



EUROPEAN POLICY BRIEF



COGNITIVE EFFECTS ACROSS THE LIFESPAN:

IMPLICATIONS FOR POLICY

Advancing the European Multilingual Experience (AThEME) is a 5-year collaborative research project investigating cognitive, linguistic and sociological issues in multilingual Europe. This particular policy brief is based on AThEME findings dealing with the linguistic and cognitive effects of multilingualism; it is complementary to the Policy Brief on Cognitive Aspects of Multilingual Communicative Interaction.

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INTRODUCTION

Linguistic diversity is one of the key features of the EU and is seen by many as a valuable resource for economic growth, social cohesion and cultural identity. The European Commission formulates this idea as: *'The harmonious co-existence of many languages in Europe is a powerful symbol of the EU's aspiration to be united in diversity, one of the cornerstones of the European project.'* Since language policy is currently determined on the national level, the EU plays more of a supporting but nevertheless crucial role in promoting and/or maintaining linguistic diversity by coordinating or supplementing actions of its Member States. During the December 2017 Council of the EU, the EU heads of state reiterated this important role and called on Europe and its institutions to continue efforts in *'enhancing the learning of languages, so that more young people will speak at least two European languages in addition to their mother tongue'*.

The current common public understanding of multilingualism often oscillates between two opposite views: the negative view that multilingualism is effortful and communication between speakers of different languages is more difficult than when speakers share the same language; and the positive view that regardless of the context and type of exposure experienced by speakers, multilingualism is always beneficial, especially from the perspective of general cognitive abilities. Three open issues are raised by these views:

- First, the common perception underlying both views is that multilinguals are either better or worse than monolinguals; multilingualism is therefore always defined by implicit or explicit comparisons with monolinguals, who still are the standard point of reference in many educational, health, and policy settings (as was described in our earlier Policy Brief on Regional minority languages published in March 2018)). Research and public practice as well as policies in society should recognise that, increasingly, it makes more sense to compare multilinguals with other multilinguals along a continuum defined by many different experiential factors (such as age of first exposure, quantity and quality of input received, level of active use, and literacy).
- The second, related issue concerns the importance of active language use and communicative interaction, in addition to passive exposure: this is generally underestimated in both bilingual and language learning settings.
- The third issue is whether multilingualism is the only type of experience that may 'train' the brain and have positive linguistic and cognitive effects: if other types of experiences have similar outcomes, they might be combined in particular ways to enhance learning.

Besides bringing important nuances to the public understanding of multilingualism, these issues also have relevant policy implications. Evidence-based policies are considered essential for effective decision-making, but all too often (preconceived) perceptions and assumptions play an unintended role in informing certain policies. For example, many educational policies on language learning at school implicitly assume that limited amounts of passive exposure to a second language are sufficient, or that the same type of exposure is equally effective for younger and older children. Also common is the idea that separation between the two languages should be in place to ensure proficiency in both languages; or that contacts between the two languages is an index of 'confusion' in bilingual speakers or 'contamination' in bilingual communities (see Policy Brief Regional minority languages). Moreover, a misinterpretation of current research is that linguistic and cognitive effects are brought about by multilingualism regardless of the amount and type of communicative interaction and use of the spoken language. Finally, the educational curriculum can benefit not only from the effects of multilingualism and language learning but also from other types of training.

In an effort to contribute to a better understanding of the effects of multilingualism, AThEME researchers investigate children and adults speaking or learning different languages in different communities and educational contexts. Their findings show that:

- The effects of multilingualism on cognitive control depend on the status of the two languages and the dynamics of communicative interaction in bilingual communities.
- Multilingualism affects not only cognitive control but also speakers' sensitivity to the appropriateness of language use in different contexts.
- Multilingualism is not the only type of experience yielding linguistic benefits: early musical training can also lead to better perception of intonational differences in a new language.
- Communicative interaction enhances shared understanding and converging ways of perceiving the world both among speakers of the same language and among speakers of different languages, but convergence is not necessarily automatic in interactions involving non-native speakers, especially from linguistically and culturally different backgrounds.

EVIDENCE AND ANALYSIS

The first relevant finding is that **the cognitive aspects of multilingual communicative interaction depend on the ways in which the two languages are used in the community.**

ATheME research in Leiden (the Netherlands) investigated the relationship between code-switching and cognitive control in Frisian–Dutch bilingual children. For Frisian–Dutch bilinguals, mixing of Dutch (the majority language) into Frisian (the minority language) is common, but mixing of Frisian into Dutch is not. Therefore, Frisian–Dutch bilinguals need to maintain some degree of language separation when they speak Dutch, but not when they speak Frisian. ATheME researchers showed that frequency of code-switching from Dutch to Frisian, but not from Frisian to Dutch, is related to cognitive control. This finding supports the hypothesis that code-switching requires more cognitive control when a bilingual speaker has to maintain some degree of language separation between his or her two languages. It also points to the usefulness of having opportunities to switch between languages in a flexible way, depending on different interlocutors.

The second relevant finding is that **multilinguals show enhanced sensitivity to the appropriateness of language expressions in the context of communicative interactions.**

A collaborative team from the University of Nova Gorica (Slovenia) and CNRS Lyon (France) examined the effect of multilingualism on speakers' adherence to pragmatic principles, more specifically to a principle requiring the evaluation of different ways of phrasing an utterance and choosing the one that is based on access to information shared by both speaker and listener. For example, *John knows that Peter lives in London* differs from *John thinks that Peter lives in London* because only the former presupposes the fact that Peter actually lives in London; the use of *think* is inappropriate if presupposition of a fact holds. Awareness of these presuppositions is known to develop over time in monolingual children. The study compared the performance of two monolingual groups of 9 to 13 year-old children speaking Italian or Slovenian, and a group of Italian–Slovenian bilingual children matched by age. Using an experimental paradigm that was based on the differences in the meaning of the pair of verbs *think* and *know* in Slovenian and Italian, it was experimentally established that multilingualism positively affects pragmatic abilities in this age group. Although all participants demonstrated adult-like knowledge of the relevant pragmatic principle, bilinguals were shown to be more likely to detect contexts where such pragmatic alternatives must be evaluated than their monolingual peers and adapt to the linguistic demands of such contexts. This advantage, in turn, is likely to be related to bilinguals' more efficient executive control in evaluating alternatives in the light of their mental state and the mental state of others, choosing the most appropriate one and discarding the other.

The third finding is that **multilingualism and musical training in children have similar linguistic effects on the perception of sound properties of a new language.**

Researchers from the University of Nova Gorica (Slovenia) and CNRS Lyon (France) established that both children who are early bilinguals, and children who have been exposed to a musical training early in life, manifest a greater sensitivity to prosodic (sound) properties of sentences in an unknown language. The researchers tested 108 Slovenian children who were bilingual, musically trained, or both. They found that both groups outperformed monolingual or non-musically trained children in discriminating sentences in an unknown language (French) on the basis of the sentences' overall intonational patterns. Although there was no evidence of cumulative effects of multilingualism and musical training, the results support the growing body of evidence that multilingualism positively affects aspects of linguistic knowledge, but not uniquely since other experiences may produce similar effects. The perceptual aspects investigated in this study are particularly relevant for the spoken language and therefore for learning in communicative interaction between native and non-native speakers.

The fourth finding is that **communicative interaction leads to better convergence among speakers' ways of labelling objects, but this convergence is less automatic in interactions between speakers with different language and cultural backgrounds.**

There are clear-cut differences in how languages categorise the world, and these differences can lead to monolingual and multilingual interlocutors having significantly different ways of naming objects in everyday life. Knowing that these differences exist can help second language learners better understand the conceptual and categorical differences across the languages that they speak. This understanding in turn can support better communication between native and non-native speakers of a language.

AThEME researchers in Edinburgh (UK) conducted research on how people use language to label groups of objects, how labels affect the categorization of objects in interactive settings, and whether people's labels are likely to converge in communicative interactions with speakers of the same language or of very different languages (English and Mandarin Chinese). The findings emphasise the importance of context for novel labelling effects on the way speakers categorize. An online categorization tasks was used with instructions that did or did not promote labelling objects in a manner that would make sense to other people. Novel labels only increased category coherence when the context required participants to sort with other people in mind, and this was found both in native–native and in native–non-native interactions. Arguably this is because language is strongly tied to communication and, as such, can be used to help people coordinate and converge in specifically communicative contexts. However, in native–to-non-native interactions, just interacting about categories is not sufficient to bring speakers' categories closer together. These speakers must share a goal of coordinating their categories (i.e., making their categories more similar) in order for interaction to bring about greater similarity in their categories. While further research is needed on labelling in interactions between speakers from more similar linguistic and cultural backgrounds, this study shows that achieving coherence in how we label objects can be crucial to successful communication both within and across native speakers of different languages, which is particularly relevant in today's ever-more multilingual world. In sum, this strand of AThEME research focused on the linguistic and cognitive effects of multilingual communicative interactions, at different ages (older children vs. adults), in different contexts (multilingual vs. monolingual communities), and for different aspects (pragmatic, lexical, perceptual) and compared with different types of learning experience (language vs. music).

Overall, the findings point to the fact that linguistic and cognitive effects are strongly intertwined. At the cognitive level, the results show that the effects of code-switching depend on the status of the languages and the direction of switching. At the linguistic level, the evidence suggests that multilingualism enhances sensitivity to pragmatically appropriate linguistic choices, which may be related to perspective-taking and cognitive control rather than knowledge per se. While the results also indicate the benefits of interaction in converging on mutually shared ways of labeling objects, they suggest that this process of mutual convergence is not automatic in interactions with non-native speakers from very different backgrounds. Finally, the comparison between multilingualism and musical training shows similar beneficial effects on the perception of sound aspects of a new language.

POLICY IMPLICATIONS AND RECOMMENDATIONS

The AThEME research reported above focus on the cognitive and linguistic effects of multilingualism across the lifespan, with special reference to the use of different languages in interactive

communication, in different contexts, and in comparison with other types of experiences. While more research is needed, we offer the following recommendations:

Raise awareness of the naturalness of language switching in situations of language contact.

This can take different forms, for example:

- Provide speakers with information on how languages in contact affect each other and complete separation is not necessary either for language maintenance or for preservation of good standards (see Policy Brief Regional minority languages);
- Encourage speakers of the majority language to learn local minority languages not only for cultural preservation but also as an opportunity for cognitive training, without being afraid of mixing the two languages.

Increase exposure to the spoken language and offer opportunities for communication in language learning educational contexts.

This may be achieved by:

- involving trained student volunteers who are native speakers of the target language in classroom activities with students and teachers;
- creating more age-appropriate social media resources (e.g., vlogging) in the target language and encourage learners to make more use of existing ones (e.g., videos, discussions and quizzes).

Offer both second language learning and musical training in educational settings at an earliest age.

This may involve:

- Teaching a musical instrument through the medium of a second language;
- Creating opportunities for children to play an instrument and sing in a second language at the same time, facilitating 'transfer of training' effects between music and language;
- Embedding language learning into frequent enjoyable low-cost music playschool sessions run by professional music educators in a second language.

RESEARCH PARAMETERS

AThEME is a 5-year collaborative research project studying multilingualism in Europe. Researchers from 17 partner institutions across 8 European countries worked on (1) investigating cognitive, linguistic and sociological issues in multilingual Europe, (2) assessing existing public policies and practices within the areas of education and health and (3) contributing to evidence-based policy making.

The project focused on four main research themes: **(a) regional minority languages, (b) heritage languages, (c) atypical bilingualism and communicative impairment, and (d) the cognitive aspects of being multilingual.** The aim is to advance knowledge of the various factors that contribute to successful multilingualism in different environments and in typical and atypical contexts, as well as to understand how multilingualism affects language comprehension in human interaction, and what the effects of multilingualism are at the neuro-cognitive level.

The main research objective related to the linguistic and cognitive effects of multilingualism were to understand the effects of code-switching in multilingual communities, the ways multilingualism affects pragmatic understanding and object categorization in interaction, and

the similarities between multilingualism and musical training. To this end, the following objectives were identified and addressed:

- To investigate the effects of the directionality of code-switching between a minority and a majority language
- To assess the effects of multilingualism on less-studied aspects of language, such as pragmatic appropriateness and labelling new objects in interaction
- To compare the effects of multilingualism and musical training on auditory perception of the sound system of a new language.

A defining feature of the AThEME project is its interdisciplinarity, involving researchers from theoretical linguistics, experimental linguistics and cognitive psychology working together to address complex research questions arising in different contexts of multilingualism. AThEME research combined theoretical and empirical work. Most of the linguistic research was qualitative, but some teams used a range of quantitative methods. Most of the psycholinguistic research was experimental and relied on a variety of methods to collect both online and offline data.

Dissemination plays an important role in the AThEME project and was coordinated jointly by Bilingualism Matters centre in Edinburgh (through a network of branches set up in each partner country) and the Taalstudio in Amsterdam. Dissemination meetings were organised every other year in order to establish and facilitate contact and exchange between research teams and different groups of practitioners.

More details on the AThEME project, its activities and research outcomes are available on www.atheme.eu.

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FURTHER
READING

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