

Final Publishable Summary Report

AThEME (GA 613465) – 1 March 2014 – 28 February 2019

EXECUTIVE SUMMARY

AThEME was a collaborative research project studying multilingualism in Europe. AThEME stands for Advancing the European Multilingual Experience. This 5-year research project was set up to study multilingualism in Europe and ran from 1 March 2014 until 28 February 2019. AThEME was a project with an integrated approach towards the study of multilingualism, incorporating and combining linguistic, cognitive and sociological perspectives. The main objectives of the project were to investigate cognitive, linguistic and sociological issues in multilingual Europe; to assess existing public policies and practices within the areas of education and health as well as their impact on multilingualism and to contribute to evidence-based policy making. With 16 research partners and one SME, across 8 European countries, AThEME set out to fulfil the following research agendas:

1. To increase our understanding of what multilingualism with regional minority languages entails from a linguistic, cognitive and social point of view;
2. To investigate factors which contribute to the maintenance of heritage languages and proficient multilingualism, with the aim to stimulating heritage speaker multilingualism as a growing resource in Europe;
3. To provide assessment tools and therapy for clinical practitioners in treating multilingual European citizens with acquired communicative disorders, with a view to contribute to evidence-based policy making;
4. To understand the factors which contribute to being “successful” multilinguals
5. To raise awareness about multilingualism in European communities such that people in different sectors of society can make informed decisions.

AThEME results emphasise the importance of intergenerational transmission of linguistic and cultural traditions. Both regional and heritage languages can be seen as a source of promoting and maintaining multilingualism. Though language contact situations may contribute to the acceleration of ongoing linguistic change, they may actually reduce the range of variation patterns, and promote the maintenance of conservation structures. Furthermore, heritage language speakers face more challenges at maintaining their heritage language at a higher proficiency level. AThEME researchers also show that emergent multiethnolects are developed only under certain conditions, and it is closely related to attitudes and social ties.



AThEME results also emphasise the importance of developing language independent tasks to test multilinguals. Aside from paying attention to the methodological designs, diagnostic tests must take into consideration the language status of the interlocutors during testing. AThEME research results have shown that being multilingual is not necessarily an impeding factor, rather it can be an advantage in certain domains: multilingual children with developmental dyslexia have higher metalinguistic awareness, enhancing their sensitivity to the structures of their languages. Nonetheless, extended exposure to multilingual input is critical for children, in particular, children with DD. Extended exposure is not only important for children with DD; rather, even for simultaneous bilinguals, the amount of language used on a daily basis is a good predictor for the ultimate attainment of the languages.

AThEME researchers show that accented communication in a multilingual setting leads to more passive updating of information, less anticipation of upcoming information and it can affect decision making. However, it does not affect understanding or personality evaluations. Furthermore, though it is unclear whether or not being multilinguals lead to cognitive effects in domains such as executive control or working memory, being multilingual enhances children's ability in the perception of prosodic properties, and the switching of languages can also enhance pragmatic salience in communication.

In order to build public understanding of the nature of multilingualism as well as engage in a dialogue about the implications of research findings with the broader public, this project used and further helped develop the Bilingualism Matters (BM) network. Founded in 2008 by Professor Antonella Sorace at the University of Edinburgh (UK), the BM network, particularly its five existing branches (in the UK, Italy, Germany and Croatia) served as the national dissemination centres for AThEME. In the four other countries in which AThEME research was conducted (Spain, Slovenia, France, and The Netherlands) new BM centres were set up with the support of AThEME. Taken as a whole, these ten branches of BM played a key-role as AThEME's dissemination infrastructure.

DESCRIPTION OF THE PROJECT CONTEXT AND MAIN OBJECTIVES

Promoting linguistic diversity as well as language learning have long been cornerstones of EU policy on multilingualism. With the current number of official languages within the European Union standing at 24, increasing numbers of languages spoken regionally and/or by specific (incoming) groups, as well as the growing prevalence of English, the European Union expresses the urgency to preserve its linguistic diversity. AThEME (Advancing the European Multilingual Experience) is a large-scale 5-year research project aimed at investigating the many facets of multilingualism as well



as implications these may have. In this way this European collaborative project hopes to provide much-needed research on which decision-makers as well as individuals are able to take full advantage of the potentials of multilingualism. In turn this is expected to contribute to social cohesion and a harmonious and inclusive society.

AThEME is a project with an integrated approach towards the study of multilingualism, incorporating and combining linguistic, cognitive and sociological perspectives. With 17 partners across eight European countries, its main objectives are:

- to investigate the outstanding cognitive, linguistic and sociological issues in multilingual Europe;
- to assess existing public policies and practices within the areas of education and health and their impact on multilingualism; and
- to contribute to evidence-based policy-making.

The conceptual framework on AThEME is grounded in three key premises: (a) Multilingualism is multifaceted; (b) Attitude towards a language affects acceptability of multilingualism; and (c) Knowledge of language and its use involve different linguistic components and their mutual interactions, and interfaces with other cognitive modules. Furthermore, multilingualism is studied at three different levels of societal magnitude within AThEME: (a) the individual multilingual citizen (i.e., the micro-level), (b) the multilingual group (i.e., the meso-level), and (c) the multilingual society (i.e., the macro-level). Starting in early 2014, this ambitious project set out to fulfil four main research agendas:

1. To increase our understanding of what multilingualism with regional minority languages entails from a linguistic, cognitive and social point of view.

With over 60 regional minority languages recognised in the EU, these languages form a big part of multilingual Europe. Despite this, attitudes towards regional minority languages are often indifferent or even negative, both at the speaker-level as well as at the policy-maker-level. This is partly due to the lack of understanding (description and analysis) of these languages. Furthermore, Many of Europe's regional minority languages are 'vulnerable' or 'endangered', to varying degrees; they are learned by fewer and fewer children and therefore spoken by a declining number of people. However, regional minority languages provide a natural opportunity for multilingualism from childhood, a fact that is often not properly recognised or appreciated.



Research towards this first research agenda was conducted by means of (a) collecting, describing and analysing grammatical diversity across regional varieties and dialects spoken in various parts of Europe so that we could reach a deeper understanding of the fine-grained dimensions of linguistic diversity; (b) comparing regional varieties/dialects with standard languages in order to gain a better understanding of how languages change over time due to contact with other languages; we also aimed to identify linguistic-structural characteristics and sociolinguistic variables that play a role in language change; (c) experimental studies, investigating the cognitive effects of regional varieties, paying special attention to language distance, and type of linguistic knowledge;– and (d) attempting to provide a systematic and in-depth description as well as analysis of language maintenance of regional varieties.

2. To investigate factors which contribute to the maintenance of heritage languages and proficient multilingualism, with the aim to stimulating heritage speaker multilingualism as a growing resource in Europe.

One of the challenges posed by migration in Europe is to facilitate integration and social cohesion without inducing cultural displacement. This typically involves concentrating on learning the language of the host country while ignoring the importance of maintaining the heritage language. A heritage language can be defined as a minority language acquired by children at home in a context of bilingualism with a majority dominant language; this situation is similar to that of children exposed to regional minority languages, except that bilingualism with heritage languages is becoming more and more common due to increasing transnational mobility.

This second agenda was addressed by (a) experimentally investigating linguistic knowledge of heritage speakers in order to understand how heritage language knowledge and acquisition differs from both native and second language knowledge and acquisition; and (b) investigating the emergence of multi-ethnic varieties, within which we aimed to determine to what extent use of the variety acts as an impediment to social mobility, and the extent to which heritage language proficiency impacts the speakers' ethnical/national identity.

3. To provide assessment tools and therapy for clinical practitioners in treating multilingual European citizens with acquired communicative disorders, with a view to contribute to evidence-based policy making.

Multilingual children run the risk of being over diagnosed for communicative disorders (Developmental Language Disorder, or Developmental Dyslexia) when educators or clinical practitioners misinterpret non-target use of the majority language. Similarly, they can be underdiagnosed for communicative disorders because the impairments may be interpreted as



typical developmental trajectory. In addition, issues concerning language control and language deterioration in elderly multilingual European citizens with cognitive impairment need to be better understood.

AThEME researchers approached this third research agenda through (a) experimental studies, in which we investigated morphosyntactic awareness and interpretive competence in selected populations of developmental dyslexia multilinguals in comparison to monolinguals; (b) employing Artificial Grammar Learning paradigms, so that we were able to address the problem of wrong diagnosis; (c) studying the elderly with Parkinson's disease or Alzheimer's disease, in order to gain a better understanding of the mechanisms of language control in multilinguals, as well as disease progression and language deterioration; and (d) a study of wellbeing and social integration of bidialectal elderly, by which we aimed to understand the emotional attachment to regional varieties, and how it impacts the wellbeing and social integration of the elderly.

4. To understand the factors which contribute to being "successful" multilinguals.

There are many aspects of being "successful" as multilinguals. One important aspect for us to understand has to do with communicative interactions with multilinguals. Does the language in which we interact with others affect the way we perceive our interlocutors? How do we understand their messages and the weight we give to different aspects of the interaction if it is not in our native language? Is it possible that negotiations conducted in a non-native language may lead to a different outcome compared to when the native language is used? Do we have more positive reactions when interacting with people speaking to us in our native language/accents than with those speaking in a different language or with a different accent? Furthermore, AThEME researchers aim to understand the cognitive aspects of multilingual interactions.

In addressing this final research agenda, AThEME researchers aimed to (a) advance our knowledge of how age-of-onset and language distance contribute to the ultimate attainment of L2 acquisition through experimental studies with multilinguals (using EEG techniques); (b) understand how certain processes (communicative alignment), are involved in conversations which may be affected when foreign-accented speakers are involved through experimental studies (EEG); (c) also understand the pragmatic abilities of early multilinguals and L2 speakers at different levels of proficiency, as these abilities are essential for daily conversations; and (d) further understand cognitive effects of multilingualism by comparing multilingual and monolingual populations.



Our final AThEME objective was **to raise awareness about multilingualism in European communities such that people in different sectors of society can make informed decisions**. In order to build public understanding of the nature of multilingualism as well as engage in a dialogue about the implications of research findings with the broader public, this project used and further helped develop the [Bilingualism Matters \(BM\) network](#). We aimed to build the public understanding of different types of multilingualism depending on age-of-onset, context, amount of input available, and attitudinal/sociolinguistic variables and, at the same time, build a strong and coordinated European dissemination network promoting multilingualism by organising research-based awareness-raising activities targeting all sectors of society.

MAIN S&T RESULTS

Results of the AThEME project can be found on the AThEME website (<https://www.atheme.eu/>) and are summarised below.

The AThEME project focused its research on four main lines of enquiry: (1) the maintenance of regional languages; (2) the maintenance of heritage languages in the EU; (3) multilingualism and communicative impairments and (4) what it means to be multilingual. For each of these lines of enquiry, we will provide an overview of main results of AThEME research:

(1) THE MAINTENANCE OF REGIONAL LANGUAGES

For regional languages, the issues of language maintenance, language contact and language change were central to our investigations. The maintenance of both regional and heritage languages leads directly to linguistic diversity, as well as multilingualism. The questions we were predominantly concerned with were how and to what extent contact with majority languages affects the maintenance of regional (and heritage) languages. In many cases, such questions lead to tension in communities.

Early on in the project, AThEME researchers published a report on the maintenance of regional languages including Basque, Frisian, Fiuman dialect, Gallo, Sardinian, Primorska Slovenian and varieties spoken in Trentino-Alto Adige/Südtirol. They conclude that intergenerational language transmission is the principal matter of concern for these language communities, due to the serious decrease of speakers. Other AThEME researchers also demonstrate that in a context with both a minority (Frisian) and a majority language (Dutch), chances for becoming proficient in both languages are best for children who speak the minority language at home. Due to factors such as negative attitude towards one's own language (because of its associated social, economic status, among others), intergenerational transmission of linguistic and cultural traditions is disrupted. The report recommends urgent need for language documentation, new policy initiatives and new materials



to enhance the vitality of these languages/varieties, and for building support for language communities. In an effort towards understanding more about language maintenance, AThEME researchers also published a report on the grammatical diversity of regional languages, including Dutch dialects and Frisian, Basque dialects, Scottish Gaelic, Sardinian, Germanic and Romance varieties in Trentino-South Tyrol areas, Gallo and the Fiuman dialect, Primorska Slovenian dialects. It demonstrates the importance of documenting and identifying the grammatical properties and phenomena that the regional varieties share or do not share with the surrounding, and in most cases, the majority/dominant language. This can help in identifying areas that may be (more) sensitive to grammatical change in language contact situations. Language change is a natural phenomenon induced by the contact between languages in bi-/multi-lingual communities. Languages in contact affect each other, but in a selective way that depends on the characteristics of the two languages and of their particular grammatical structures.

AThEME researchers in the Netherlands provided evidence from Frisian, a West-Germanic regional language spoken in Friesland, a province in the North of the Netherlands. All speakers of Frisian are bilingual; they speak Dutch as well. Dutch and Frisian are also closely related languages, with only small differences in structure. This research shows that the way language change works is not just conditioned by social and contact factors but is also dependent on the degree to which the languages have the same structural make-up or build (i.e. structural alignment). Dutch constructions do not replace Frisian constructions as a result of language contact; rather the two constructions co-exist in the grammars of Frisian speakers. Consistent with these findings, researchers in Slovenia established that language contact through bi-/multi-lingualism may have contributed only in part to changes in standard Slovenian and in Slovenian dialects spoken in areas neighbouring Italy: the change is similar to change found in dialects not affected by Italian, all following well-established patterns of language change occurring in natural languages.

Researchers in the Basque Country (Spain) focused on the interaction between Standard Basque and Basque local varieties in younger speakers (speakers with two dialectal varieties: 'bilectal'). Bilectalism again shows an enrichment of expression possibilities and confirms that language change as a result of language contact should not be interpreted as "contamination" of one language by the other language: the communicative function and efficiency of the language system remain stable. At the same time, bilectal speakers are under pressure to 'correct' dialectal varieties under the normative influence of Standard Basque. This research, consistent with other results, found a high degree of resilience of Basque-specific linguistic forms in the context of language contact: the fact that only some structures are open to change confirms that change is not an automatic effect of language contact but it responds to precise linguistic constraints. In addition, researchers in Italy investigated contact-induced language change in the particularly interesting Trentino-Alto Adige (South Tyrol)



region. In this area three minority languages (Rhaeto-romance, and the Germanic dialects Mòcheno and Cimbrian) and two groups of dialects (the Romance-Trentino group and the German-Tyrolean group) are spoken besides the official languages Italian and German. More than 200 speakers from all age groups (from 20 to 80 years old) participated in the research, which used the methodologically innovative crowdsourcing website VinKo (*Varieties in Contact* <https://www.dipsco.unitn.it/vinko/index.php>). Focusing on word order phenomena, researchers found that contact with Italian as the majority language cannot be the only factor responsible for observed shifts in regional minority languages; rather, these changes appear to be internally motivated, albeit accelerated by language contact. Similar conclusions about the naturalness and selectivity of grammar change due to language contact was found by researchers in France investigating Gallo, a regional Romance language of Brittany, which seems to be undergoing a fast decline in intergenerational transmission. The geographical proximity to Breton (a Celtic language, regarded as the main language of Brittany) has had negative effects on the maintenance of Gallo. Proper description work on this regional language has been rare up to now, especially with regard to the features that distinguish it from French. While there are no monolingual speakers of Gallo, its speakers can be classified in two groups with respect of their bilingualism: successive and simultaneous. Simultaneous bilinguals seem to have two grammars coexisting to varying degrees, depending on the speaker's degree of active bilingualism. Consistently with the other findings, this research shows that syntactic change involves a competition between variants, with one of them becoming more prominent and accepted while the other declines. From this point of view, dialectal variation of Gallo is not only due to contact with French but also presents the typical patterns of language change over time.

Other researchers provided further support for this. They investigate grammatical language change in three regional and minority languages across Europe: Frisian, Cimbrian and a variety of Basque called Guipuscoan. These local language varieties face the pressure exerted by either a stronger standard language or other more prominent dialects. They conclude that the nature of grammatical change exhibited by these three languages displays similarities. Importantly, in all three cases, they argue that language contact contributes to the acceleration of ongoing change by either favouring well-known grammatical paths or by reducing the range of variation patterns. The latter suggests that contact may even promote the maintenance of conservation structures.

Though language change is often regarded as negative; the linguistic standards of languages in contact are seen as deteriorating, either from the minority language point of view (losing original features) or from a majority language point of view (contamination). AThEME researchers have investigated a variety of regional minority languages across Europe and have found that these languages (minority and majority) do affect each other, but only in selective ways. These findings may already go some way to challenging this negative perception; minority languages in situations of



language contact prove more resilient than perhaps previously thought. At the same time, our findings do show changes in specific language structures, but this is considered a natural phenomenon attributable to many different factors. All languages undergo changes over time and these changes can therefore not be described as being a deterioration of linguistic standards.

(2) THE MAINTENANCE OF HERITAGE LANGUAGES

Heritage languages are similar to regional languages in that they share the urgent issue of language maintenance, as this is linked to maintaining multilingualism in the European population.

Nonetheless, little is known about the acquisition process of heritage languages as well as the ultimate attainment of these languages, in connection to the acquisition of the second/majority language.

Researchers in France looked at Korean heritage speakers' language comprehension and production of Korean. They compared different aspects of linguistic knowledge across different types of populations: adult and child first language (L1) speakers, child and adolescent heritage speakers, and intermediate and advanced university second language (L2) learners. The properties under investigation concerned the interpretation of sentences which, depending on their word order, are interpreted as either information seeking questions or negative statements. The results indicate that 5- to 7-year old native Korean speakers already have adult-like knowledge of properties that are difficult to acquire – that is, just like adults, they appropriately discriminated between the question vs. declarative meaning of the sentences, depending on the word order. In contrast, heritage Korean speakers, like L2 speakers, have not fully acquired this property and are less sensitive to word order, tending to interpret the test item as a question, not as a negative statement. These findings suggest that heritage language speakers of Korean in France are not like L1 Korean speakers – and in particular, do not have the grammatical knowledge/competence that 5- to 7-year old monolingual speakers of Korean have acquired.

These AThEME researchers provide further support for this conclusion, by probing the syntax-semantics knowledge of heritage Korean speakers in France. Using an elicited production protocol with controlled discourse context, they compare monolingual native Korean speakers (child and adult) with heritage Korean speakers. Though monolingual Korean speakers use two alternative strategies for interpreting information questions, heritage speakers use only one. The researchers consider this to be related to a transfer effect from the dominant language (French). This result corroborates the findings for regional and minority languages that heritage Korean speakers do not have enough exposure or opportunity to use the heritage language. More importantly, it also highlights that certain deep aspects of knowledge are acquired very early on and, therefore, the



importance of exposure and opportunity to use the heritage language early in life, before the age of 5-7 which is when schooling typically begins.

With heritage languages and language contact, one of the phenomena which arises in major cities in many different European countries is the emergence of new forms and styles, which AThEME researchers in the United Kingdom term “multiethnolects”. This term refers to the way young people in mixed multicultural neighbourhoods may combine elements from different heritage languages with the dominant mainstream language. They conclude that multiethnolects are a distinct new language variety through which speakers express group identities. Multiethnolects follow the typical path of language development, just like other languages. As this variety has emerged, it has developed properties in its grammar that follow patterns predicted by universal principles. This ranges from the use of *man* as the impersonal pronoun, new patterns of relativization as well as question formation. A further important discovery is that as children become adolescents, many of the innovative language features typical of the multiethnolect come to symbolize integration into a multiethnic, multiracial urban culture. For young people who have grown up in the multiethnic community, immigrants and non-immigrants alike, these language features are part of their usual way of speaking. But they are also taken up enthusiastically by young people from outside the community when they want to establish a ‘cool’ urban identity. These findings suggest that (i) even in situations of massive linguistic contact, the universal general principles that guide the development of language change are at play; (ii) the new language features have become part of a new urban dialect. This is not a new phenomenon: throughout history, languages have always changed as a result of language contact. What is new is the extreme diversity of the languages that are brought into contact today and the fact that at a very young age children create a variety of the dominant language for themselves in order to communicate with each other, thereby allowing greater possibilities for variation and change than in earlier times.

Research in The Netherlands focused on an Urban Youth speech style of Dutch used by Moroccan heritage youth. Different from what has been suggested in earlier literature, using this variety does not necessarily imply that the user is taking an aggressive or anti-societal stance. In fact, it seems to be used also (or rather) as a way to characterize certain stretches of conversation as ironical and not-so-serious, while standard Dutch is used for serious topics, such as religion and advice. These findings also highlighted that users of Dutch Urban Youth speech styles have clear ideas about which styles ‘belong’ to which groups in spite of the fact that in practice these styles are used by members of many different heritage groups, including Dutch youth without a migration background.



Nonetheless, multiethnolects do not emerge in all major cities. AThEME researchers in the UK compared London with Paris, the latter does not have emergent multiethnolects. They identified four core factors which contribute to the emergent phenomenon: (a) the dominant language must be swamped by other languages; (b) a situation of unguided group second language acquisition; (c) the extent to which young people's way of speaking index their attitudes towards their neighbourhood; and (d) dense social network ties. These factors reflect that language evolution is constrained not only by social characteristics of individuals but also by the social and historical context in which individuals live.

Finally, AThEME researchers in Germany investigated the issue of age-of-onset in relation to the maintenance of heritage languages (Russian and Turkish) as well as the acquisition of the second/majority language (German). They found some opposing effects of age-of-onset on the heritage language and the majority language. When bilinguals began to acquire the majority language at a very young age, they tended to have higher proficiency in the majority language compared to bilinguals who started to acquire the majority language at an older age. Thus, an early age-of-onset could narrow or even close bilinguals' proficiency gap to monolinguals in the majority language, although the effect strongly varied depending on the linguistic phenomenon (receptive vocabulary or reading comprehension) and the heritage language group (Russian, Turkish). However, the higher proficiency in the majority language due to an early age-of-onset was accompanied by lower proficiency in the heritage language but only for Russian-German bilinguals. These findings show that bilinguals who are exposed to both languages shortly after birth profit in the majority language compared to bilinguals who acquire the majority language some years later in life. At the same time, they face more challenges to maintain their heritage language at a higher proficiency level.

(3) MULTILINGUALISM AND COMMUNICATIVE IMPAIRMENTS

With an increasingly multilingual Europe, there are more children who speak a heritage language at home while learning the majority language. As these children go through typical developmental stages in which their use of the majority language deviates from the target norms, educators and health professionals may interpret this non-target use as a sign of a specific language impairment, such as Developmental Language Disorder (DLD) or Developmental Dyslexia (DD). This may lead to over-diagnosing a non-existent impairment in typically developing multilingual children. It can also happen that specific language impairments are under-diagnosed in developing multilingual children because the manifestations of these impairments are incorrectly seen as just related to their under-developed language skills. Furthermore, multilingualism is often regarded as undermining the language development of children with a diagnosis of language impairment. As a consequence, families with a



child diagnosed with DLD or DD are discouraged from speaking their home language or from learning a second language. These problems are worsened by two factors. First, neither DLD nor DD is a discrete category; rather they are dimensional disorders, ranging from mild to severe with no clear cut-off between 'typical' and 'impaired' in either general linguistic ability or reading. Second, tests and instruments typically employed to diagnose language impairments are based on a particular language (mostly the majority language), which accentuates the risk of confusing developmental language delays and disorders. Both over- and under-diagnoses can have negative repercussions on children's well-being and families' integration in the host country. It is thus important that we understand the linguistic abilities of multilingual children with communicative disorders.

Research with implications on language testing

AThEME research on artificial grammar learning carried out by researchers in the United Kingdom, led to the creation of a battery of language-independent tasks to assess structural sensitivity, which is an essential component of linguistic competence. The tailor-made tasks can probe into very specific kinds of dependencies found in natural languages and other cognitive abilities (vision, decision making, etc.) without actually using a particular language. In the case of DLD and DD, this is particularly relevant because it allows a principled dissociation between general cognitive impairments and linguistic impairments. These new tailor-made tasks have been validated comparing monolingual and multilingual adults, multilingual children with dyslexia, as well as early school age children with development language disorder.

Other AThEME researchers in the UK also examined pragmatic abilities in communication (i.e., abilities to draw on contextual cues in a discourse) and how multilingualism affects such abilities. Importantly, such abilities are associated with scores on the Autism Spectrum Quotient, Working Memory Tasks, and Systematizing Quotient Revised Questionnaire. They found that (i) pragmatic abilities tested by these tasks can be affected by methodological design; and (ii) the language status of interlocutors (monolingual vs. multilingual) affects the way individuals perform in pragmatic tests. These results further emphasise that (a) it is important to use language-independent tasks to assess communicative impairment, particularly in multilingual populations, and (b) when language dependent tasks are used to assess pragmatic abilities (for instance, in the case of Autism Spectrum), it is essential to consider not only the methodological design, but also the language status of the interlocutors.

Research on multilingualism and developmental dyslexia

Previous research has shown that multilingualism may provide a positive boost to (i) cognitive functioning, conveying important advantages in specific domains, such as executive functions, where the use of two languages seems to favor the ability to focus on the relevant stimuli while inhibiting



the irrelevant ones, and (ii) metalinguistic awareness, where multilingualism appears to enhance speakers' sensitivity to the structures of their languages. AThEME Researchers in Italy aimed at disentangling the relationship between multilingualism and DD, comparing the performance of monolingual and multilingual children, with and without a diagnosis of dyslexia, in a task tapping morphological competence, and in particular their ability to provide the plural form of invented words ("nonwords") modelled on the phonotactic constraints of Italian. The results confirmed the presence of a positive effect of multilingualism, with multilingual children outperforming monolingual children in the pluralization of nonwords. Importantly, this advantage was also found in multilingual dyslexic children: they consistently outperformed monolingual dyslexic children, approaching and even outweighing, in the most difficult conditions, the performance of monolingual typically developing children. These results thus indicate that multilingualism can have a positive effect on morphological and metalinguistic abilities, both in impaired and unimpaired children. More particularly, bilingual children seem to benefit from a higher metalinguistic awareness, which makes them more sensitive to the structures and the rules of each of their languages, independently from the presence of developmental language disorders like dyslexia.

Furthermore, these researchers also examined the production of clitic pronouns in Italian (as in *Il bambino lo mangia*, 'The child it eats' = The child eats it) in monolingual and multilingual children. Clitic production is considered a reliable clinical marker for Italian monolingual children suffering from DLD and it is also reported to be particularly challenging for early second language children (EL2), who are less accurate than their peers in this task. The results confirmed that the deficits previously found in EL2 children were not related to multilingualism, but rather to their still incomplete competence in Italian: with longer exposure (e.g., 8 years of Italian), EL2 performed at ceiling. AThEME's Italian team extended this research to multilingual children with DD. Like monolingual children with DLD, multilingual dyslexic children also struggle with the production of clitic pronouns. The study aimed to verify whether multilingualism could exacerbate the difficulties in clitic production. Results revealed that dyslexic children, both monolingual and multilingual, have more difficulties than typically developing children in clitic production. For multilingual children with dyslexia, a significant positive correlation was found in the bilingual dyslexics between length of exposure to Italian and accuracy in clitic production. This stresses the importance of taking into account exposure factors in the assessment of multilingual children's linguistic competence. In sum, these results indicate that extended exposure to multilingual input has a positive effect on the linguistic abilities of both typically developing children and children affected by DLD and DD.

Multilingualism and cognitive impairment of the elderly

Concerning the elderly with cognitive impairment, the issue of language control is pertinent for bilinguals, as language control processes allow a bilingual to utter one language without the



interference of the other language(s). AThEME researchers in Spain investigate individuals with Parkinson's disease, notoriously associated with structural damage in the basal ganglia, which are critically involved in language control processes. Their results confirm the role of basal ganglia in language control, as lesions in basal ganglia and connected structures lead to difficulties in language switch tasks. Their results further show that some mechanisms of language control in bilinguals are not necessarily part of the domain general executive control. Furthermore, other researchers investigate early and highly proficient bilinguals with Mild Cognitive Impairment (MCI) and with Alzheimer's disease (AD) in language production tasks, in particular, picture naming and word translation tasks. They followed the progression of bilingual individuals with MCI and AD for one year. The research results show that language deterioration over time in individuals with AD is the same in both languages, suggesting that the age of acquisition and language proficiency may modulate the pattern of language deterioration. The individuals with MCI do not show language deterioration after one year, showing that MCI does not impact linguistic abilities until it is converted to AD.

AThEME researchers in the Netherlands have also examined the multi-dialect situation in a nursing home, confirming the lack of attention to the issue of how dialects create social networks in nursing homes. It shows that the use of specific language or dialect creates specific social networks, which can lead to a sense of (un)belonging, linking with group identity. Furthermore, this research suggests that aside from the social networks amongst the residents of nursing homes, attention should be paid as to how dialectal terms of address should be used as such terms can have associations with particular social economic status and/or intimate relations.

(4) WHAT IT MEANS TO BE MULTILINGUAL

AThEME's final core research area explores the cognitive aspects of what it means to be multilingual. In particular, researchers aimed to (1) gain more knowledge of how factors like age-of-onset (the age at which an individual learns a second language) and language distance (how much one language differs from another) affect the final outcome of a person's second language acquisition, (2) investigate the direct effects of multilingualism on human interaction and (3) collect more data and gain more knowledge of the relationship between language and other mental operations, like attention and memory.

Age of acquisition and ultimate attainment

AThEME researchers in Spain investigated the role of language dominance in morphosyntactic competence of simultaneous Spanish-Basque bilinguals. The participants in the study differ in their daily use of Basque (i. e., whether Basque is the dominant language) and they show individual



differences in the task of deciding the gender of morphologically transparent or opaque nouns. The results suggest that Basque dominant bilinguals tend to transfer their morphosyntactic knowledge to Spanish. This implies that even though both languages are acquired early in life, they can still interact with each other. Furthermore, acquiring a language from birth does not guarantee the level of ultimate attainment. With simultaneous bilinguals, the amount of language used on a daily basis seems to be a more reliable measure to differentiate the ultimate attainment of an individual.

Multilingual communication

AThEME researchers in Barcelona (Spain) have shown that full understanding and processing of the message is less efficient when reading/listening in a non-native language than in the native language. Even at higher levels of language comprehension, non-native listeners are not able to anticipate upcoming information as accurately as in their native language. In this research, Spanish listeners were presented with English sentences such as “In the morning I usually have coffee with ...”, while their brain signatures were recorded (EEG). Given such a context, we tend to mentally anticipate the word ‘milk’. If a different word is heard (e.g. ‘shoes’), our brain detects the mismatch and updates the information. While this updating occurs very rapidly in our native language, anticipation does not occur in the same automatic way when reading/listening in a foreign language. Basically, we are more passive while understanding in a foreign language; we wait to hear something in order to process it as plausible or implausible.

Another consequence of speaking in a non-native language is that non-native speakers tend to speak with an accent. The question arises how foreign accented speech affects communication. The researchers in Spain show that a very similar process occurs when hearing someone with a non-native accent: we tend not to anticipate the information that is about to come. Participants show that they perceive native speakers as easier to understand than speakers with a foreign accent. When speakers with a foreign accent make an error while speaking, it is harder for the listener to process this error, compared with errors taking place during native conversations. Their research results suggest that listeners have clear expectations about upcoming words when listening to a native speaker. However, when listening to a speaker with a non-native accent, expectations do not reach the same level, suggesting that communication with speakers with a non-native accent can be less effective.

In addition, AThEME researchers investigated the effect of foreign-accented speech in natural interactive contexts, in which participants have to provide directions to addressees or to receive directions from them. In a first study, a Spanish listener was given instructions about where to place objects on a shelf either in their native accent or with a non-native (in this case, American) accent. Importantly, for some of the objects, participants could take an allocentric perspective (consider that some objects were not visible by the interlocutor) or an egocentric perspective (consider only their



own visual perspective). Eye-movements recorded during the task revealed that participants were more likely to take an egocentric perspective when being addressed by a non-native-accented speaker than by a native speaker. A second study evaluated how speakers are affected by the interlocutor's accent. Spanish speakers had to give directions about objects to a native or foreign accented listener. This study showed that speech tends to be louder and slower when addressing interlocutors who have an accent. This "foreigner talk" effect seems to be very automatic and unavoidable since it is present even when the interlocutor understands the language perfectly.

It should be noted that listener's impressions of voices are not influenced by the (native or foreign) language of a speaker. The AThEME Barcelona team investigated this issue by asking Spanish listeners to evaluate personality traits from voices saying the word "Hola" (native) or "Hello" (foreign). Spanish listeners were presented with male and female voices and asked to evaluate on a seven-point Likert scale one of the following personality traits: attractiveness, aggressiveness, confidence, competence, likeability, dominance, trustworthiness and warmth. Two experiments were conducted, one in which Spanish voices were rated and the second in which English voices were rated. The results revealed a high-agreement among raters in their personality evaluations, irrespective of the language in which personality traits were evaluated. These results support the idea that first impressions from voices tend to be universal and refute the old idea that foreign speakers are considered less attractive or intelligent.

Lastly, AThEME researchers explored the effects of regional accents on linguistic and cognitive processing. In a first study, Spanish listeners were presented a story ("Alice in Wonderland") either produced with a Spanish accent (native) or with a South American accent (regional). Brain regions sensitive to accented speech were localized. Compared to regional accents, native accents showed a greater activation of the brain 'reward' network, revealing people's sense of social belonging. A second study showed that regional accents do not affect memory and credibility of messages. Spanish listeners were presented with trivia statements (e.g., "Ants never sleep") either produced with a Spanish accent (native) or with a South American accent (regional) and were asked to memorize the information or to state whether they believed it. No differences were observed between native and regional accents.

Language control, emotion and pragmatic abilities

Concerning the direct effects of multilingual communication, researchers explore whether the patterns of language switching are different when one of the languages is used by a person more frequently than the other. They found out that in an L2 context the large presence of the non-dominant L2 language increases the need for additional language control. Bilingual language control and thereby lexical access to both languages is adjusted depending on the lexical context. In an L2 context, the



non-dominant language can start to function like the dominant language to create optimal performance for bilinguals during conversations with different language contexts.

Other researchers observe that foreign languages are generally learned in emotionally neutral academic environments, while native languages are acquired in emotionally rich family contexts. They investigate if this difference in learning contexts influences emotional response on emotionally-charged sentences. Results of their investigations point out that automatic reactions to emotional-charged sentences are reduced when it involves a foreign language. Highly emotional words do not seem to cause the same emotional reaction in the native and the foreign language. This has serious implications in daily life, as well as decision making.

Researchers also investigated the development of pragmatic abilities (i.e., abilities to draw on contextual cues in a discourse) of both early bilingual children and adult L2 learners compared to monolingual speakers by testing scalar implicature processing. They tested the performance of monolinguals and bilinguals on recognizing the implicit meaning and presupposition beyond the explicit or literal meaning of utterances. The results showed that in the case of adult L2 learners, though learning a second language does not enhance pragmatic abilities, having to switch between two languages makes the pragmatic cues most salient. Their results further confirm that early bilingual development does not affect the development of pragmatic abilities.

Cognitive effects of multilingualism

Concerning the relationship between language and other mental operations (such as selective attention, memory, decision making, and whether being multilingual affects such relationship, one issue is the hotly debated potential benefits/advantages of being multilingual. Some of AThEME's research touches upon this issue, in particular, in relation to children's bilingualism. For example, research from The Netherlands state that substantial minority language exposure at home indirectly affects bilingual children's cognitive development. A higher degree of bilingualism – defined in terms of language balance – has a small positive effect on children's selective attention. The effect, however, disappears as children grow older, and is not notable for other cognitive capacities, such as interference suppression and working memory.

Joint research group from France and Slovenia investigates children's perception of prosodic properties, and whether or not being bilingual, or having musical training enhance this perception. In particular, music and speech share certain fundamental prosodic characteristics such as tone, duration and rhythm. Their results indicate that both bilingualism and musical training enhances the children's ability to distinguish between different syntactic structures in an unknown language based on prosodic cues only. This shows that the benefits of being bilingual are not necessarily revealed in more general



cognitive domains such as executive control or working memory, but can be found within linguistic domains.

Research conducted by the Barcelona team has shown that people remember less accurately those who speak to us in a foreign language than in our native language. Spanish listeners were tested in a face recognition study while their brain responses were measured (EEG). They were presented with unknown faces speaking to them in English (foreign language) or Spanish (native language). Subsequently, when the faces were presented again to the participants, they remembered more accurately those faces that previously spoke to them in Spanish. The neural correlates associated with memory determined that differences in face recognition stem from the difficulty of retrieving details (e.g., “what did she say?”) of the message received in a foreign language.

The AThEME research team also found that using a foreign language affects the decisions and moral judgments people make. On the basis of paper-and-pencil tasks given to more than 4000 participants randomly assigned to a native vs. foreign language condition, researchers established that when using a non-native language, people are less biased by loss and risk aversion. The fact that decisions made in a non-native language are less emotionally affected, results in more practical decisions when presented with moral dilemmas: when judging moral scenarios in a foreign language, people tend to employ more cost/benefit ‘utilitarian’ reasoning than when they are asked for the same judgments in their native language. Foreign language usage also affects ‘punishment’ judgments: those using a foreign language judge an immoral act as more punishable than those using their native language. Finally, cheating is also affected by the language being used: using a foreign language reduces the tendency to cheat compared to using the native language.

POTENTIAL IMPACT & MAIN DISSEMINATION ACTIVITIES

The AThEME project was set-up to have a significant impact on five main areas by means of its research and dissemination: (1) Scientific impact; (2) Impact on policies and decision-making; (3) Impact on the availability of data and tools; (4) Impact on methodology and research strategy; and (5) Impact on engaging civil society actors.

The description above concerning the main S&T results already shows the wide range of comparative, in-depth and scientifically grounded knowledge generated about linguistic, cognitive and sociological dimensions of multilingualism in Europe. Through presentations at important conferences and workshops and publications in many well-established peer-reviewed journals, AThEME's **scientific impact** has been and will continue to be felt for years to come.



By translating many of these results into five overall European Policy Briefs (including concrete policy recommendations), the project has attempted to have a lasting **impact on policies and decision-making** on the European, national and local levels. These Policy Briefs deal with regional languages, heritage languages, multilingualism and communicative impairments as well as general linguistic and cognitive effects of multilingualism. Each Policy Brief starts by defining an important policy problem related its specific theme, outlining relevant findings relating to this particular policy problem and, subsequently, deriving policy implications and recommendations from these findings. The Policy Brief dealing with regional languages, for example, recommends raising awareness of the naturalness of language change in all situations of language contact and involving speakers of regional minority languages in language documentation, whereas the Policy Brief on multilingualism and communicative interactions recommends promoting awareness of the fact that perceptions of benefits and risks is affected by the language in which risks are described.

By collecting and analysing new data on linguistic diversity, complementing existing databases on regional languages and dialects, AThEME has also contributed a third impact, namely **improving the availability of data and tools**. One example is the innovative website VinKo (<https://www.dipsco.unitn.it/vinko/index.php>), which allows researchers to gather large amounts of oral linguistic data (both sentences and lists of words) in all local Romance and German languages (minority languages and dialects) spoken in the area between Innsbruck and Verona: Trentino Romance dialects, Tyrolean dialects, Ladin, Cimbrian, Mòcheno. This website is an important tool not only for collecting of data but also for raising local awareness of the local speakers and for preserving the languages and dialects.

AThEME's holistic approach to research, with its mix of methodological strategies and techniques, have yielded important results and data, thereby also highlighting the necessity of taking an ambitiously varied and multi-faceted approach in researching such a complex phenomenon as multilingualism. Experimental techniques using eye-tracking, EEG and fMRI but also (socio)linguistics methods using questionnaires have all been employed to great effect by AThEME's researchers. The impact of this **methodological approach** is that it shows that a fundamental understanding of a complex issue can only be reached by addressing the many different aspects and by using a variety of techniques and research strategies.

The fifth impact, namely that on **engaging civil society actors**, is a key objective of AThEME's dissemination strategy. Dissemination activities were aimed primarily at raising awareness about multilingualism in European communities and disseminating research results in different sectors of society to support informed decision-making relating to multilingualism. The overarching goal was to build public understanding of the nature of multilingualism and at the same time engage in a dialogue



about the implications of findings for the decisions of individuals, groups and societies. The four main objectives that were defined, all contributed to this final impact: (1) disseminate research-based information about the nature of multilingualism at all ages; (2) build the public understanding of different types of multilingualism depending on age of onset, context, and other individual/social variables; (3) update the contents of the initial dissemination activities with the results of the ATHEME project; and (4) build a strong and coordinated European dissemination network promoting multilingualism by organising research-based awareness-raising activities targeting all sectors of the society.

In order to build public understanding of the nature of multilingualism as well as engage in a dialogue about the implications of research findings with the broader public, this project used and further helped develop the [Bilingualism Matters \(BM\) network](#). Founded in 2008 by Professor Antonella Sorace at the University of Edinburgh (UK) the BM network, five existing branches (in the UK, Italy, Germany and Croatia) served as the national dissemination centres for ATHEME. In the four other countries in which ATHEME research was conducted (Spain, Slovenia, France, and The Netherlands) new BM centres were set up with the support of ATHEME. Taken as a whole, these ten branches of BM played a key-role as ATHEME's dissemination infrastructure. By means of the ATHEME website, digital bi-annual newsletter, ATHEME's social media presence (Facebook, Twitter), printed dissemination materials as well as the organisation of many local and (inter)national events, the BM network laid the groundwork for engaging civil society on the European, national and local levels.

The ATHEME project was promoted at a variety of events: for example, events disseminating specialised ATHEME results to an expert community of BM branches, committed to outreach with non-academic audiences and not formally associated with ATHEME; events representing the ATHEME project as a whole at major specialised events & conferences for lay and professional audience; but also local events promoting specific knowledge on bilingualism, focused on ATHEME or including ATHEME. The presence of the project varied from availability of the flyer and banner to a major presentation, organization of the event or organization of workshops in the event.

In each partner country, the national branch of Bilingualism Matters built a network of local, regional and national stakeholders. These included interested individuals, and groups, such as teachers, parents, community groups, cultural institutions, health professionals, and policy makers from different levels of governance. Contact information on relevant stakeholders was collected in order to distribute the newsletters and other publications.

There is abundance of research confirming that the mere availability of new evidence does not change people's attitudes and formed opinions. However, making the information available in a variety of formats and locations, described or explained in a plain language legitimises it, raises its profile and



increases its effectiveness. It also creates and maintains the momentum of public debate. The effects of all of the above cannot be objectively measured in the short run; however, it is safe to say that lack of access to public information is a clear obstacle to stimulating public debate. Some proxy measures of activity, suggesting the increased debate on bilingualism include statistics of activity, which has been provided in the previous section. Some case studies, such as in The Netherlands where a dissemination project promoted language awareness in nursing homes indicate, that attitude change might have taken place and awareness certainly has been raised, and that within and beyond the immediate project partnership. We believe that by making the research results available via multiple, targeted communication channels and in variety of formats (website, multiple leaflets, videos, policy briefs and social media, public talks, conferences and published papers) and branding them with shared visual identity, we have addressed the information sourcing preferences of the majority of the targeted audiences.

Amongst the obstacles to behavioural or attitude change the AThEME project addressed are the following:

- Obstacle 1:** Perception that the research derived evidence is not relevant or needed in one's particular context. AThEME approached this by engaging a wide variety of stakeholders in the process of undertaking research and also consulting them on their specific needs.
- **Obstacle 2:** Lack of basic subject knowledge amongst target audiences preventing understanding of more complex knowledge. AThEME approached this by using the Bilingualism Matters network of branches. Bilingualism Matters branches have been engaging with the public and professionals through events from the outset of the project. We believe this has created trust, interest and basic understanding of the subject and enabled them to appreciate the value of the AThEME research results later. In addition, research results were presented using plain language and simple explanations of complex issues.
- **Obstacle 3:** Lack of trust in the source of information, fear of fake or biased news. AThEME approached this by featuring researchers, representing reputable institutions, in trusted press and media features, and alongside research results, having them provide explanations of the research methodology and its shortcomings. Researchers also made themselves available for discussion and questions on multiple occasions and during different events.
- **Obstacle 4:** Lack of emotional link with the new knowledge or the source of the knowledge. AThEME's approach to this was making research available in the diverse formats, enhanced



by engaging in direct collaborations and interactions with the audiences over an extended period.

AThEME has had a significant impact on the growth and consolidation of the BM Network. During the AThEME project, the network grew by almost half, and since then, it has doubled in size again. Network members worked collaboratively on the research as well as its dissemination, developing science communication skills learning from each other and coordinating efforts. By the end of AThEME new governance structures have been put in place ensuring the network's sustainability beyond the project. On completion of the project, all but one branches renewed their commitment to remain members of the BM Network. One branch suspended its activity because of lack of staff and resources after the end of the project.

In addition to impact on the structure of the Bilingualism Matters, the AThEME project has also expanded the skills and knowledge within the network. The AThEME take-away messages are now routinely used in the BM outreach and engagement efforts, ensuring their sustainability beyond the project. For example, new evidence on the language change is frequently referred to during events on maintenance of local minority languages, i.e. Scottish Gaelic. These AThEME take-away messages are: (1) *Language is a 'living creature' constantly evolving: languages in close proximity affect and change each other;* (2) *Regional minority languages in Europe are declining: more resources are required to ensure their continued use in families and their transmission across generations;* (3) *Bilingualism does not have a negative impact in cases where children have dyslexia or developmental language disorders;* (4) *Interacting with speakers who have distinctive non-native accent affects some aspects of memory and communication but not personality impressions or the credibility of the message;* (5) *The effects of bilingualism on the brain are influenced by where the languages are used and how different the languages are from each other and* (5) *Multilingual speakers flexibly adapt their communication and cognitive strategies according to who they are speaking with.*

