

On the one hand, to apply one's knowledge from all the possible fields to solve current, real-world problems is in line with the current trend of multidisciplinary in research. On the other hand, the selection and combination of methods of research in multilingualism is now a challenging task, especially for students and novice researchers, since there are so many methods available, and employing those from another discipline requires solid knowledge of the discipline in question.

The third challenge would be the interpretation of findings. As multilingualism studies adopt the methods used in other domains (such as sociology, linguistics, and psychology) and from fields previously deemed unrelated to multilingualism (such as mathematics and economics), additional methods to help with the study of multilingualism become a temptation for a researcher. This is, no doubt, a positive development. However, with newer and appealing methods, the problem arises of how to interpret the results obtained with the help of, say, neuroscience imaging methods. It is impossible to be an expert in all the possible domains of bi- and multilingualism. A researcher faces the challenge of deciding whether s/he is expert enough to use the appropriated or borrowed methods and to interpret them in a sufficiently informed, reliable and valid way. Extrapolating and interpreting results from the adjacent disciplines becomes a crucial concern.

The challenges originating in the current global situation itself are shared by other areas of human knowledge. The main causes of challenge are twofold. Firstly, dynamic flux and change of all the aspects of global reality, and, secondly, the intensive development of the fields of bilingualism and multilingualism, the vigorously unfolding new phenomena, and the sudden and unexpected changes in social practices (Aronin, Fishman, Singleton & Ó Laoire 2013; Aronin & Hufeisen 2009). A challenge, standing significantly central in bi- multilingualism, is the problem of the mismatch between the rapidly changing reality and the methods used by researchers to understand such reality. Paradigms, trends, principles of participants selection do not always keep up with the pace of change in the area of language acquisition and use.

It is not secret that many researchers realize the difficulty of researching multilingual phenomena and processes, with their complexity and multiple agents and factors. The research community is faced with the dilemma of how to treat the numerous past studies performed *de facto* on multilinguals, but announced as being on bilinguals or second language learners. Furthermore to focus on one language, such as English, in a multilingual learner means to ignore possible influences from other language systems.

The response to the challenges mentioned above comes in the form of re-conceptualization. The most prominent and significant issues in re-conceptualization in methodology arise from distinguishing between bilingualism and multilingualism. With regard to the above problem with bilingual or multilingual research, Jessner (2006: 14) calls for 'reorientation' of research on 'de-facto' multilinguals to specific to multilingualism and its concerns.

Developing models specific only to multilingualism, and not to bilingualism, is a realization and re-conceptualization of the field of bi- and multilingualism. A number of models specific to multilingualism have been proposed: The Factor Model developed by Hufeisen (2000, 2001; Hufeisen & Gibson 2003); the Multilingual Processing Model elaborated by Meisner (2003); an ecological model of multilinguality, presented by Aronin and Ó Laoire (Aronin & Ó Laoire 2004); a role-function model, put forward by Hammarberg and Williams (Hammarberg 2001; Williams & Hammarberg 1998), and the Dynamic Model of Multilingualism (DMM) proposed by Herdina and Jessner (2002). (For a more comprehensive explanation of the models see Hufeisen 2005, 2010; Hufeisen & Marx 2003; Hufeisen & Neuner 2004; Jessner 2008a, 2008b). They provide frameworks for understanding the processes and phenomena of multilingualism.

Thus, the nature and the development of methodology of bi- and multilingualism necessitate constant monitoring, recalibrating and reorganizing of the use of methods, both novel and those already in common use.

At this point, the following potential future developments seem plausible.

It is sure that the complexity trend will be increasing, and spreading into more disciplines and areas of bi- and multilingualism, SLA and TLA. Hence, we envision that more novel or unusual methods will be implemented in multilingualism as scholars increasingly realize its multidisciplinary and wide ranging character.. Additionally, it might be wise to continue developing already consolidated methods, such as affordances, philosophy, material culture, and the historical method.

Concluding thoughts

We believe we can speak of the following trends in the research methodology of studies on bi- and multi-lingualism:

1. A recent tendency to appropriate methods of study used in disciplines traditionally thought to be rather 'distant' from research into language acquisition and use (Aronin & Hufeisen 2009: 115).
2. A trend towards a remarkable increase in cross-disciplinary investigations in methodology of multilingualism as well as in bilingualism.
3. The use of conceptualization, which actually serves as a method of research. The concepts and perspectives of affordances, multi-competence, Dominant Language Constellations (DLC); the use of metaphors for research purposes; the fields of material culture of multilingualism, historical multilingualism are advancing the field of multilingualism and opening it up. The philosophy of multilingualism is equally a promising avenue of research in the field of multilingualism at large.
4. We have also pointed to the growing divergence of bi- and multilingual research, and explained how the methods grew in the core of bilingualism but now increasingly more methods are specifically multilingual.

Indeed, the overall trajectory of methodology can be said to have moved from simple to complex. The unfolding of theoretical assets, accepted ways of explaining the bilingual and multilingual reality do not appear in a smooth way. A step by step accumulation of data can suddenly develop into an explosion of certain topics and corresponding methods of research into a position of extreme interest.

While time honoured methods persist, new methods are making their way, and more intensive use of the emerging and complexity methods is expected.

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