A SOCIAL THEORY OF BILINGUAL ADAPTATIONS: HOW LANGUAGE EXPERIENCE AND LINGUISTIC REGISTER VARIATION MODULATE THE PROCESSING OF AGREEMENT ATTRACTION ERRORS

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DOCTORAL THESIS

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FAIG CONSTAR que aquest treball, titulat "A social theory of bilingual adaptations: How language experience and linguistic register variation modulate the processing of agreement attraction errors", que presenta la Camilla Masullo per a l'obtenció del títol de Doctora, ha estat realitzat sota la meva direcció al Departament d'Estudis Anglesos i Alemanys d'aquesta universitat, i que la tesi compleix tots els requisits per poder optar a l'Esment Internacional de Doctorat.

HAGO CONSTAR que el presente trabajo, titulado "A social theory of bilingual adaptations: How language experience and linguistic register variation modulate the processing of agreement attraction errors", que presenta Camilla Masullo para la obtención del título de Doctora, ha sido realizado bajo mi dirección en el Departamento epartamento de Estudios Ingleses y Alemanes de esta universidad, y que la tesis cumple todos los requisitos para poder optar a la Mención Internacional de Doctorado.

I STATE that the present work, entitled "A social theory of bilingual adaptations: How language experience and linguistic register variation modulate the processing of agreement attraction errors", presented by Camilla Masullo for the award of the degree of Doctor, has been carried out under my supervision at the Department of English and German Studies of this university, and that that it fulfils all the requirements to be eligible for the International Doctorate Mention.

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Abstract

This dissertation delves into the social dimension of bilingualism and language processing through different steps. First, I present a systematic review of 368 studies on bilingual cognitive adaptations to see how frequently factors related to the social and sociolinguistic dimensions of the bilingual experience are considered, as well as how often studies ascribe their findings to a cognitive, social, or mixed origin. The results reveal that 73.41% of studies attribute their findings to specific social and sociolinguistic factors of bilingualism. This underscores the importance of operationalizing as many sociolinguistic factors as possible to achieve a better understanding of where different bilingual effects on cognition stem from. Secondly, I inquire into the sociolinguistic dimension of bilingual language processing through an experiment that compares how different language groups process Subject-Verb agreement mismatches through a timed acceptability judgment task. The sample includes Italian monolinguals, Italian-Spanish bilinguals, and two groups of Italian bidialectals, namely Italian-Pavese and Italian-Agrigentino bidialectals. The results reveal differences in accuracy and reaction times between monolingual and bidialectals and within the bidialectal groups, which are explained by the different sociolinguistic dynamics and language practices of each group. Lastly, I examine the effect of linguistic register variation on the processing of Subject-Verb agreement mismatches, jointly and independently from speakers' linguistic background. The aforementioned language groups are compared on a task that features both high- and low-register stimuli. The results reveal a significant effect of linguistic register variation: grammatical anomalies are better detected in low-register sentences. Furthermore, register variation shows a significant interaction with speakers' linguistic background, with varying accuracy rates and reaction times across different language groups. In sum, the results of this dissertation support a social-based approach for cognitive adaptations to bilingualism, where the cognitive and social dimensions should be equally valued and explored.

Resum

Aquesta tesi estudia la dimensió social del bilingüisme i del processament lingüístic. Una revisió sistemàtica de 368 estudis sobre les adaptacions cognitives bilingües investiga amb quina freqüència es consideren els factors relacionats amb la dimensió social i sociolingüística del bilingüisme i quantes vegades els estudis atribueixen els seus resultats a un origen cognitiu, social o mixt. El 73.41% dels estudis atribueix els seus resultats a factors socials i sociolingüístics del bilingüisme. Això posa de manifest la importància d'operacionalitzar els factors sociolingüístics per comprendre l'origen dels diferents efectes cognitius del bilingüisme. En un estudi exploratori s'investiga la dimensió sociolingüística del processament del llenguatge bilingüe tot comparant com diferents grups lingüístics processen la manca de concordança Subjecte-Verb. La mostra inclou monolingües italians, bilingües italià-espanyol i dos grups bidialectals italians, parlants d'italià i pavese o d'italià i agrigentino. Els resultats revelen diferències de processament entre els monolingües i els bidialectals, i dins dels grups bidialectals, que s'expliquen per les dinàmiques sociolingüístiques i pràctiques lingüístiques diferents de cada grup. Finalment, examino l'efecte de la variació del registre lingüístic en el processament de la manca de concordança Subjecte-Verb, tant independentment com en relació a l'experiència lingüística dels parlants. En aquest estudi, els mateixos grups lingüístics ja esmentats es comparen en una tasca de judicis d'acceptabilitat on la meitat dels estímuls es presenten en registre alt i l'altra meitat en registre baix. Els resultats mostren un efecte significatiu de la variació del registre lingüístic: les anomalies gramaticals es detecten millor en registre baix. La variació del registre també mostra una interacció significativa amb l'experiència lingüística dels participants, amb diversos resultats de processament en diferents grups lingüístics. Els resultats d'aquesta tesi donen suport a un enfocament social per a les adaptacions cognitives bilingües, on tant les dimensions cognitives com les sociolingüístiques siguin igualment valorades i explorades.

Resumen

Esta tesis estudia la dimensión social del bilingüismo y del procesamiento lingüistico. Una revisión sistemática de 368 estudios sobre las adaptaciones cognitivas bilingües investiga con qué frecuencia se consideran los factores de la dimensión social y sociolingüística del bilingüismo y cuántas veces los estudios atribuyen sus resultados a un origen cognitivo, social o mixto. El 73.41% de los estudios atribuye sus resultados a factores sociales y sociolingüísticos de la experiencia bilingüe, evidenciando la importancia de operacionalizar los factores sociolingüísticos para comprender el origen de sus diferentes efectos cognitivos. La dimensión sociolingüística del procesamiento del lenguaje bilingüe es ulteriormente investigada en un estudio exploratorio que compara cómo diferentes grupos lingüísticos procesan la falta de concordancia Sujeto-Verbo. Los participantes son monolingües italianos, bilingües italiano-español y dos grupos bidialectales italianos, hablantes de italiano y pavese y de italiano y agrigentino. Los resultados revelan diferencias de procesamiento entre los monolingües y los bidialectales, y dentro de los grupos bidialectales, explicadas con las diferentes prácticas lingüísticas de cada grupo. Por último, examino el efecto de la variación del registro lingüístico en el procesamiento de la falta de concordancia Sujeto-Verbo, junto a la experiencia lingüística de los hablantes. En este estudio, los mismos grupos lingüísticos mencionados anteriormente son comparados en una tarea de juicios de aceptabilidad donde la mitad de los estímulos es en registro alto y la otra mitad en registro bajo. Los resultados muestran un efecto significativo de la variación del registro lingüístico: las anomalías gramaticales se detectan mejor en registro bajo. La variación del registro muestra una interacción significativa con la experiencia lingüística de los participantes, con varios resultados de procesamiento en diferentes grupos lingüísticos. Los resultados de esta tesis apoyan un enfoque social para las adaptaciones cognitivas bilingües, donde tanto las dimensiones cognitivas como las sociolingüísticas sean igualmente valoradas y exploradas.

Contents

List of Figures

List of Tables

Full List of Abbreviations

AJs	Acceptability Judgements
AJT	Acceptability Judgement Task
AoA	Age of Acquisition
CEIPSA	Ethics Committee for Research into People, Society and the Environment
EFs	Executive Functions
ELAN	Early Left Anterior Negativity
ERPs	Event-Related brain Potentials
GLME	Generalized Linear Mixed-Effects model
IPG	Incremental Procedural Grammar
ISTAT	Istituto Nazionale di Statistica
LAN	Left Anterior Negativity
LME	Linear Mixed-Effects model
LSBQ	Language and Social Background Questionnaire
MAIN	Multilingual Assessment Instrument for Narratives
NP	Noun Phrase
NQ	Negative-Quantifier
NV	Negative-Verb
PATH	Plurilingual Adaptive Trade-off Hypothesis
PP	Prepositional Phrase
RQ	Research Question
RTs	Reaction Times
SES	Socio-Economic Status

UNESCO United Nations Educational, Scientific and Cultural Organization

VIF Variance Inflation Factor

WM Working Memory

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Three years have passed quickly, and the end of my PhD has arrived without even realizing. During these years, I met lot of people who contributed to make my PhD experience unique in different ways.

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Chapter 1

Introduction

1.1. Overview

Inquiring about bilingualism means tapping into a stream of research that has at least a century of life (Saer, 1923; Garraffa et al., 2020 *inter alia*). A substantial body of literature has delved into what being bilingual entails, with a strong debate on whether speaking more than one language could be detrimental or beneficial for our cognition (Feldman & Shen, 1971 *inter alia*). While the former hypothesis has been proposed in earlier studies (Saer, 1923; Manuel, 1935), during the second half of the XX century, specifically after Peal & Lambert's research (1962), the tendency to report bilingual advantages gained ground (see Barac & Bialystok, 2011 for a detailed timeline). After more than 50 years, the bilingual (dis)advantage debate is still controversial (Treccani & Mulatti, 2015; Blanco-Elorrieta & Caramazza, 2021), with studies reporting both positive and negative bilingual effects on cognition for different bilingual populations.

The term "bilingual effect" refers to the cognitive consequences that the bilingual experience brings to different cognitive domains, among which are executive functions (EFs), semantic fluency, syntactic processing, and metalinguistic awareness (Gollan et al., 2002; Bialystok, 2007; Adesope et al., 2010; Siu & Ho, 2022). Such cognitive consequences have been described in terms of (i) *positive effects*, which occur when bilinguals show better performance in cognitive tasks compared to monolingual people, (ii) *negative effects*, when the opposite pattern is observed, and (iii) *null effects*, which amount to no difference between monolingual and bilingual people. Together with the apparent inconsistency of its results, another aspect of the bilingual (dis)advantage debate concerns the fact that psycholinguistics research has been primarily focused on the specific cognitive outcomes that derive from speaking more than one language (Titone & Tiv, 2022). However, less effort has been directed at examining which specific social or sociolinguistic factors shape the bilingual experience (Kroll et al., 2023), with most studies describing their bilingual groups by taking into account, at best, a limited number of (socio)linguistic variables, such as the age of acquisition or the language proficiency of the tested speakers/signers.

Nonetheless, the social dimension should be considered a crucial component of the bilingual experience, especially if we aim to build a "just and equitable future for applied psycholinguistic research", as recently proposed by Luk (2022: 1), who supported a shift "from processes to *people*" in research on bilingualism (p. 5). In a person-centered dimension, language is not merely a cognitive ability that differentiates humans from other species: Besides being an instrument of communication, it is an integral part of people's identity (Jaspal, 2009 *inter alia*). Thus, if we embrace a person-led approach and regard social identity as "part of an individual's self-concept" (Tajfel, 1978: 63) with language being a vehicle for expressing people's identity, it follows that considering the social components of the bilingual experience should be a pivotal step in investigating bilingualism. Indeed, both the definition and the representation of bilingualism are now heading towards a more nuanced perspective which appreciates the joint contribution of different social and cognitive factors (see Marian & Hayawaka, 2021 for the proposal of a bilingualism quotient for measuring the bilingual experience; Titone & Tiv, 2022 for the proposal of the Systems Framework of Bilingualism; Wagner et al., 2022; Luk, 2022 *inter alia*).

Following this line of work, the main purpose of this dissertation is to shed light on how social and sociolinguistic factors shape the bilingual experience, and, thus, to help in clarifying the apparent inconsistencies regarding the bilingual effects on cognition: As Costa et al. (2009) put it, when it comes to the bilingual advantage in conflict processing, "now you see it, now you don't". If "language can be viewed as a new machine created out of various cognitive and social components that evolved initially in the service of completely different functions" (Bates et al., 1979: 248), social and cognitive factors should not be perceived as stand-alone elements, since they jointly sculpt individuals' language experience (Titone & Tiv, 2022). Specifically, this dissertation aims to determine the impact of social and sociolinguistic factors on the bilingual experience by bringing together both bilingual speakers of standard languages, namely Italian and Spanish, and bilingual speakers of two Italian bidialectal communities, namely Italian-Pavese and Italian-Agrigentino bidialectal[1] speakers. By focusing on Italian bidialectal communities I seek to bridge the underrepresentation of such populations in bilingualism research, which shows a stronger tendency to consider bilingual speakers/signers of standard languages. Comparing bilingual speakers of both standard and non-standard languages will enlighten the potential differences and commonalities among different linguistic

[1] For a more detailed description of the term "bidialectal", see §1.4.

populations, revealing the role of social and sociolinguistic factors on different bilingual experiences.

Together with the social components of the bilingual experience, another cornerstone of this dissertation will be the investigation of whether and how linguistic register influences language processing, both independently and jointly with individuals' linguistic background. Indeed, inquiring about the impact of linguistic register on language processing could be seen as a further step in adequately framing the social dimension of language. In this regard, I will adopt the definition of linguistic register proposed by Lüdeling et al. (2022; see also Biber & Conrad, 2009), and I will consider it as the sum of those aspects of socially recurring intra-individual variation that change according to the situation and the function of the communicative context. Taking this definition as a starting point, the link between linguistic register and the social dimension of language becomes clear. Indeed, since the first approaches to linguistic register, which were already attested in Ancient Greece in the 1st century B.C. (Kemp, 1986; Lüdeling et al., 2022), emphasis has been put on the social components that modulate register choices (see Lewandowski, 2010 for an overview of the different definitions of linguistic register). The social nuances of linguistic register were also highlighted by Halliday, who stated that linguistic register is "a variety defined by reference to a social context" (Halliday, 1978: 157), and by Gregory & Carroll (1978), who identified the major role of society in determining the cultural factors modulating linguistic register variation. Zwicky & Zwicky (1982) devoted particular attention to situational factors surrounding linguistic register choices and, analogously, Holmes (2001) described register as a variety of language associated with specific situational parameters such as addressee, setting, mode of communication, task, or topic. Last, as argued by Lüdeling et al. (2022), the third wave of sociolinguistic studies made a strong contribution to defining language users' register knowledge: According to this view, speakers/signers assume a role by taking a specific place in their sociolinguistic environment, and the situational landscape itself influences their register choices. The aforementioned definitions of linguistic register highlight its strong connection with social factors. Thus, bringing linguistic register into the picture and considering its role together with other social factors that are relevant to the bilingual experience will help us gain further insights into the social dimension of language.

In a nutshell, my research goals in this dissertation are the following: (i) Investigating the origin of bilingual effects on cognition, with a specific focus on social and sociolinguistic factors; (ii) understanding how bilingualism of standard and non-standard languages influences

language processing; (iii) detecting the role that linguistic register plays in language processing, both jointly with and independently from speakers' linguistic background.

In the following sub-sections, I will give an overview of the main themes of this dissertation. Sub-section §1.2 presents the testing vehicle of my experiment, namely an acceptability judgement task (AJT) featuring Subject-Verb agreement mismatches in different linguistic registers. In §1.3, I will address the issue of how linguistic experience affects language processing, focusing on the comparison between monolingual, bilingual, and bidialectal speakers and presenting findings from previous literature. Sub-section §1.4 is devoted to the Italian (socio)linguistic landscape and aims to provide a better understanding of the investigated bidialectal communities and the role that dialects play in Italy. §1.5 describes results from previous research conducted on the bilingual populations included in my studies. §1.6 presents the importance of considering social and sociolinguistic factors in approaching the bilingual and bidialectal experience. Lastly, sub-section §1.7 provides the outline of the dissertation.

1.2 Agreement attraction errors, acceptability judgements, and linguistic register variation: A combined approach to study language processing

As already mentioned, this dissertation aims to investigate the role that linguistic background and register play in language processing. To pursue these goals, I will specifically focus on the processing of agreement attraction errors. I tap into this phenomenon through a novel AJT that elicits responses from four groups of participants: Italian-speaking monolinguals, Italian-/Spanish-speaking bilinguals, Italian-/Pavese-speaking bidialectals, and Italian-/Agrigentino-speaking bidialectals. To better illustrate my methodological choices, I will briefly go through the previous literature on the processing of Subject-Verb agreement mismatches and the use of acceptability judgements (AJs) as an experimental tool.

1.2.1 Agreement attraction errors and language processing

An agreement attraction error occurs when a linguistic element does not follow the agreement features of its grammatical controller because of the influence of another nearby element, generally called a "distractor". What happens instead is that the mismatching element follows

the agreement features of this distractor (Wagers, 2009; Sprouse, 2018). The result of an agreement attraction error is an ungrammatical sentence where two elements that are supposed to agree in specific syntactic features fail to do so (example 1).

(1) *The key to the cabinets are on the table (Phillips et al., 2011).

Although sentences like (1) are ungrammatical, quite often language users fail to consistently recognize them as such, mainly because the parser still computes agreement, albeit on the incorrect element (i.e., the distractor). For this reason, sentences featuring agreement attraction errors have been listed among the so-called "grammatical illusions", which are defined as linguistic structures that trick our parser in such a way that an ungrammatical sentence is considered acceptable (Phillips et al., 2011). Regarding the possible factors that lead to an agreement attraction error in production, Wagers (2009: 2) listed a series of candidates, such as "the number features on potential attractors, their relative structural depth with respect to the grammatical controller, and linear order". According to the grammatical feature involved in the agreement (i.e., person, number, gender, case, etc.), different types of agreement attraction errors occur. In my experiments, I will focus on Subject-Verb agreement attraction errors.

This kind of agreement attraction error has been frequently examined in previous literature, both in production and in comprehension studies. In a series of production experiments, Bock & Miller (1991) tested the effect of number, animacy, and length of a disrupting prepositional phrase (PP) on Subject-Verb agreement processing in English and found that plural PPs were more prone to elicit agreement attraction errors than singular PPs. The animacy and length of the PP, instead, did not seem to affect agreement processing. Similar findings were also reported by Bock & Eberhard (1993), who investigated whether the nature of number information (i.e., notional, lexical, morphological)[2] had an impact on the agreement processing. Their results attested to the prominent role of lexical information, leading to the claim that "verb agreement is dominated by lexical number" (Bock & Eberhard, 1993: 57). These results were confirmed by a later study on the impact of congruency between the grammatical and conceptual number in the production of Subject-Verb agreement in English

[2] Notional number is defined as "the number in the speaker's intended message" (Bock & Eberhard, 1993:59), lexical number is linked to the inherent properties of the noun (i.e., whether it is a mass or count noun), while morphological number refers to the presence of overt morphological features on the PP (i.e., a marked form for the plural or specific allomorphs).

and Dutch (Bock et al., 2001). For Italian, Vigliocco et al. (1995) reported similar findings in terms of increased error production when there was a number mismatch between the subject and the distractor. However, contrary to previous studies on English (Bock & Eberhard, 1993), the semantic distributivity of the head noun was found to be relevant for agreement processing, suggesting that Italian and English differ in their sensibility to the number of tokens referred to by the head noun. Moving to comprehension studies, Pearlmutter et al.'s (1999) results are in line with the ones reported in production studies: Subject-Verb agreement processing turned out to be more costly when the subject and the distractor differed in number. A later study by Wagers et al. (2009) confirmed these findings and proposed that agreement attraction processing in comprehension should be attributed to a retrieval mechanism initiated by the verb (i.e., the verb starts a query among the elements of the received input to find the one that matches in number).

In the last 50 years, studies on Subject-Verb agreement mismatches have been accompanied by several hypotheses on how Subject-Verb agreement processing is computed and how agreement attraction errors are generated. Bates & MacWhinney (1982), for example, proposed a psycholinguistic computational model according to which sentence comprehension is governed by specific dynamics involved in the association of linguistic forms to functions. The cost of the mapping between forms and functions is defined as *cue strength*, which in turn is determined by cue validity and cue cost. A cue is defined as high in validity, and consequently low in costs, when it is highly reliable and not misleading in mapping forms into functions. Following this approach, sentence processing, including Subject-Verb agreement, would be influenced by cue validity and cue cost of (morpho)syntactic features. The manipulation of morphosyntactic cues was applied to compare cross-linguistic data and to see how different languages rely on them. In this regard, Vigliocco et al. (1995) pointed out that the number feature of verbs in Italian, which is a morphologically rich language, seems to be a relevant cue for choosing the agent of a sentence; in English, instead, the most relevant cue would be the word order. Another psycholinguistics model for Subject-Verb agreement is the Computational Model of Grammatical Encoding, proposed by Kempen & Hoenkamp (1987). In this model, the Incremental Procedural Grammar (IPG) plays a pivotal role: Subject-Verb agreement would be computed in separate steps, following a hierarchical procedure, and there would be no feedback exchange between the different steps. In other words, once a lexical element has been identified as the subject of the sentence and its number features have been established, there will not be any further check of number information between the subject and the verb. Thus, the number agreement would not depend on the retrieval process of the head

noun (Wagers et al., 2009), but it would be already determined once the head noun has been selected as a subject. Subject-Verb agreement computation has also been analyzed by representational and retrieval accounts. Representational accounts (Eberhard et al., 2005; Staub, 2009; Brehm & Bock, 2013), and, in particular, feature percolation accounts (Nicol et al., 1997; Vigliocco et al., 1998; Franck et al., 2002), propose that agreement attraction errors stem from the misleading representation of the subject of the sentence. This ambiguous representation would derive from the transfer of the number features of the distracting noun phrase (NP), which lies between the subject and the verb, on the subject. The consequent wrong number features of the subject would lead to a wrong number agreement on the verb. From a different perspective, retrieval accounts interpret agreement attraction errors as a failure of the memory retrieval system, which is part of EFs (McElree, 2000; McElree et al., 2003; Lewis & Vasishth, 2005; Martin & McElree, 2008; Van Dyke & McElree, 2006). According to these accounts, during the retrieval process of the subject in the agreement region, the parser would select an incorrect element (i.e., the distracting NP) due to an overload of the working memory system (Bock & Cutting, 1992; Hartsuiker & Barkhuysen, 2006).

The diverse hypotheses regarding the nature of Subject-Verb agreement attraction errors highlight the complexity of such linguistic phenomena in terms of processing, which can be also linked to their classification as grammatical illusions. Successfully navigating grammatical illusions requires heightened processing abilities, which in the case of Subject-Verb agreement mismatches consist of suppressing the influence of the misleading distractor. Indeed, besides ungrammatical sentences, also grammatical sentences can present processing difficulties when it comes to the computation of Subject-Verb agreement. Slower reaction times are recorded when the subject head noun and the distractor present different number features (see Franck et al. 2015, and Laurinavichyute & von der Malsburg, 2019 for studies on comprehension, and Santesteban et al. 2020 for studies on production).

1.2.2 AJTs: A glimpse into language processing

AJTs have been defined as a type of rating task where participants are asked "to provide a report of their perception of the acceptability of a sentence" (Sprouse et al., 2013: 221). According to Myers (2017), AJs can offer insights into language processing mechanisms. Across frameworks, introspective judgements have been one of the most frequently used tools

to provide an empirical foundation on how language is perceived and comprehended by speakers, and, over the years, different and more elaborate techniques of data collection have been developed and applied (Schütze, 1996; Sprouse et al. 2013 *inter alia*). Sprouse & Almeida (2012) make a distinction between the initial informal traditional methods and the formal experimental methods, which have gained ground in the last 30 years. Despite Sprouse & Almeida's (2012) explanatory distinction, the two methods share the same experimental foundation and only differ across a few dimensions, namely the used responses scale, the number of participants, and the number of stimuli per condition (Sprouse & Almeida, 2012).

In the last years, formal experimental methods, also called "experimental syntax techniques" by Cowart (1997), have taken several forms according to the research purpose and the rating scale used to elicit judgements. Regarding the first parameter, Sprouse et al. (2013) distinguish between (i) standard AJs, where participants are only required to rate the acceptability of a sentence on an arbitrary scale or in reference to another sentence, (ii) coreference judgements, used to test binding relationships[3], and (iii) interpretation judgements, which are based on the meaning of a sentence, and are used to verify whether it is ambiguous or not. Regarding the different scales used for acceptability ratings, Sprouse (2018) lists four of the most common types used in experimental research, namely N-point rating scales, two-alternative forced-choice with nominal categories, two-alternative forced-choice comparing sentences, and magnitude estimation. In experiments employing N-point rating scales, participants are asked to evaluate the acceptability of the sentences, presented one by one, along a scale of ordered numbers, where the first and the last number are labeled with specific values of acceptability (i.e., "1 = completely unacceptable", "5 = completely acceptable"). In tasks using two-alternative forced-choice with nominal categories, participants must assign the sentences, presented one by one, to one of the two outlined categories (i.e., acceptable vs. unacceptable), while in studies that use two-alternative forced-choice comparing the sentences, participants are presented with two sentences at once and need to choose which one is more acceptable. Lastly, the use of magnitude estimation consists of presenting participants with a starting sentence, which constitutes the reference level, and asking them to assign a numeric value to it. The evaluation of the following sentences will be based on the value assigned to the reference level. The choice of using one scale instead of another is determined by the purpose of the study and by the inquired phenomenon: N-point rating scales and magnitude estimation

[3] Participants read/listen to a sentence with two or more NPs and indicate whether the two NPs refer to the same entity.

(Bard et al., 1996), for example, allow researchers to measure ratings on a continuum, thus they are more in line with a gradient concept of acceptability; two-alternative forced-choice judgements, on the other hand, are more suitable for categorical acceptability and align judgements within a binary distinction.

The mention of a gradient concept of acceptability brings along a crucial matter, which is the nature of acceptability and its difference from grammaticality. While sentences can be classified on a rich continuum between the categorical notions of "acceptable" and "unacceptable", and thus acceptability could be defined as a gradient phenomenon, this is not the case for grammaticality, which entails a binary distinction between "grammatical" and "ungrammatical". The difference between acceptability and grammaticality has been addressed in different works. Sprouse (2007b), for example, found that even when respondents are offered the possibility of rating sentences on a continuum, they tend to categorize their responses to the extremes of the scale, reflecting a grammatical/ungrammatical distinction. Lau et al. (2016) proposed a compatible view of grammaticality, which was described as a binary notion, and explained the gradience of acceptability through a probabilistic model where different performance components set acceptability ratings on a continuum. The role of extra-grammatical components was also addressed by Leivada & Westergaard (2020), who argued in favor of the gradient nature of (un)acceptability and the binary nature of grammaticality. The authors proposed a distinction between relative and absolute grammaticality, where the former is defined as an "ever-changing property of the stimulus", while the latter is described as a "stable" property that concerns the violation of some principles of language and cognition (Leivada & Westergaard, 2020: 8). The core differences between acceptability and grammaticality suggest that a clear distinction between the terms "acceptability judgements" and "grammaticality judgements" should be made (Tremblay, 2005; Sprouse et al. 2013; Lau et al., 2016; Leivada & Westergaard, 2020 *inter alia*). Bard et al. (1996) proposed a three-way distinction between grammaticality, acceptability, and AJs. Grammaticality was defined as "a characteristic of the linguistic stimulus itself", acceptability as "a characteristic of the stimulus as perceived by a speaker" and finally AJs were described as "the speaker's response to the linguistic inquire" (Bard et al. 1996: 33).

Attempts to distinguish between grammaticality and acceptability go back to Chomsky (1965), who argued that "acceptability is a concept that belongs to the study of performance, whereas grammaticalness belongs to the study of competence" (p. 11). This association between acceptability and performance makes it plausible to consider that language processing can be inquired through AJs (Myers, 2017). Indeed, AJs have been frequently used as a testing

vehicle to study language processing. The connection between language processing, memory, and parsing mechanisms was investigated by Nagata (1989), who found that judgements on both grammatical and ungrammatical sentences were affected by repetition. After repeated exposure to a set of stimuli, respondents seemed to become more stringent and to better detect syntactic and semantic properties of the presented sentences. Crocker & Keller (2006) focused on the role of previous linguistic experience in driving the linguistic parser during an AJT and concluded that gradience in sentence processing performance and gradient grammaticality should be perceived as separate concepts since the former should be ascribed to the acceptability dimension. Sprouse (2007a) used AJs to examine the processing of wh-movement and island effects. He focused on the role that linguistic context plays in AJs and concluded that constraints that are affected by context are encoded differently in grammatical knowledge compared to those that are not. This pattern revealed that AJs are strongly affected by processing mechanisms that are in turn influenced by extra-grammatical factors, such as linguistic context. The impactful role of processing mechanisms on AJs was also confirmed by Topolinski & Strack (2009), who manipulated processing ease by improving visual clarity of the stimuli and memory enhancement through the priming effect. They found that processing facilitation strategies influence AJs. The influence of processing mechanisms on AJs was also discussed by Leivada & Westergaard (2020), who found that (un)acceptability ratings of grammatical illusions are modulated by parsing difficulties.

In the next section, I will focus on how extra-grammatical factors can influence language processing, impacting AJ ratings.

1.2.3 The impact of extra-grammatical factors on AJs and the role of linguistic register

Even though the reliability of AJTs has been extensively proved, this experimental method has also received some criticism. The latter mostly concerns specific methodological choices and the role that extra-grammatical factors could play on AJ ratings. In this section, I will go through some of these factors, discussing how they have been addressed.

In 1972, when the informal, introspective method was widespread in linguistic research (Sprouse & Almeida, 2012), Levelt pointed out some problems about what he called “linguistic intuitions” (i.e., AJs). First, he criticized the fact that, in many AJTs, sentences were presented without a context of discourse, and this could have an impact on their ratings. He expressed a

similar concern about the practice of presenting stimuli in isolation instead of organizing them in terms of balanced sets consisting of both grammatical and ungrammatical stimuli, because "if many grammatical examples are given, one slightly less grammatical case will be judged ungrammatical" (Levelt, 1972: 25). He further commented on the practice of using "unnatural and funny examples" (Levelt, 1972: 26) as experimental items as well as on the linguists' tendency to assume the role of their own informants. In the latter case, Levelt (1972) emphasized the risk for linguists of potentially being biased by specific theoretical expectations in their judgements and of employing implicit or explicit criteria based on the linguistic school to which they belong. Finally, he suggested that to correctly use AJs for experimental research, extraneous factors such as unnecessary loading of short-term memory or distracting semantic costs should be avoided. In line with Levelt (1972), Sprouse (2007a) addressed the issue of linguistic context in AJs, specifying that in standard AJTs it is rarely provided, and stating that "given that acceptability as a property is dependent on context, and given that context is rarely supplied during the collection of AJs, it is no wonder that both linguists and psychologists have questioned the reliability of acceptability data" (p. 47). Although the transition from traditional informal methods to formal experimental methods had partially addressed these problems, Sprouse & Almeida (2012) further strengthen the reliability of AJs by addressing one of the main criticisms against the traditional informal methods, namely the fact that such methods would have led to a high number of false positive results. False positive results occur when an experiment erroneously indicates the presence of a difference between two experimental conditions (i.e., alternative hypothesis), even when this difference does not exist (i.e., null hypothesis). This phenomenon is commonly referred to as a "Type I error". The opposite situation, which occurs when an experiment erroneously supports the null hypothesis, when indeed there is a difference between the two experimental conditions, is known as a "Type II error". According to the Neyman-Pearson approach (Neyman & Pearson, 1928), the statistical power of an experiment corresponds to the probability that the experiment favors the alternative hypothesis when this hypothesis is true. Through a series of experiments, Sprouse & Almeida (2012) showed that traditional methods yield false positives only between 2-5% of the time. They further suggested that a way to reinforce the credibility of AJ data goes through the assessment of the statistical power in formal AJ experiments.

While the above-mentioned criticisms about the validity of AJs mostly pertain to the methodological dimension, other concerns have been expressed about the role of extra-grammatical factors. Bard et. al. (1996) argued that among the influencing extra-grammatical factors on AJ ratings, there could be the conformity of the stimuli to a prescriptive norm or a

prestigious linguistic register. Some of these issues were also raised by Schütze (1996), who listed a series of possibly impactful variables on AJs, such as organismic factors (i.e., field dependence/independence of the subject[4], handedness, gender, age) and experiential factors (i.e., linguistic training, literacy, and education). Among the latter group of factors, Schütze included the amount of experience that subjects have with the tested language. This point could turn out to be particularly significant for the comparison between monolinguals, bilinguals, and bidialectals. Indeed, Van Kleeck (1982) and Bialystok (1986, 2012) *inter alia* argued that the experience in another language leads to differences in metalinguistic abilities and this could impact AJ performance.

Regarding the possible impact of the conformity of the stimuli to a prescriptive norm or a prestigious linguistic register, which can be linked to the influence of sociolinguistic factors on AJs, Labov (1996) stressed the role that linguistic prestige can have for speakers of dialects and non-standard languages. He argued that most of the time there is a lack of correspondence between the people's linguistic judgements and their actual language use. He identified 5 conditions where linguistic intuitions were more likely to fail, namely (i) social intervention, "when a socially superordinate norm takes precedence over the native system", (ii) physical collapse, "when the physical basis for a distinction is weak or eroded", (iii) semantic suspension, "when the semantic function of a productive distinction is suspended, (iv) cognitive interference, "when cognitive strategies determine linguistic preferences" and (v) pragmatic opacity, "when the pragmatic function of a form is inconsistent with overt recognition by users" (Labov, 1996: 100). Relying on these observations, he warned that when one of these 5 conditions is present, speakers' linguistic introspections could not be enough to depict the properties of the inquired language. To clarify the 5 conditions listed by Labov (1996) as potential influencing factors on the AJs of non-standard languages, I will report some examples from American English mentioned by the author. A case of social intervention could be the preference for "nowadays", used in the northern and southern varieties of American English, to the use of "anymore" in sentences without negation, spread in the midland varieties. An instance of physical collapse is the reduction of /hæv/ to /v/, which leads to the reinterpretation of "have" as "of" in forms like "could have". For semantic suspension, the author mentions the merge of /o/ and /oh/ in "cot" and "caught" in North America where the suspended semantic distinctiveness could be the result of physical collapse. As an instance of

[4] Field dependence is defined as a personal characteristic for which the individual merges traits of the world and experiences; on the contrary, a field independent person analyzes separately world's information and experiences as split components (Weiner et al., 1977 in Schütze, 1996).

cognitive interference, Labov cites the Negative-Quantifier (NQ) and Negative-Verb (NV) dialects, which always use the quantifier and the verb respectively to create the negative form of a sentence (Carden, 1970). Lastly, the alternation of "G'bye" and "bye-bye" is listed as an example of pragmatic opacity.

Among the social and extra-grammatical factors behind the acceptability of a sentence, there is also linguistic register. Indeed, Schütze (1996) tackled this issue and listed some linguistic register features that could influence linguistic processing such as clarity, awkwardness, slanginess, and floweriness. He also detected a gap in the literature on this topic, arguing that "while these [factors related to register-CM] have likely been examined in a sociolinguistic context, I am not aware of any research looking for them as confounds where grammaticality was the property subjects were targeting" (Schütze, 1996: 145). Since this observation, only a few studies have focused on the influence of linguistic register on AJs and language processing. To the best of my knowledge, the only projects which specifically investigated this topic have been recently conducted by the Collaborative Research Center 1412 "REGISTER", where register knowledge of speakers, language processing and intra-individual variation are the focus of different lines of research (Lüdeling et al., 2022). Within this project, Pescuma et al. (2022), focused on how sentence processing is influenced by linguistic register, and more specifically, by the variation in context formality in German. An AJT with eye-tracking measurement was employed to see whether morphosyntactic congruence and register variation have an impact on sentence processing. Participants were asked to read sentences that conveyed either a formal or an informal context. After each of these sentences, a target sentence appeared. The manipulation in the target sentence involved the selection of verbs with varying lexical registers, allowing for both high-register and low-register options while preserving the same intended meaning. A congruent context-formality match was met when a formal sentence preceded a target sentence featuring a high-register verb, or when an informal sentence preceded a target sentence with a low-register verb. Conversely, a mismatch in context-formality arose when there was incongruence between the linguistic register of the first sentence and the register of the target verb. Another manipulated variable of the experiment was the Subject-Verb agreement (mis)match in the target sentence. Both context-formality and morphosyntactic congruence influenced reading times, suggesting that both linguistic register information and morphosyntactic knowledge are integrated incrementally during sentence comprehension. Given the scarcity of research on the role of linguistic register on language processing, I will investigate both the joint and the independent

role of linguistic register and participants' linguistic background (i.e., being "monolingual", bilingual, or bidialectal) on the processing of Subject-Verb agreement mismatches.

The concepts illustrated in section §1.2 help in explaining the methodological choices for the experimental design of my studies, which is structured as follows. Following the experimental design of Stowe & Kaan (2006), the timed AJT involves 120 auditory stimuli, split into 40 test items, 60 grammatical fillers, and 20 ungrammatical fillers, aiming for a 2:1 ratio between fillers and test items and a 1:1 ratio between grammatical and ungrammatical stimuli. The 40 test items are ungrammatical sentences with a Subject-Verb agreement mismatch and a plural NP serving as a disrupting distractor between the subject and the verb. The test items are split for two conditions: Half (n = 20) are presented in a high linguistic register, while the other half (n = 20) are presented in a low linguistic register. Each condition has 10 items with an animate distractor and 10 items with an inanimate distractor. The test items in the two conditions (i.e., low- vs. high-register) are matched for semantic content. 108 neurotypical adult speakers completed the AJT. They were split into the Italian-speaking "monolingual"[5] (n = 27), the Italian-/Spanish-speaking bilingual (n = 27), the Italian-/Pavese-speaking bidialectal (n =2 6), and the Italian-/Agrigentino-speaking bidialectal (n = 28) groups. All groups were tested in Italian, and the bidialectal communities were further tested in their dialects, namely Pavese and Agrigentino. Two types of responses were collected: (i) AJs on a 5-point Likert scale where value 1 was specified as "completely wrong. The sentence sounds bad" and value 5 as "completely correct. The sentence sounds good", and (ii) reaction times.

1.3 Language processing and linguistic experience: How do they correlate?

In this section, I will focus on the relation between the bilingual experience and EFs, with specific attention to language processing.

The impact of long-life experience on the structures and the functions of the brain has been frequently studied in many research fields, such as biology, psychology, and neuroscience (Pascual-Leone et al., 2005; Mirescu & Gould, 2006; Mustard, 2006; Bethlehem et al., 2022 *inter alia*). Insights from these disciplines have revealed the remarkable capacity of the human

[5] The use of the term "monolingual" in this dissertation must be intended as referring to the lowest degree of the continuous scale of bilingualism, where participants should be perceived as "more or less bilingual" instead of "completely monolingual/bilingual". Indeed, the notion of pure monolingual in nowadays society, at least in Italy, has become increasingly rare because of the passive exposure to Italian regional varieties, dialects, and school-based knowledge of English/other foreign languages.

mind to adapt resiliently to life's events, aiming to ecologically enhance human well-being and cognitive efficiency. This adaptability manifests through cognitive changes, which have been defined as "cognitive adaptations". Cognitive adaptations are processes "of cognitive adjustment to a threatening life event involving search for meaning in the experience and attempt to restore one's sense of control and positive self-view" (Czajkowska, 2017: 1). Besides threatening life events, cognitive adaptations involve skills essential for everyday human activities, including effective communication and successful integration into complex sociocultural environments (Tomasello, 2020). Among the various theories proposed to explain the acquisition of such complex skills, Taylor et al. (2022) introduced the Complementary Cognition theory. According to this theory, human adaptations evolve through a system of collective cognitive search, which consists of "individual neurocognitive specialization in search and co-evolution with language and aspects of cooperation" (Taylor, 2022: 62). This approach could help in providing an explanatory framework of how aspects like culture and language evolved.

Within the spectrum of human daily activities, linguistic engagement holds a prominent position. Thus, it is reasonable to think that language plays a crucial role in shaping brain plasticity and structures (Friederici, 2011), leading to specific cognitive adaptations. This also concerns complex linguistic experiences, such as bilingualism. Indeed, being bilingual has been described as having two languages in the brain, with the resulting necessity of coping with two different linguistic systems simultaneously (Bloomfield, 1933; Laka, 2012; Bialystok, 2017, 2020 *inter alia*). The complex nature of bilingualism led many authors to suggest that being bilingual confers specific brain adaptations that differentiate the bilingual brain from the monolingual one. Structural changes in the bilingual brain have been observed in several neuroimaging studies (Kuhl et al., 2016; Grundy et al., 2017; see Pliatsikas et al., 2020 for a review). Among the different cognitive domains, research on bilingual cognitive adaptations has widely focused on the EF domain, which has been defined as "a set of top-down cognitive control processes used to manage thought and behavior" (Kaushanskaya et al., 2017: 912). According to previous literature (Vaughan & Giovanello, 2010; McAlister & Schmitter-Edgecombe, 2016; Maldonado et al., 2020), EFs should be seen as a group of separate subcomponents that, while cooperating, involve different activities, such as inhibiting, updating, and set-shifting information, which are all crucial components for language processing. This association has led numerous studies on bilingualism to focus on language processing as an avenue for exploring its link with EFs.

In a study on the neural correlates of bilingual and monolingual cognitive processing, Grundy et al. (2017) reported an increase in gray matter, white matter, and functional connectivity in bilingual people. The authors observed that bilinguals exhibit "a shift from reliance on anterior to subcortical and posterior brain regions" and argued that such adaptations "might be related to a shift from more effortful, controlled processing to more automatic processing of stimuli" (Grundy et al., 2017: 10). These findings have been interpreted as a possible processing facilitation effect for bilinguals. In many cases, research on language processing relied on the measurement of event-related brain potentials (ERPs), which are commonly used to investigate both syntactic and semantic processing. In the specific case of syntactic processing, some of the most relevant ERP components are the Early Left Anterior Negativity (ELAN), mostly observed during the processing of phrase structure violations or word category anomalies, the Left Anterior Negativity (LAN), recorded for different syntactic violations including morphological agreement mismatches, and the P600, observed during the processing of costly syntactic structures or ambiguous sentences, such as garden-path sentences[6] or words which are ungrammatical given the preceding context (Kaan et al., 2000; Moreno et al., 2010).

Regarding the comparison between monolingual and bilingual language processing, some studies found different P600 and LAN elicitations. Hahne & Friederici (2001) tested Japanese learners of German as L2 in the comprehension of sentences in German that were either semantically and syntactically correct, semantically incorrect only, syntactically incorrect only, or both semantically and syntactically incorrect. Japanese-/German-speaking bilinguals showed similar ERP patterns for semantically incorrect sentences compared to German-speaking monolinguals, but a greater P600 for syntactically incorrect sentences, which the authors ascribed to a syntactic integration difficulty for bilinguals. In another study, Hahne (2001) found results traceable back to semantic integration difficulties for Russian learners of German as L2. In a comprehension task involving both semantically and syntactically incorrect sentences, greater elicitation of N400 was observed for Russian-/German-speaking bilinguals compared to their German-speaking monolingual counterpart. Moreno et al. (2010) recorded ERPs in monolinguals and bilinguals undertaking both an AJT and a grammaticality judgement task of sentences containing both syntactic and semantic errors. In the grammaticality judgement task participants were asked to choose "yes" if the sentence was grammatically

[6] A garden-path sentence is a temporary ambiguous sentence which, despite being grammatical, causes reading difficulties and generates processing costs. An example by Fujita (2021: 1234) is "Mary saw the girl drank some water".

correct and "no" if it was grammatically incorrect, independently from its meaning. In the AJT, participants were told to judge a sentence as not acceptable, if they thought there was something wrong in general with the sentence, irrespective of what it was, or acceptable if the sentence was semantically coherent and grammatically correct. Behavioral results showed a bilingual disadvantage in AJ accuracy, while for the grammaticality judgement task, the two groups did not differ. ERP measurement revealed a processing facilitation effect for bilinguals, who generated a smaller P600 amplitude and a more bilateral distribution of activation in the grammaticality judgement task compared to monolinguals. In addition, bilinguals showed a larger N400 compared to monolinguals, which is interpreted as an enhanced ability to process semantic information, even when the task focused on syntactic grammaticality. These findings were explained by enhanced executive control for bilinguals, particularly pronounced during linguistic processing of conflict resolution (Moreno et al., 2010). Kasparian et al. (2017) focused on the neurocognitive mechanism underlying L1 attrition in Italian-/English-speaking bilinguals. They compared Italian-speaking monolinguals and Italian-/English-speaking bilinguals in an AJT involving number agreement mismatches. The stimuli were sentences in Italian where agreement mismatches included Subject-Verb agreement mismatches and Subject-Modifier agreement mismatches. During the task, LAN/N400 and P600 measurements were recorded. Monolingual and bilingual participants differed in LAN and P600 elicitations, with monolinguals showing weaker LAN and longer duration of P600, which were interpreted as more effortful agreement repair processes compared to bilinguals. At a behavioral level, bilinguals reported longer reaction times in the AJT. Furthermore, a significant correlation between ERP measurement and Italian proficiency was found: In the modifier region of the sentence, high-proficient bilinguals showed negativity patterns that resemble a LAN, whereas low-proficient bilinguals reported an N400-like distribution of the negativity.

Besides neuroimaging research, other studies have focused on the comparison between monolingual and bilingual processing, and AJTs were often used as the testing vehicle. Bialystok (1986, 1988) tested monolingual and bilingual children on the judgement of sentences containing syntactic errors, semantic anomalies, or both, and participants were asked to express their evaluations only about syntax. When both syntactic and semantic errors were present, bilingual children were better at ignoring semantic features and focusing on syntax, thus they showed enhanced attentional control compared to their monolingual counterparts. Later, Sorace & Serratrice (2009) focused on the acceptability of Italian and English sentences with anomalies in the syntax-pragmatic interface. They tested the distribution of overt and null subject pronouns and the presence of definite articles in specific and bare plural nouns. The

reasoning behind the choice of these interface phenomena was that they require integrating different types of information, so they are particularly suited for observing whether bilinguals present processing difficulties. The results showed a tendency to over-accept overt subject pronouns in no-topic shift contexts by both English-/Italian-speaking and Spanish-/Italian-speaking bilingual children. For bare plural nouns, both Italian-/speaking monolingual children and Spanish-/Italian-speaking bilingual children performed at the ceiling level, while English-/Italian-speaking bilingual children tended to over-accept more frequently ungrammatical bare plural noun phrases in generic contexts in Italian. These findings were explained by both processing factors (i.e., the necessity to coordinate different levels of information) and structural overlaps between languages.

Differences in monolingual and bilingual processing were also observed by Kaltsa et al. (2016), who tested Greek-speaking monolingual and Albanian-/Greek-speaking bilingual children in an AJT in Greek. The focus was on coordinate subjects in pre-verbal and post-verbal positions and their agreement with the verb. In Greek, Subject-Verb agreement depends on the coordinate subject position: If the plural subject is pre-verbal, the verb must be plural, while if the plural subject is post-verbal, the verb can be either singular or plural. Both monolingual and bilingual speakers showed similar processing patterns: Both in the pre-verbal and the post-verbal subject condition, plural number was processed faster than singular number. However, bilingual children were generally slower than monolingual children, and, in particular, they showed slower reaction times in the last segment of sentences with post-verbal subject and plural verb, which was interpreted as a reanalysis difficulty compared to monolinguals. Using an online and offline AJT, Fernández & Souza (2016) also found differences between Brazilian Portuguese-speaking monolinguals and Brazilian Portuguese-/English-speaking bilinguals in the processing of argument structures. However, the authors ascribed such differences to grammatical representations rather than performance variables. Later, Jessen et al. (2021) used a scalar AJT to test German-speaking monolinguals and Turkish-/German-speaking bilinguals on pseudo-partitive Subject-Verb agreement in German, which allows both singular and plural agreement on the verb. Both groups showed similar performance patterns in agreement preferences; however, bilinguals were found to rely more on noun proximity and plural morphology than monolinguals. Bilingual speakers of Greek and a Germanic language and monolingual speakers of Greek were compared in an AJT testing grammatical illusions by Leivada, Mitrofanova, & Westergaard (2021). The use of grammatical illusions as experimental stimuli offered a novel approach to investigating bilingual language processing. While previous research tended to rely on experimental stimuli

where there is a salient cue for inhibition, errors are less evident in grammatical illusions, because the sentence seems to be well-formed and meaningful despite the grammatical anomaly. The results revealed an interesting pattern: Bilinguals were better in detecting grammatical illusions, but slower in answering. The authors explained these findings in terms of a trade-off mechanism and proposed the Plurilingual Adaptive Trade-off Hypothesis (PATH), according to which bilinguals show enhanced top-down control processes, which enable a heightened detection of grammatical illusions. This positive effect, however, could be counterbalanced by a less advantageous outcome that, in this case, concerned slower reaction times.

While most research on bilingual language processing has focused on standard languages, a few studies have delved into bilingualism involving minority languages and dialects. When addressing non-standard varieties, multiple factors can hinder clear-cut experimental results. These variables can be linked to both the sociolinguistic dimension of the minority languages and their structural distance from the baseline standard language (Leivada et al., 2023). About the former point, linguistic prestige seems to play a crucial role, with many studies reporting that, while minority language speakers can judge some linguistic forms as unacceptable, they still use them in everyday conversations (Labov 1972, 1994 *inter alia*). About the structural distance between minority languages and standard varieties, Auer (2000) coined the notion of "intermediate speech repertoire" to describe those specific cases where the minority languages or dialects are strongly influenced by the standard language. In these contexts, establishing a clear boundary between the two linguistic systems becomes difficult, and speakers are not conscious of the variety they are using. With this concept in mind, Cornips (2006) pointed out the difficulty of gathering AJ data in such sociolinguistic situations, where assigning an acceptability label becomes difficult and leads to a "relative acceptability". In her words, "this continuum [between standard language and dialects-CM] arises not only from a geographic perspective but also from a stylistic (for example the use of dialect and standard features in a more informal and formal setting, respectively) and social perspective (age, gender, ethnicity and levels of education and occupation of the speaker) as well. I propose that a speaker may no longer be able to judge syntactic features as fully grammatical or ungrammatical. Instead, it is very likely that due to the effects of the standard - dialect contact situation the speaker can only make relative judgements by comparing those variants" (Cornips, 2006: 17). Among the studies on AJs and language processing in bidialectal populations, the research conducted by Papadopoulou et al. (2014) reported findings which support the concept of relative acceptability. The study focused on the performance of

bidialectal speakers of Greek and Cypriot Greek in an AJT. Cypriot Greek presents a specific sociolinguistic situation: It is defined as a variety of Standard Modern Greek spoken in the Republic of Cyprus and, since it lacks the status of an official language, speakers may attribute to it a lower sociolinguistic prestige compared the Standard Modern Greek. This picture can be linked to the situation described by Cornips (2006), in which minority language speakers are not always conscious of the language they use and tend to consider the standard variety as the gold standard. The results showed a lack of clear-cut preferences towards the investigated structures, and this was ascribed to different causes, such as the "gradience of grammatical variants, a two-fold competition between grammars and motivations and specific syntactic/semantic choices that are given as input in experimental settings" (Papadopoulou et al., 2014: 124). The remarkable degree of intradialectal variation across the judgements of bidialectal speakers showed by Papadopoulou et al.'s (2014) results is linked to the linguistic continuum between Standard and Cypriot Greek, which, although being closely related, are different linguistic varieties. As happens in many bidialectal environments, the Standard Greek-Cypriot Greek continuum is characterized by competing grammars modulated by specific sociolinguistic dynamics where the acquisition and use of different variants of a linguistic structure are determined by competing motivations (Tsiplakou, 2007). Such motivations are linked to dynamics of prestige associated with the standard variety, as well as to the sense of identification in a specific bidialectal ingroup. The complex interplay of these factors brings to gradient judgements of dialectal linguistic form, leading to the aforementioned "relative acceptability". Bidialectal speakers of Cypriot Greek and Standard Greek were also the target population of a later study by Leivada (2020), who analyzed the processing mechanisms behind comparative illusions in Standard Greek-/Cypriot Greek-speaking bidialectals and Greek-speaking monolinguals. Bidialectals showed an advantage in detecting ill-formed sentences. This result is interpreted as hinting at an enhanced processing efficiency of bidialectals, which would be driven by the daily switching between two languages. From a geolinguistic perspective, Wood (2019) employed an AJT to investigate the role of geographic variation on the acceptability of different syntactic structures of American English. The results showed that AJs can be a suitable tool to detect syntactic (micro)variation and, thus, to describe regional traits of specific linguistic varieties.

While different studies have addressed bilingual language processing, an unanimously accepted explanation about which specific components of the bilingual experience influence processing mechanisms is still lacking. Furthermore, only a limited number of studies involved speakers of minority languages or dialects. This dissertation aims to fill this gap by devoting

special attention to two bidialectal populations. Focusing on minority languages and/or regional dialects can reveal the role of specific sociolinguistic components that, together with other features of the bilingual experience, influence language processing mechanisms, impacting one's performance in AJTs.

1.4 A glance at the (socio)linguistic landscape of Italy: The role of dialects and Standard Italian

As mentioned previously, the sample of my experiments will include Italian-speaking monolinguals, Italian-/Spanish-speaking bilinguals, and two Italian bidialectal groups, namely the Italian-/Pavese-speaking and the Italian-/Agrigentino-speaking communities.

With the term "Italian bidialectals", I refer to people who have linguistic competence in both Standard Italian and an Italian dialect. While bidialectal speakers are bilingual speakers in all respects (Ross & Melinger, 2017; Alrwaita et al., 2022), I will apply this terminological distinction to denote the difference between bilingual speakers of standard languages, and bilingual speakers of a standard and a non-standard language, which in this case is an Italian dialect. But what do we mean by the term "Italian dialect"? How many Italian dialects can be identified and how do they differ from Standard Italian? To answer these questions and give a better understanding of Italian bidialectalism, this section will be devoted to the description of the Italian linguistic landscape and its sociolinguistic nuances.

In the Italian linguistic landscape, the term "dialect" is used with reference to a non-standard linguistic variety which is (i) usually ascribed to the oral dimension, (ii) is proper of a specific local community and (iii) is excluded from formal and institutional uses (Loporcaro, 2009). When dealing with Italian dialects, a terminological clarification should be made. In contrast to what happens in the English sociolinguistic literature, where the term "dialect" is used with a generic connotation and is also employed with reference to stylistic or social varieties of the standard language, the use of the term "Italian dialect" does not entail any linguistic derivation from Standard Italian. Italian dialects are not regional varieties of Standard Italian, they are rather linguistic systems that evolved directly from Latin and that must be considered "sisters" of the Florentine dialect, which gained prestige in the 14th century and was later codified in written form as the Standard Italian language (Berruto, 2018). Thus, from a linguistic point of view, Italian dialects are independent systems from Standard Italian, and they present their own structural features (Cerruti & Regis, 2014). Indeed, Pellegrini (1970)

showed that the structural distance from an Italian dialect to another Italian dialect or Standard Italian is equally comparable to the one between different standard Romance languages. He compared 15 Romance varieties (including both standard Romance languages and Italian dialects) on 40 phonetic and morphosyntactic features and found that, in many cases, the distance between Standard Italian and Italian dialects was greater than the distance between Standard Italian and another Romance language. Therefore, Standard Italian and Italian dialects are not tied by any sort of linguistic dependency, as they both developed from Latin: The major difference between them concerns their social prestige. In this regard, some terminological precautions have been proposed. Loporcaro (2008), for instance, suggested the use of the term "variety" instead of dialect, stating that it conveys the meaning of a specific linguistic system, without referring to its sociolinguistic value. In this dissertation, the use of the term "dialect" aims to indicate independent linguistic varieties from Standard Italian, which have their own structural and sociolinguistic features, without any implicit negative connotation often associated with lower prestige ascribed to these languages.

The sociolinguistic subordination of dialects to Standard Italian can be traced back to the socio-politics dynamics that characterized the history of Italy. At the time of the unification of Italy, in 1861, Standard Italian was used for official and written communications only, while dialects were people's first languages and were used in all other communicative settings. The affirmation of Standard Italian on dialects took place slowly during the 20th century, and it was supported by economic and political changes. The development of a centralized political system, together with industrialization, urbanization, and new school programs that supported the teaching of a unified national language promoted its diffusion. As a result, Italian dialects started to receive a negative connotation and to be linked to sociocultural backwardness and poverty, with the consequent loss of many domains of use (Parry, 2010). This change in the domains of dialect use led to a shift from a diglossic to a dilalic situation. The term "diglossia" suggests a situation where, in the same society, two separate codes are used, and their different use is determined by social factors: In official and formal settings (politics, religion, education, etc.) people adopt the "high code", while in every-day activities they use the "low code" (Ferguson, 1959; Fishman, 1967; Hudson, 2002). In the 19th century, Italy was characterized by a diglossic situation where Italian dialects covered the role of low code, while Standard Italian was the baseline high code. The concept of dilalia differs from the one of diglossia by the fact that, in the former, the two codes (i.e., high vs. low) can be equally used in some specific communicative situations (Berruto, 1987). In the Italian sociolinguistic landscape, this is what happened after the diffusion of Standard Italian, which became the mother tongue of

the new generations of speakers during the second half of the 20th century. Tamburelli (2010) described this sociolinguistic situation in terms of societal bilingualism, where "the two languages involved did not enjoy the same rights nor did they enjoy the same amount of representation in high culture" (p. 6). According to the ISTAT (Istituto Nazionale di Statistica) data of 2015, 45.9% of Italians used predominantly Italian in family contexts, while 32.2% used both Standard Italian and their local dialect. Only 14% of Italians declared a predominant use of their local dialect. This brief description of the sociolinguistic role of Italian dialects over the years outlines the social roots of their sociolinguistic subordination to Standard Italian, although nowadays the negative connotation ascribed to dialects is progressively disappearing (Berruto, 2018).

Alongside Standard Italian and Italian dialects, the sociolinguistic landscape of Italy is characterized by the use of other linguistic varieties, which in most cases derive from the strong contact between these two linguistic systems. In this regard, the model proposed by Cerruti & Regis (2014), which is based on Auer's Cone model (2005), can help in describing the complex sociolinguistic continuum of the Italian panorama (Figure 1).

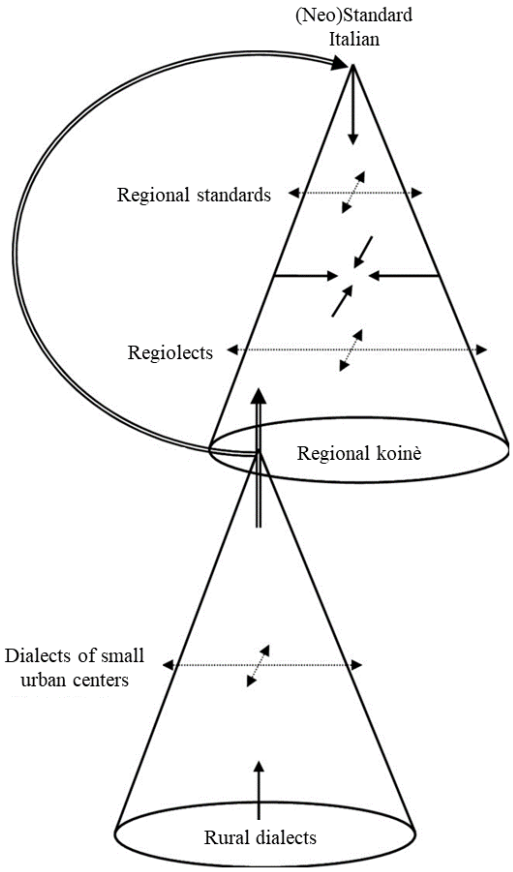

Figure 1: Adapted version of Cerruti & Regis' (2014) cone.

Since Italian dialects are independent linguistic systems from Italian, Cerruti & Regis (2014) decided to illustrate the Italian sociolinguistic continuum through two separate cones corresponding to two distinct (sub)continua, namely the dialect continuum and the Italian one. Starting from the bottom of Figure 1, which is constituted by the dialect subcontinuum, we can see that dialects undergo a process of standardization. Rural dialects of a specific region, typically spoken in small villages, tend to exhibit an intralinguistic convergence. This results in the emergence of a dialectal variety that assumes a leading role thanks to the linguistic prestige ascribed to it by the speakers. This variety has been defined as regional koinè, namely "a stabilized contact variety which results from the mixing and subsequent levelling of features of varieties which are similar enough to be mutually intelligible, such as regional or social dialects. This occurs in the context of increased interaction or integration among speakers of these varieties." (Siegel, 2001: 175). The regional koinè in turn constitutes the basis of the Italian subcontinuum. The advergence of dialectal features towards Standard Italian leads to the creation of intermediate varieties, namely regiolects and regional standards. Although both are characterized by specific regional traits, regional standards are commonly used by all speakers in the region independently from their social background, and they are accepted as shared linguistic norms. Standard Italian constitutes the top of the Italian subcontinuum. However, because of the progressive presence of non-standard spoken informal features in Standard Italian, which are accepted all over Italy, Berruto (1987) suggested using the label "neo-standard Italian". Indeed, "nobody in Italy can be considered to be a true native speaker of Standard Italian", if with Standard Italian we mean a variety that lacks regional traits accepted in the whole Italian peninsula.

Concerning the geo-linguistic distribution of Italian dialects, their first classification dates to the 14th century and was made by Dante Alighieri in his *De Vulgari Eloquentia*. He divided the Italian dialects into different areas according to a geographical criterion, identifying 12 groups: Eastern and western Apulia, Rome, Duchy of Spoleto, Tuscany, Sicily, Sardinia, Marche, Romagna, Lombardy, Veneto, and Friuli-Venezia Giulia with Istria. Later, the classification system was modified to add dialectal linguistic traits, besides considering their geographical distribution. One of the most popular classifications is the one proposed by Ascoli in 1882. He labeled Italian varieties into four groups: (i) Dialects that depend on neo-Latin systems not specific of Italy (i.e., Provençal, Franco-Provençal, and Ladin); (ii) dialects that are different from the actual Italian system, but are not part of any neo-Latin system outside Italy (i.e., Gallo-Italic dialects and Sardinian dialect); (iii) dialects which constitute a specific system of neo-Latin dialects, together with the Tuscan dialect (i.e., Venetian, dialects from the

center and the north of Italy, and Corsican). Nowadays this classification is still approved, except for the fact that Venetian and Gallo-Italic dialects are both considered part of the Gallo-Romance dialects group (Tamburelli & Brasca, 2018). Looking at the whole territory of the Italian peninsula, the main dialectal groups currently recognized are (i) northern dialects, which comprehend the Italian varieties spoken to the north of Rimini-La Spezia isogloss, also defined as Gallo-Romance dialects; (ii) Friulian dialects, spoken in the Friuli-Venezia Giulia region of Italy; (iii) Tuscan dialects, which include the varieties spoken to the south of Rimini-La Spezia isogloss till Roma-Ancona isogloss; (iv) center-southern dialects, which include the varieties spoken from the southern and eastern border of Tuscany and Marche, till Sicily.

Pavese and Agrigentino, which will be considered in this dissertation, belong to two dialectal groups that are different in terms of structural features, geographical distribution, and sociolinguistic context. Pavese is part of the northern Italian dialects group and, specifically, it is included in the subgroup of western Lombard varieties. On the other hand, Agrigentino is part of the center-southern Italian dialects group, and it belongs to the subgroup of extreme southern varieties. Pavese and Agrigentino dialects present structural differences at different linguistic levels. At the phonetic/phonological level, the two dialects show differences in the vocalic and consonantal systems. For the vocalic system, Pavese is characterized by the pan-Romance system for the accented vowels (i, e, ɛ, a, ɔ, o, u), while for the non-accented final vowels, it presents features typical of the Gallo-Italic dialectal group, which reduces the Latin vocalic system to -a only (i.e., -i:, -i, -e:, -e, -o(:), -u disappear). Agrigentino dialect, instead, and more generally Sicilian dialects, are characterized by a pentavocalic system for accented vowels (I, ɛ, a, ɔ, u). For non-accented final vowels, it shares the system of extreme southern Italian dialects (-i, -u, -a). Regarding the consonantal system, Pavese presents some general Gallo-Italic features, such as the sonorization of occlusive intervocalic consonants (Italian *ruota* > Pavese *røda*, "wheel"), the degemination of geminate intervocalic consonants (Italian *sette* > Pavese *sɛt*, "seven"), and the palatalization of -cl and -gl in -č and -ǧ. Agrigentino dialect, instead, shares with all the extreme southern dialects the retroflection of some consonantal groups, such as -ll > -ɖɖ in *bɛɖɖu* (Italian *bello*, "beautiful"), or -tr >-ʈʈ in *kwaʈʈso* (Italian *quattro*, "four"). The two dialects also present different features at a morphosyntactic level. Just to list a few examples, Pavese shows subject clitic pronouns in the third person singular and plural of finite verbs, something which characterizes most of the northern Italian dialects (Manzini & Savoia, 2005), the use of a weakened form of the definite article (Italian *il* > Pavese *el*, "the", masculine singular), or the use of the oblique Latin pronominal particles "me" instead of "ego" to form the 1st person singular subject pronoun. Among the specific

morphosyntactic features of Agrigentino, and all the Sicilian dialects, there is the limited use of present perfect, which is only used with durative or iterative value. Another morphosyntactic phenomenon that characterizes Sicilian dialects is the presence of overt subject in infinitive phrases, typical of Latin, but absent in Standard Italian.

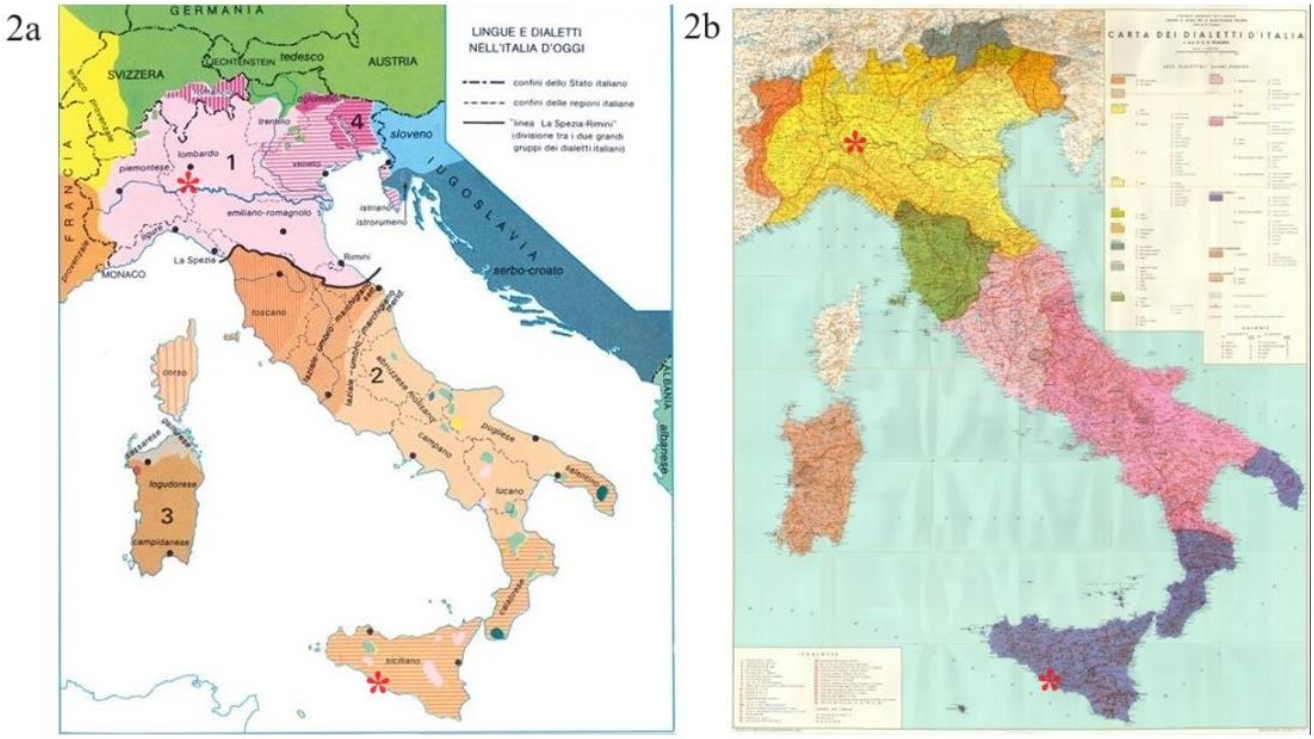

Figure 2: Representation of the linguistic varieties spoken in Italy. Panel 2a illustrates the distribution of Italian dialects and other languages spoken in Italy in Sabatini (1978); Panel 2b illustrates the distribution of Italian dialects and the Italian dialect branches in Pellegrini (1977). In each panel, two red stars have been added to highlight Pavia, in the north of Italy, and Agrigento, in Sicily Island.

After having briefly overviewed the geographical distribution of dialects, their classification, and some structural features of Pavese and Agrigentino which stresses their independence from Standard Italian, I will go through their main sociolinguistic features. Although every dialect presents a specific sociolinguistic profile, some commonalities can be identified across all of them. Regarding dialect use, for example, sociodemographic variables such as gender, age, and educational background seem to play a significant role. In particular, the use of dialects was found to be more common among people with lower educational levels (Alfonzetti, 2005 *inter alia*) and older generations of speakers (Cerruti & Regis, 2005;

Alfonzetti, 2005). With respect to gender, Parry (2010) mentioned a weak tendency for women to prefer Standard Italian, which is linked to a higher social prestige compared to dialects. This is in line with findings reported in previous sociolinguistic research, where women's linguistic choices were found to be more aligned with the high-prestige variety (Trudgill, 1999 *inter alia*). Situational context has also been argued to influence speakers' linguistic choices, supporting the concept of dilalia outlined in Berruto (1987). According to Cerruti & Regis (2005), the use of dialects is favored in private settings, while Standard Italian is preferred in public and more formal contexts. These trends were also reported by Vietti & Dal Negro (2012), who referred to such linguistic preferences with the term "dilalic pattern", where both Italian and dialect are used with family members and friends, while only Italian is chosen to communicate with strangers. Similar to what happens in bilingualism that involves standard languages, Italian bidialectal speakers, if fluent in both languages, show code-switching patterns (Poplack, 1980; Beatty-Martínez et al., 2020). Some studies attribute the degree of code-switching to factors such as the conversational interlocutor, the change of external situation (for example, the presence of another person who cannot understand the dialect), the communicative location and function, and the purpose of conveying specific emotions (Parry, 2010; Berruto, 2018 *inter alia*). However, the code-switching practices between Standard Italian and Italian dialects also present specific features (Ramat, 1995), which stem from the sociolinguistic situation of the dialects as well as the linguistic practices of each bidialectal community. In this regard, it is useful to report the distinction made by Trumper (1977) between macro- and micro-diglossia. In a situation of macro-diglossia, the standard language and the dialect overlap across different communicative domains without being mutually exclusive, while in a situation of micro-diglossia, the boundaries between the two languages are more defined. According to Trumper (1977), code-switching practices vary following a trend that seems to be linked to micro- vs. macro-diglossic patterns. Macro-diglossic contexts are characterized by frequent switching practices which lead to a high degree of fusion between Standard Italian and dialect. On the other end, in micro-diglossic contexts, code-switching between Standard Italian and dialect is less frequent and the two linguistic systems are kept more separated. Concerning the dialects addressed in this dissertation, language practices in Pavia could be linked to a situation resembling micro-diglossia, whereas the linguistic context in Agrigentino aligns more closely with macro-diglossic patterns.

While the above-described features can be attributed to most Italian dialects, there are also some differences between them, which can be explained by the specific sociolinguistic and socioeconomic realities across different regions of Italy. ISTAT data from 2012

highlighted different percentages of active dialect users in northern and southern Italy: In general, Standard Italian was preferred in Gallo-Italian areas except for Veneto, while southern regions showed more frequent code-switching practices between Standard Italian and dialect, suggesting a stronger vitality of southern dialects (Mioni & Arnuzzo Lansweert, 1979; Berruto, 2018). Other differences between Italian dialects concern the linguistic attitudes dimension. While in 1990, Volkart-Rey argued that the more dialectal traits a speaker presents, the lower their sociocultural and socioeconomic evaluation will be, Berruto (2018) noted that dialects are recently losing their negative connotation of poverty and low educational status. However, different regions of Italy show opposite tendencies, with an almost paradoxical situation in which, quoting Berruto (2018), the "dialect may still be stigmatized in regions where it is used relatively more frequently (the South), while speakers' opinions toward it have become more positive in the regions where it is less used (the North-West)" (p. 507). A similar pattern was reported by De Pascale & Marzo (2016), who conducted a perceptual experiment and found different linguistic attitudes towards northern and southern regional Italian varieties: Northern varieties were perceived as more prestigious than the southern ones, but southern varieties were associated with a stronger sense of solidarity. Lastly, another parameter through which regional differences were observed is the vitality of dialects. Using 9 factors proposed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) for evaluating language vitality (UNESCO, 2003), Berruto (2006) calculated the vitality index of some Italian dialects, namely Piedmontese and Campanian, on a scale from 0 to 5. Both languages were classified as endangered, but the results showed different degrees of linguistic vitality, with Piedmontese characterized by a lower vitality index (2.4 out of 5) compared to Campanian (3 out of 5). These findings attest to the stronger vitality of southern dialects (i.e., Campanian), which also present more frequent code-switching practices and record higher numbers of active speakers.

The description of the sociolinguistic situation of Italy aimed to give an idea of the complex dynamics of the Italian linguistic landscape. Some linguistic projects have focused on the description of Italian varieties. Boula de Mareüil et al. (2021), for example, worked on the creation of a speaking atlas that enables users to listen to the same story, "The North Wind and the Sun", in numerous linguistic varieties of Italy. Although some research on the description of such varieties has been conducted, Italian dialects still suffer from an underrepresentation in bilingualism studies. Indeed, in studies on bilingual populations, the comparison between language groups tends to involve bilingual speakers of standard languages, leaving minority languages and dialects in the margins.

1.5 Previous research on Italian-/Spanish-speaking bilinguals and Italian bidialectals

In previous literature on bilingualism and its cognitive adaptations, some studies have focused on Italian-/Spanish-speaking bilinguals both in production and in comprehension tasks. In Paolieri et al. (2010), for example, Italian-/Spanish-speaking bilinguals completed a picture naming task in Spanish (i.e., their L2) and a translation task from Italian (i.e., their L1) into Spanish. The purpose of the study was to investigate whether the grammatical gender of participant's L1 affected the production of words in their L2. In both tasks, participants showed faster reaction times in nouns that had the same lexical gender in both languages compared to nouns with different lexical gender across the languages. These results were replicated by Paolieri's et al. (2019) later study: The authors ran a translation task on both Russian-/Spanish-speaking bilinguals and Italian-/Spanish-speaking bilinguals, manipulating the concreteness of nouns. Both bilingual groups showed faster reaction times when there was gender congruency between the languages. The gender congruency effect was stronger in the processing of concrete nouns. The findings from both studies were explained through the presence of both a semantic and a direct lexical route that connects words in bilinguals' linguistic systems. The lexical route would lead to stronger activation of the L2 when there is greater similarity between the nouns' lexical representations in the two languages. The gender congruency effect on the access of L2 words in Italian-/Spanish-speaking bilinguals was also investigated by Casado et al. (2023), who did a lexical decision task with ERP measurement. Bilinguals showed lower accuracy rates and greater amplitude of N400 when processing gender-incongruent nouns compared to Spanish-speaking monolinguals, suggesting that gender (in)congruency between bilinguals' languages can modulate language processing.

Other studies focused on the interplay between the variables of the bilingual experience. In De Carli et al. (2015) Italian-/Spanish-speaking bilinguals did a sentence recognition task, where they were asked to choose the most appropriate translation from their L1 to their L2 and vice versa. The results showed that translation accuracy and proficiency levels were modulated by language use (i.e., intensive vs. occasional use of the L2) instead of participants' L2 age of acquisition. To the best of my knowledge, no studies have been conducted on the processing of Subject-Verb agreement mismatches in Italian-/Spanish-speaking bilinguals.

Contrarily to Italian-/Spanish-speaking bilinguals, Italian bidialectal speakers have been considered by very few studies, among which none of them have focused on Italian-/Pavese-speaking and Italian-/Agrigentino-speaking bidialectals. Garaffa et al. (2017)

compared Italian-speaking monolinguals and Italian-/Sardinian-speaking bilinguals on a series of verbal and non-verbal tasks. In the verbal task, participants were asked to select the picture corresponding to the proposed sentences, which differed in grammatical complexity. The non-verbal tasks consisted of tests involving working memory, and cognitive control (Backward Digit Span task, Orsini et al., 1987; BCOS Rule Finding and Concept Switching Test, Humphreys et al., 2012; Stroop Task, Valgimigli et al., 2010). Bilinguals showed better scores on the tasks involving working memory. Furthermore, an interaction between bilingualism and educational level was found. Bilinguals with low educational levels were faster than their monolingual counterpart in the comprehension of one type of the target complex sentences. Scaltritti et al. (2017) focused on the role of language switching in bilingual adaptations and tested Italian-/Venetian-speaking bilinguals and Italian-speaking monolinguals on a flanker task (Eriksen & Eriksen, 1974). No advantages were found for Italian-/Venetian-speaking bilinguals, and this was explained by fewer opportunities for language switching compared to other bilingual populations (i.e., Spanish-/Catalan-speaking bilinguals) due to the sociolinguistic situation of Italian dialects (see §1.4). Sanfelici & Roch (2021) investigated the performance of bilingual children of Standard Italian and Vicentino through the Multilingual Assessment Instrument for Narratives (MAIN, Gagarina et al., 2012, 2015; Gagarina & Bohnacker, 2022). The results enabled the identification of 3 different types of bidialectal profiles: (i) receptive bilinguals, who were able to understand Vicentino, but did not produce any dialectal element at the phonological, lexical, morphological, or syntactic level; (ii) Italian-/Vicentino-speaking bidialectals who spoke Italian but with phonological and morphological dialectal elements; (iii) Italian-/Vicentino-speaking bidialectals who spoke Italian, but also presented dialectal elements in the syntactic level. The authors proposed an implicational scale for describing dialectal competence, arguing that "if a child exhibits some productions with dialectal syntax, s/he also produces dialect at the phonological, morphological, and lexical level, but not vice versa" (Sanfelici & Roch, 2021: 12). Regarding the comparison between bilingualism with standard languages and bidialectalism, the study pointed out that the main difference concerns the fact that, unlike standard language bilinguals, the majority of bidialectal speakers tend to be receptive bidialectals, since they can understand their second language (i.e., dialect), but they are not always able to produce it.

Besides filling a literature gap on the underrepresentation of bidialectal communities in research on bilingualism, and specifically on Italian-/Agrigentino-speaking and Italian-/Pavese-speaking bidialectals, that have never been investigated in previous literature, the focus on two Italian bidialectal communities and their comparison with Italian-Spanish bilinguals

brings to the fore the issue of language similarity in the bilingual experience (Oschwald et al., 2018). Importantly, Agrigentino, Italian, Pavese, and Spanish are all Romance languages. Nowadays a precise classification of language distances between Romance languages which considers all the linguistic levels is still lacking (Gamallo et al., 2017). Furthermore, most of the tentative measurements of linguistic distance between Romance languages do not include Italian dialects. Regarding the distance between Italian and Italian dialects, the existing literature either covers limited dialectal groups (Tamburelli & Brasca, 2018 for Gallo-Italic dialects; Sciaretta, 2022 for Central-Southern Italian dialects) or focuses on single linguistic domains (Wieling et al., 2014 for the lexical distance between Tuscan and Italian) and the same is true for studies focused on the similarity between different Romance languages (Cappelli, 2019 for the phonetic and phonological distance between Italian and Spanish). As previously mentioned in section §1.4, a comprehensive tentative measurement of linguistic similarity between Romance languages, which also included some Italian dialects (i.e., Sardo, Lucano, Vegliotto, Engadinese, Friulano, Fassano, Cadorino) was done by Pellegrini (1970), who followed Muljačić's (1967) proposal of considering specific lexical, phonological, and syntactic traits of different Romance languages. Although Agrigentino and Pavese are not included in Pellegrini's classification, his results attest to the similar linguistic distance of most of Italian dialects and other Romance languages to Standard Italian. For example, the language distance score between Standard Italian and Lucanian, which belongs to the extreme southern Italian dialect group, as Agrigentino, is slightly greater than the one between Standard Italian and Spanish (39 vs. 33)[7]. Even if a precise measure of the distance between Italian and Agrigentino, Italian and Pavese and Italian and Spanish is missing, the fact that these languages belong to the same linguistic family and share similar linguistic features, at least for Subject-Verb agreement, makes the linguistic distance between the languages of the different bilingual and bidialectal groups considered in this dissertation comparable. Importantly, the main differences concern the sociolinguistic values ascribed to the languages, which in turn affect language use and code-switching patterns (Rowe & Grohmann, 2013). This point holds significant importance for interpreting potential variations in language processing among bilingual and bidialectal speakers examined in my studies. It suggests that these differences would be more closely tied to the language practices within each specific community (Green & Abutalebi, 2013) rather than being influenced by factors related to language distance. To

[7] Pellegrini's language scores go from a minimum of 0 (no differences between the languages) to a maximum of 57. For the detailed scores of each considered language pair, see Pellegrini (1970: 230).

summarize, comparing the bilingualism of standard languages and bidialectalism can shed light on whether there are differences in the cognitive effects deriving from these complex linguistic experiences and which factors lie behind these differences. The analysis of specific factors of the bilingual and bidialectal experience which are related to language attitudes and practices (Alrwaita et al., 2022) could also be illuminating for understanding the apparent inconsistency in results on cognitive adaptations of bilingualism.

1.6 The importance of considering bilingualism as a gradient phenomenon and embracing its social dimension

The (socio)linguistic description of the interplay between Standard Italian and Italian dialects in §1.4 shows how language and social factors are strongly connected. This link should be perceived as a crucial element when trying to understand linguistic experiences such as bilingualism, where speaking or signing two languages is not limited to dealing with two linguistic systems from a cognitive point of view, but further entails a variety of social and experiential factors which modulate bilingual language use and practices. The stronger interest in bilingual effects on cognition led early research to focus predominantly on the cognitive aspects of bilingualism, while the social dimension has been often left in the margins. Importantly, the group of factors that constitute the social sphere of language is complex and could be seen as a thick network characterized by variability and complexity. Although dealing with such variability is a demanding challenge, it could be the key to explaining which specific factors of the bilingual experience play a role in conferring bilingual adaptations and to what extent they have an impact on cognitive outcomes. Although this holistic perspective of the bilingual experience, together with the need to consider the social factors behind it, has recently been highlighted (Bialystok, 2017; DeLuca et al., 2019 *inter alia*), some studies treat bilingualism as a dichotomous phenomenon and measure it through a reduced set of linguistic variables.

Despite being in the minority, some studies on bilingualism have drawn their attention to the role of specific social factors. Parry (2010), for instance, described how linguistic choices depend on variables that pertain to different spheres, such as the sociodemographic dimension of speakers (i.e., age, gender, region of origin), their socioeconomic status (i.e., level of education, social role in the community), the set of their personal traits (i.e., linguistic attitudes, conservative/innovative personality), and the situational context (i.e., role of the interlocutor,

topic, level of formality, etc.). In a study focused on American heritage speakers of Spanish, Oh & Au (2005) investigated the impact of sociocultural factors such as cultural identification and cultural participation on language practices. The results showed a complex relation among these background variables. Language and cultural identity were found to strongly influence language proficiency since participants who strongly identified with the Latino culture were the ones who participated more frequently in Latino cultural activities and who developed better pronunciation and prosodic skills in Spanish. The influence of cultural identification was also addressed by later studies which confirmed that the cultural and linguistic attitudes of bilingual speakers play an important role (Laketa et al., 2021; Studenica et al., 2022). These factors were found to have a positive impact on bilinguals' metalinguistic awareness and executive control (Rubio-Fernández & Glucksberg, 2012; Tran et al., 2015 *inter alia*).

In line with these works, a recent line of research has begun to define bilingualism as a gradient phenomenon. According to this view, the gradient traits of bilingualism are determined by the combination of different linguistic, sociolinguistic, social, and cultural factors which only together can satisfactorily describe the essence of being bilingual. Marian & Hayawaka (2021) listed a series of variables that can modulate bilingual linguistic profiles, and, among other social factors, they mentioned the pivotal role of age and manner of acquisition, language proficiency, language use, language switching, and language identity. In explaining their proposal to build a common index for measuring bilingualism, the authors specified the interrelated nature of social and linguistic variables, stating that "bilingualism emerges from a complex and interactive set of dimensions that can take many different forms" (Marian & Hayawaka, 2021: 531). A later study by Wagner et al. (2022) highlighted the importance of sociolinguistic factors in the self-perception of bilinguals and revealed their crucial impact on how speakers classified themselves in specific language groups. The authors stressed how factors such as language attitudes, the sociolinguistic status of a language, linguistic relatedness with another variety, and the written or oral form of the variety itself are crucial criteria to define a language as such and, in turn, to establish who can be considered as a bilingual speaker. They finally argued that this combination of factors is "potentially a fundamental source of the controversy" in determining language group membership (Wagner et al., 2022: 9). The importance of perceiving bilingualism as a gradient and dynamic experience was also stressed by Luk (2022), who linked the bilingual experience to the concept of intersectionality (Crenshaw, 1991), according to which multiple identity systems are influenced by different social factors such as race, gender, language status, and immigration.

Appreciating the social dimension of the bilingual experience and embracing the concept of bilingualism as a gradient phenomenon could be a promising approach to understanding the apparent inconsistency of results of bilingual adaptations on cognition (Treccani & Mulatti, 2015). By acknowledging that each bilingual experience is characterized by specific sociolinguistic variables, and by measuring such factors while investigating the bilingual effects on cognition, we can trace back different bilingual cognitive outcomes to the uniqueness of each bilingual experience. In this dissertation, this point will be addressed in two ways. The first way involves conducting a systematic review that examines how frequently studies on bilingual adaptations consider the sociolinguistic factors of the bilingual experience and how often bilingual effects are attributed to cognitive, social, or mixed origins (Chapter 2). The second way goes through adducing experimental results on Subject-Verb agreement processing from Italian-speaking monolinguals, Italian-/Spanish-speaking bilinguals, and two previously unexplored Italian bidialectal communities (Chapter 3). Examining Italian bidialectal speakers constitutes a unique opportunity to investigate the impact of factors associated with the specific sociolinguistic dynamics of the Italian linguistic landscape, which vary for each bidialectal community, from the north to the south of Italy (see §1.4). Given that language use and practices are deemed pivotal factors in elucidating variation in bilingual cognitive adaptations (Alrwaita et al., 2022), a comparative analysis of bilingual and bidialectal groups, varying in these specific factors, can help to connect different bilingual adaptations to specific sociolinguistic variables.

1.7 Outline of the dissertation

This dissertation aims to delve into the social and sociolinguistic dimensions of our linguistic experience by focusing on bilingualism and language processing.

In Chapter 2, I will present a systematic review of 368 studies on bilingual cognitive adaptations, in which we inquire about the origins of bilingual effects on cognition. A still ongoing debate concerns where such effects stem from. Our review tackles this debate by devoting special attention to the role of social and sociolinguistic factors in the bilingual experience, aiming to shed light on the apparent inconsistency or results (i.e., positive and negative effects) reported in research on bilingual cognitive outcomes. Chapter 2 is published as “Masullo, C., Dentella, V., & Leivada, E. (2023). 73% of the observed bilingual

(dis)advantageous effects on cognition stem from sociolinguistic factors: A systematic review. Bilingualism: Language and Cognition, 1–15".

The role of sociolinguistic factors in shaping bilingual cognitive adaptations is further examined in an experiment presented in Chapter 3. In this study, we apply a comparative perspective to investigate the processing of Subject-Verb agreement mismatches in different monolingual, bilingual, and bidialectal populations. Our sample includes Italian-speaking monolinguals, Italian-/Spanish-speaking bilinguals, Italian-/Agrigentino-speaking bidialectals, and Italian-/Pavese-speaking bidialectals. The impact of the sociolinguistic dimension on bilingual language practices and, in turn, on language processing mechanisms is particularly relevant in linguistic contexts where a standard and a non-standard variety coexist. Hence, the inclusion of Italian bidialectal speakers offers a fertile ground to explore how bilingual language processing can be modulated by sociolinguistic factors related to how speakers use and perceive their languages. Chapter 3 is published as "Masullo, C., Casado, A., & Leivada, E. (2024). The role of minority language bilingualism in spotting agreement attraction errors. PLoS ONE, 19(2), e0298648".

Chapter 4 consists of an experimental study where I explore the social and sociolinguistic dimensions of language processing by focusing on linguistic register variation. Specifically, I will investigate the role of linguistic register variation in the processing of Subject-Verb agreement attraction errors both jointly and independently from speakers' linguistic background. By analyzing the impact of linguistic register on language processing mechanisms, I aim to stress the importance of developing a theory for linguistic register that encompasses not only its description as a sociolinguistic phenomenon but also its cognitive dimension. Furthermore, investigating how different language groups engage in the processing of register variation aims to clarify the role that the linguistic experience has in mastering different domains of language, such as linguistic register. Chapter 4 is submitted as "Masullo, C., Casado, A., Leivada, E, & Sorace, A. (submitted). Register variation and linguistic background modulate accuracy in detecting morphosyntactic errors."

As a whole, the chapters of this dissertation endeavor to present a social-based approach to bilingualism and language processing, underlining the significance of integrating the cognitive and sociolinguistic dimensions as complementary components of our linguistic experience.

Chapter 2

73% of the observed bilingual (dis)advantageous effects on cognition stem from sociolinguistic factors: A systematic review

Published as: Masullo, C., Dentella, V., & Leivada, E. (2023). 73% of the observed bilingual (dis)advantageous effects on cognition stem from sociolinguistic factors: A systematic review. *Bilingualism: Language and Cognition*, 1–15. doi:10.1017/S1366728923000664

Abstract

Being bilingual confers certain behavioral effects. Determining their precise origin is of utmost importance given the need to avoid unjust misattribution of labels such as "bilingual (dis)advantage" to people's bilingual experiences. To this end, this systematic PRISMA-based review aims to shed light on the social and sociolinguistic origins of bilingualism-related behavioral effects. Analyzing 368 studies, we find that 73.41% of the 267 studies that report such effects attribute them either to sociolinguistic factors alone or to the interaction of sociolinguistic and cognitive factors. Linking the two fronts, type of effect and origin of effect, we find a previously unreported correlation: Studies that find evidence for bilingual disadvantages are more likely to claim a sociolinguistic origin, while studies that report advantages are more likely to link their findings to a cognitive origin. We discuss these results and present the key components of a sociolinguistic theory of the origin of bilingual effects.

1. Introduction

Developing a theory that accounts for the effects of bilingualism on cognition is an endeavor fraught with methodological, interpretive, and expository difficulties, to the extent that it has been described as a challenge of the deepest scientific nature (Mueller Gathercole, 2015). 100 years since the first studies that described bilingualism as causing mental confusion (Saer, 1923), and 50 years since the first studies that reported bilingual advantages (Feldman & Shen, 1971; see Barac & Bialystok, 2011 for a detailed timeline), the topic of bilingual effects on cognition is still riddled with open questions (Blanco-Elorrieta & Caramazza, 2021). Although many studies have provided ample evidence for bilingual effects on cognition (often presented as bilingual advantages and disadvantages), the field still lacks a solid theory that enjoys consensus and covers critical topics such as what the observed effects boil down to and what the driving factors behind them are (Treccani & Mulatti, 2015).

In broad terms, it can be claimed that two ongoing discussions surround bilingual adaptations on cognition. The first one concerns the type of the effects and recognizes three categories of results: bilingual advantages (i.e., positive findings), bilingual disadvantages (i.e., negative findings), and null effects (i.e., findings that suggest that the differences between monolinguals and bilinguals are indistinguishable from zero). Regarding the terminology we

use, while we a priori reject the use of evaluative terms such as “bilingual advantage” and “bilingual disadvantage” as simplistic (Leivada et al., 2022), the primary purpose of any systematic review is to take stock. We thus employ these mainstream terms, following a long line of systematic reviews, meta-analyses, and quantitative analyses that adhere to the same practice (Lehtonen et al., 2018; Donnelly et al., 2019; van den Noort et al., 2019; Grundy, 2020; Ware et al., 2020). Specifically, the present work explores the origin of bilingual (dis)advantages across cognitive domains, to present a fine-grained picture of the origin of the conferred bilingual adaptations. In this respect, another terminological specification should be made about the term “bilingual adaptations”, which we use synonymously with the term “bilingual effects”. We follow recent literature (e.g., D’Souza & D’Souza, 2021, Ivanova et al., 2023) that borrowed the term “adaptation” from research on human evolution to highlight that the act of adapting to the surrounding linguistic environment is on par with other ecological adaptations (Leivada et al., 2022). Thus, we use the term “bilingual adaptations” to indicate the offset between advantageous and disadvantageous effects that the bilingual experience has across different cognitive domains, such as executive functions (Bialystok, 2007; Costa et al., 2008 inter alia), semantic fluency (Gollan et al., 2002; Ivanova & Costa, 2008), syntactic processing (Siu & Ho, 2022), and metalinguistic awareness (Adesope et al., 2010).

Although certain disagreements still exist in relation to the type of effects (e.g., related to what counts as an advantage vs. a disadvantage; see Leivada et al. 2022 for an overview), several explanations have been offered for these different sets of results (van den Noort et al., 2019; Leivada et al., 2021a; Paap et al., 2021). For instance, van den Noort et al. (2019) ascribe the heterogeneity of results to differences in studies’ methods. They point out that cognitive reserve can be shaped by several factors (e.g., level of education, linguistic input, lifestyle, profession, and language typology), which are operationalized differently among studies, hence the varied set of results. Similarly, Leivada et al. (2021a) also acknowledge the impact of multiple factors, such as language proximity, the heterogeneity of the term “bilingual”, sample size effects, and task effects.

The second discussion, which concerns the origin of the observed effects, is trickier to classify in terms of main categories of results. Succinctly put, this discussion deals with the following question: Where do these advantages and disadvantages stem from? One popular answer refers to cognitive factors such as enhanced monitoring abilities, increased switching flexibility, and sharpened executive control, tracing the origin of the effects to cognitive adaptations to constant language monitoring and inhibition in bilinguals (Bialystok et al., 2004a, b; 2012; Abutalebi & Green, 2007; see Blanco-Elorrieta & Caramazza, 2021 for a recent

review). However, it has been argued that such cognitive enhancements may be substantially mitigated when we account for individual differences between monolinguals and bilinguals in terms of social, socio-economic, and sociolinguistic factors (Dick et al., 2019). Thus, another answer is that bilingualism and socio-economic status (SES) may both confer adaptive effects, but act independently, such that the observed bilingual advantages are not limited by social factors (Engel de Abreu et al., 2012; Calvo & Bialystok, 2014). A third answer is that both social and cognitive factors jointly contribute to enhanced self-regulatory behaviors that may lead to bilingual adaptations (Hartanto et al., 2019).

In sum, although many studies acknowledge that the observed bilingual advantages and disadvantages are amenable to a multifactorial account that recognizes the presence of both cognitive and socio-demographic/sociolinguistic factors of influence (e.g., Mueller Gathercole et al., 2010; Chen et al., 2013; Garraffa et al., 2015; Antón et al., 2019), in a large part of the literature either the interaction of the two sets of factors is not spelled out or one set of factors, cognitive or sociolinguistic, is not mentioned at all, depending on the focus of the work. Moreover, controlling for SES is undoubtedly a useful practice, but it does not fully eliminate the potential confounding effects of social factors, if many uncontrolled and ambiguous variables come into play. To give an example, overall L2 proficiency has been linked to cognitive control abilities (Luque & Morgan-Short, 2021), but proficiency across registers is tightly connected to language use in different contexts, which may be a proxy for sociolinguistic prestige (Leivada et al., 2021a). From this perspective, proficiency and use are ambiguous factors that can be plausibly read in favor of both cognitive and sociolinguistic accounts of the origin of bilingual effects.

A second example of the complex nature of this debate can be found in the many studies that test bilingual adaptations without, however, considering certain sociolinguistically loaded notions such as type of bilingual trajectory (i.e., simultaneous bilingual, heritage language user, L1 attriter, unbalanced second/foreign language learner). For instance, some studies control for SES, but their bilingual groups are formed based on a positive answer to one question: Does the participant speak another language other than English? (e.g., Brito & Noble, 2018). Grouping together different types of bilinguals, who acquired and, in all likelihood, use their languages in different contexts and registers, inevitably invests the bilingual group with some degree of sociolinguistic variation, the impact of which is unclear.

Measuring variables such as degree of language use and proficiency is useful, however it may bring along certain challenges that contribute to the debate. Degree of use is typically measured by asking participants whether and to what degree they use two languages, or a

language other than the one used in the community, when conversing with friends and family (e.g., Dick et al., 2019). One challenge that comes from grouping together in one big bilingual group, people who use another language with friends and family is that heritage language learners, who fit this inclusion criterion, receive variable qualitative and quantitative input, facing socio-political and sociolinguistic pressures from the majority language spoken in their community (Montrul, 2015; D'Alessandro et al., 2021). Consequently, while the degree of use may be controlled for in many studies, the variability that is inherent to the sociolinguistic values attached to the many different languages (often more than 30), that are included in big and heterogeneous bilingual groups, is usually neither measured nor acknowledged (Leivada et al., 2023). This is relevant to the origin of the bilingual effects debate because using two languages does not entail viewing them in a similar way or, more importantly, being able to reliably reflect on their use. Every bilingual person has a preferred language (Dodson, 1985), and both the emotional stance bilinguals adopt towards their languages as well as the way these languages are compartmentalized and used across contexts have strong implications (Duñabeitia, 2017). Regarding the emotional and affective aspects of language learning and use, some recent studies have operationalized bilingualism considering variables such as acculturation, educational context, and parental encouragement to learn the languages (Laketa et al., 2021; Studenica et al., 2022). In some cases, acculturation was found to play an important role in shaping the bilinguals' language profile and appeared to have independent effects from bilingualism on cognition (Laketa et al., 2021).

In sum, it has been argued that many early studies in bilingualism research were flawed because they did not control for SES or other sociocultural differences between the tested groups of monolinguals and bilinguals (Mueller Gathercole et al., 2010 and references therein). While the considerable progress made since then is incontestable and very helpful in enabling us to map variation in bilingual experiences (Fricke et al., 2019), we have not yet resolved all the ambiguities that surround the occurrence of bilingual effects. Finding bilingual advantages and disadvantages is not enough, if we cannot explain what the effects boil down to and what factors drive them. Possibly, this is the key reason that this domain of research has been linked to "insufficiently clear theories and hypotheses that are difficult to falsify" (de Bruin et al., 2021: 433), even after decades of testing. The aim of this work is to address this issue through shedding light on the origin of bilingual effects on cognition. More specifically, we seek to determine what percentage of the studies conducted in this field test and control for sociodemographic factors (Research Question 1), what percentage of studies that find bilingual adaptations attribute them to a cognitive, sociolinguistic, or mixed origin (Research Question

2), and what social, sociodemographic, and sociolinguistic factors are typically involved in studies that find bilingual adaptations (Research Question 3).

In relation to these questions, one important challenge refers to the scope of these domains, which remains vague in the literature: What counts as a cognitive vs. a social/sociolinguistic determinant of bilingual adaptations? While some proposals are straightforward (e.g., attributing differences between monolinguals and bilinguals to cognitive processes related to general conflict-monitoring and goal-orienting abilities; Costa et al., 2009; Hernández et al., 2013), other factors are variably treated as pertaining to the sociolinguistic or the cognitive component. For example, differences in cultural knowledge may be attributed to the cognitive component (Green et al., 2007) or not (Barac & Bialystok, 2012). For the purpose of this systematic review, we employ one specific criterion (following De Cat, 2020) in classifying the origin of bilingual effects as either cognitive or sociolinguistic: If the results of a study suggest that any observed differences between monolinguals and bilinguals are due to *individual-internal* cognitive processes (e.g., sharpened monitoring or switching abilities, different use of neural markers, enhanced control of attentional resources, weakened retrieval capacity), this is classified as cognitive origin. If the differences are amenable to an explanation that relies on *cognition-external* factors (e.g., SES, age, education, social prestige, sociocultural knowledge, language use in different contexts, typological proximity, script), this is classified as sociolinguistic origin.

All in all, while these sociolinguistic factors are an inherent part of the bilingual experience, we cannot afford to subsume them under the generic label "bilingualism-related factors". In the current context of replacing dichotomous labels such as "cognitive (dis)advantage" with a more nuanced approach (Leivada et al., 2022), examining the role and magnitude of sociolinguistic factors of influence will shed light on the characteristics of different trajectories, helping us to avoid unjust misattribution of certain labels and behavioral outcomes to people's bilingual experiences (Luk, 2022).

2. Method

We performed a systematic review of the literature on bilingual advantages and disadvantages. The review was conducted according to the PRISMA Statement (Liberati et al., 2009; Page et al., 2021), which is a reporting guideline designed to assist authors of systematic reviews and meta-analyses in describing the purpose and the methodology of their work in a transparent

way. Data were plotted and analyzed using R, version 4.2 (R Core Team, 2021), and jamovi, version 1.8 (the jamovi project, 2022).

A systematic search of the literature was conducted in the following databases: PsycInfo, PsycExtra, PsycBooks, APA Journals, and PubMed. The searches were conducted in December 2021. The search strategy consisted of the following keywords: “bilingual” & “advantage” OR “bilingual” & “disadvantage”. As these are popular terms, a total of 1753 articles were obtained from this search procedure, which marks the highest number of screened studies in a systematic review/meta-analysis in bilingualism research. Duplicates were removed through Mendeley Desktop software, and the remaining abstracts were screened for content. First, two researchers (C. M. & V. D.) independently searched the databases, selected the relevant studies, and extracted the data, following predefined criteria. In cases of disagreement, a third researcher (E. L.) was asked to evaluate the study in question for inclusion. In all cases, consensus was eventually reached among all authors.

The selection of relevant studies was conducted based on previously determined inclusion and exclusion criteria. First, studies had to present original experimental results. Therefore, meta-analyses, review articles, and theoretical articles were excluded. Second, studies had to be written in English, to enable all three researchers to clearly understand the content of the studies and make the database easily accessible to as many readers as possible. Third, studies had to be published after 1960. Fourth, studies involving neuroatypical populations were excluded. Fifth, data from at least one monolingual and one bilingual group had to be reported, to avoid any bias of grouping together fundamentally different groups. Last, studies focusing solely on the brain without any reference to behavioral measures were excluded. The obtained database covers results from 368 studies, 474 experiments, and 109.604 participants. Figure 1 presents the screening and selection process.

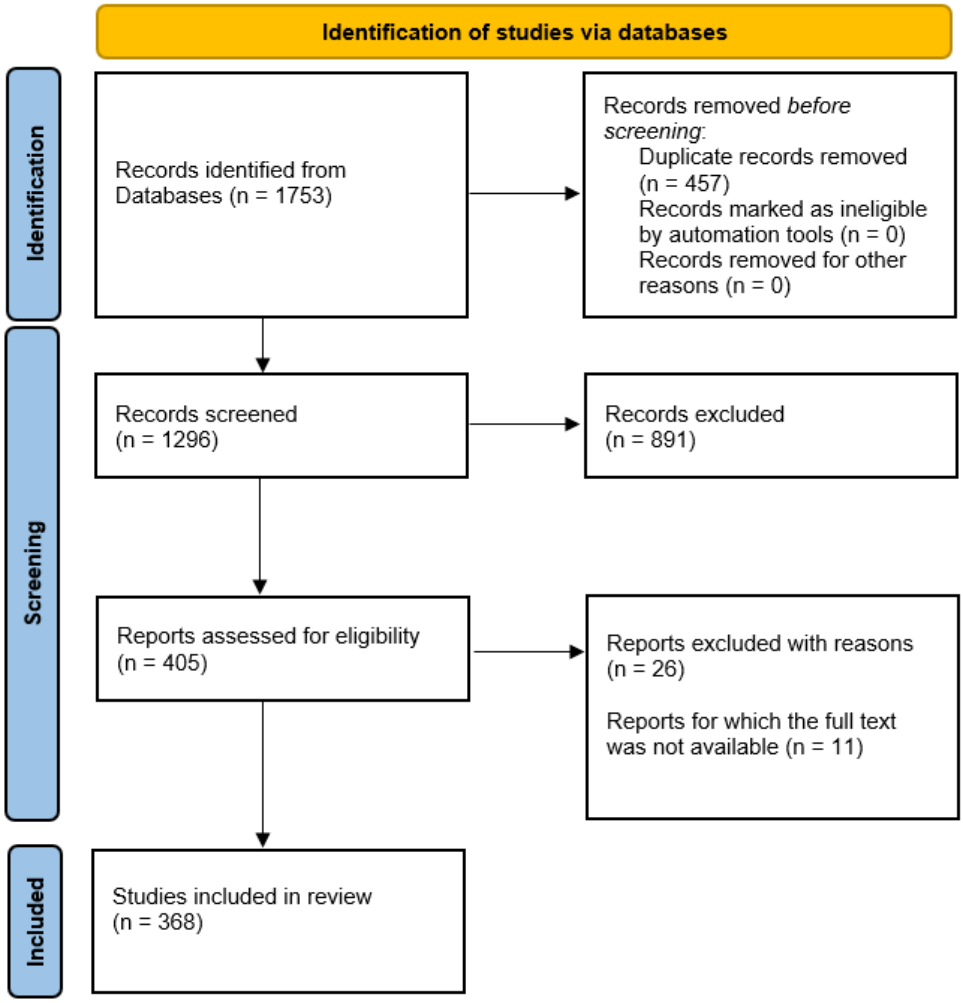

Figure 1. PRISMA Flow Chart.

The pool of data and the complete list of studies that were analyzed for this review are available at: https://osf.io/2z4cx/?view_only=95009316afe3479aa3249b419551a6b4. In the classification of the screened articles, the sociodemographic variables of age, gender, and SES, together with the language profile, are presented, when measured. With reference to SES, studies are divided into three groups: studies that did not mention it, studies that merely acknowledged it in their introduction or discussion sections, and studies that either measured it or controlled for it by group matching. Articles were subsequently screened by two researchers to determine both the reported bilingual effects (i.e., bilingual advantage, bilingual disadvantage, both effects, or null effect) and the origin of the effects (i.e., cognitive origin, sociolinguistic origin, or mixed origin). The two researchers were completely aligned in their judgements about the classification of the bilingual effects reported by the articles (Cohen's k = 1) and presented a very high agreement in their judgements about the origin of such effects

(Cohen's k = 0.972). When the origin of the bilingual effect could not be unambiguously established for some studies (n = 5), a third researcher was consulted for reaching agreement.

3. Results

The findings of the analyzed studies are first classified according to the bilingual effects they report. Considering the entire pool of data, comprising a total of 368 analyzed articles, 57.34% of them report a bilingual advantage, 11.41% report a bilingual disadvantage, 3.80% find both advantageous and disadvantageous effects and 27.45% find a null effect. These advantages and disadvantages pertain to different cognitive domains (e.g., executive functions, memory, metalinguistic awareness, different types of fluency, syntactic processing, phonological awareness, etc.); unlike most previous systematic reviews and meta-analyses on bilingual adaptations, we did not limit our pool of results to one cognitive domain (typically, executive functions). Figure 2 presents a summary of the distribution of effects.

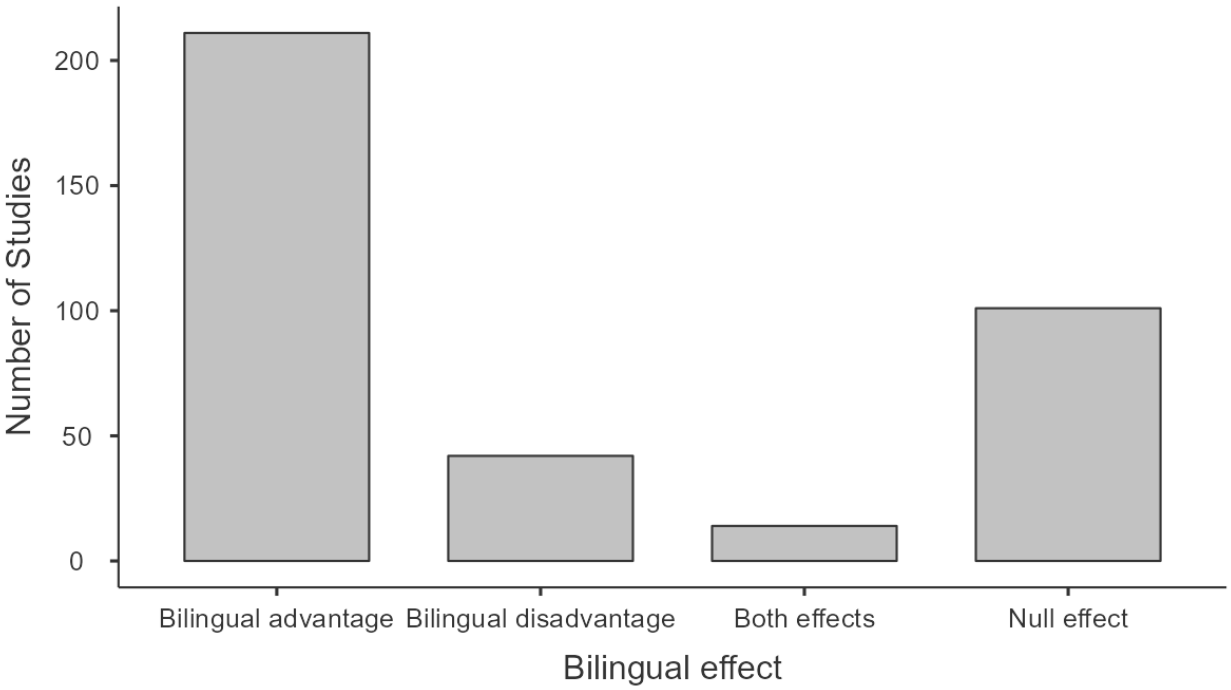

Figure 2. Frequencies of effects per category.

The findings of the analyzed studies are subsequently classified into the following three categories:

(i) Effects attributed to social, sociolinguistic, or sociodemographic factors (category "sociolinguistic origin")

(ii) Effects attributed to a combination of sociolinguistic and cognitive factors (category "mixed origin")

(iii) Effects attributed exclusively to bilingualism and cognitive adaptations linked to it (category "cognitive origin")

Figure 3 presents a summary of the origin of effects.

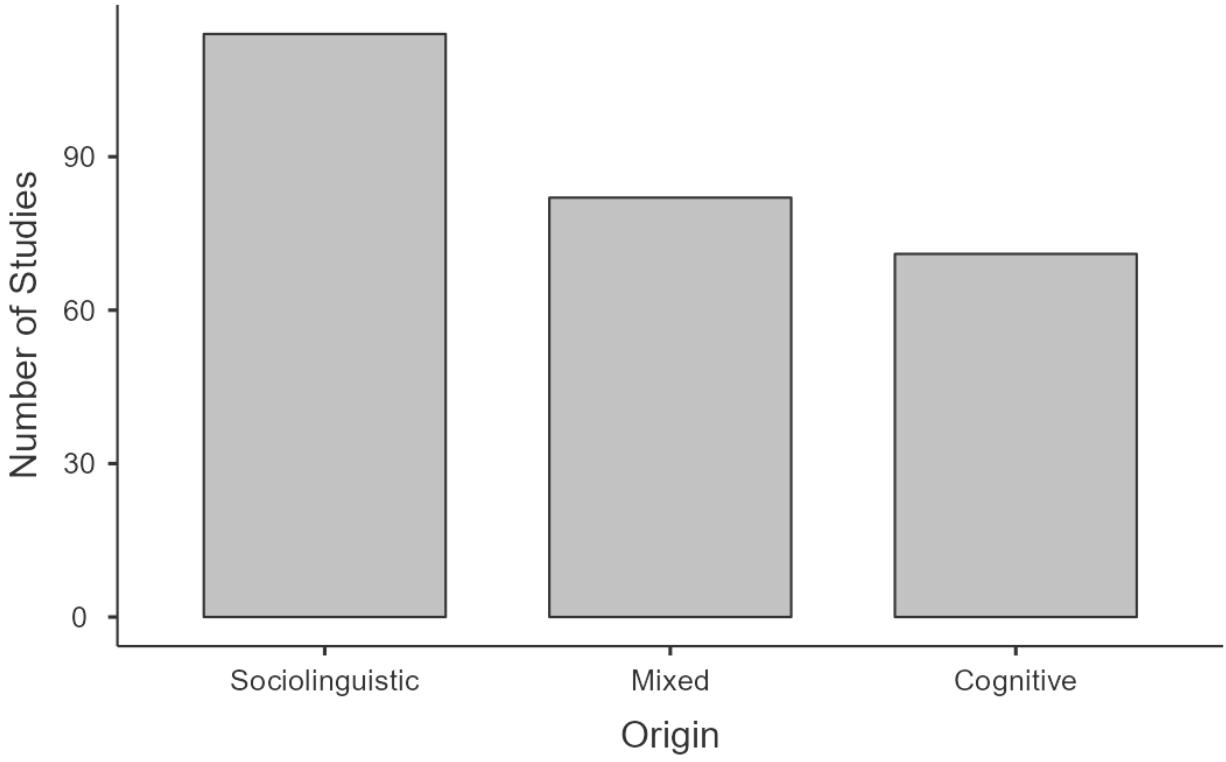

Figure 3. Number of studies that reported different origins of bilingual effects.

Encompassing a variety of tasks and populations, our results suggest that 73.41% of the screened studies that find bilingual effects can be linked to either a sociolinguistic or a mixed origin. The overall distribution of these effects in terms of origin is shown in Figure 4.

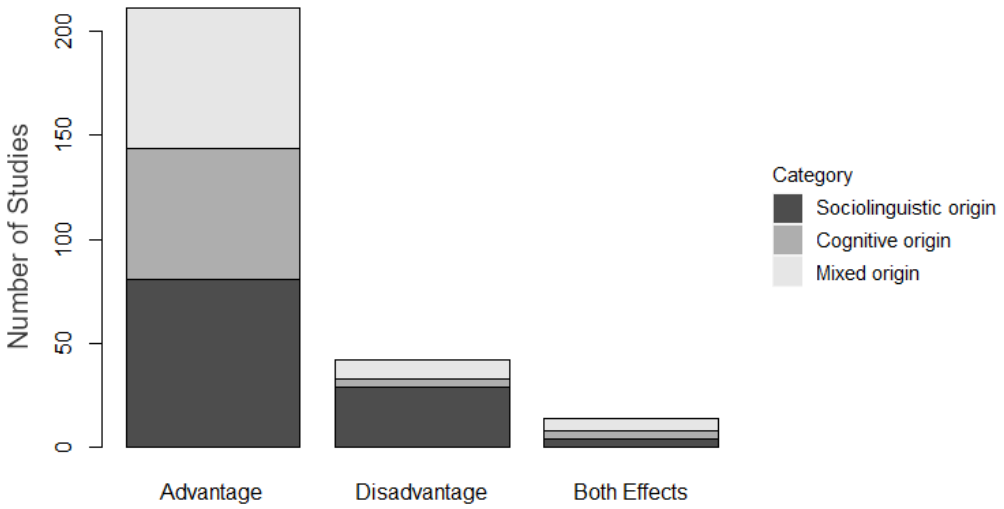

Figure 4. Frequencies of bilingual effects for type of effect (advantage, disadvantage, both) and origin (sociolinguistic, cognitive, mixed).

To find whether there is a significant correlation between the type of effects and their origin, we performed two analyses. First, we ran a χ^2 test of association to determine the relationship between the two variables. In this analysis, we omitted the category "both effects", and we focused on the categories "bilingual advantage" and "bilingual disadvantage". Results show a significant correlation between the type of effect and its origin ($\chi^2 = 14.3$, $p < .001$). The significant difference boils down to the fact that studies that find bilingual disadvantages are more likely to attribute them to sociolinguistic factors, while those that find bilingual advantages are more likely to claim that these effects are linked to either a cognitive or a mixed cognitive and sociolinguistic origin. To provide the full picture, we reran the previous analysis including the previously omitted category "both effects" ($n = 14$). Treating effect and origin as multinomial variables, again we found a significant association between the two variables ($\chi^2=16.4$, $p=.003$). Table 1 presents the model results and Table 2 presents the post-hoc comparisons with Bonferroni correction for multiple comparisons. In the "both effects" category, results are equally distributed between the sociolinguistic and the cognitive type of origin.

						95% Exp(B) Confidence Interval			
Response Contrasts	**Names**	**Effect**	**Estimate**	**SE**	**exp(B)**	**Lower**	**Upper**	**z**	**p**
Both - Advantage	(Intercept)	(Intercept)	-2.726	0.281	0.0655	0.0941	0.224	-9.707	< .001
	Origin 1	Cognitive - Sociolinguistic	0.251	0.727	1.2857	0.0593	0.531	0.346	0.729
	Origin 2	Mixed - Sociolinguistic	0.595	0.666	1.8134	0.1661	0.848	0.893	0.372
Disadvantage - Advantage	(Intercept)	(Intercept)	-1.93	0.221	0.1451	0.0378	0.114	-8.743	< .001
	Origin 1	Cognitive - Sociolinguistic	-1.73	0.559	0.1773	0.3094	5.343	-3.093	**0.002**
	Origin 2	Mixed - Sociolinguistic	-0.98	0.416	0.3752	0.4913	6.693	-2.358	**0.018**

Table 1. Model results for the association of the two variables, type of effect, and origin of effect.

Effect	**Origin**	**Difference**	**SE**	**z**	**$p_{bonferroni}$**
Advantage	Cognitive-Mixed	0.0703	0.0568	1.236	0.788
	Sociolinguistic-Cognitive	-0.1768	0.0567	-3.119	0.062
	Sociolinguistic-Mixed	-0.1065	0.0602	-1.769	0.382
Disadvantage	Cognitive-Mixed	-0.0534	0.044	-1.213	0.812
	Sociolinguistic-Cognitive	0.198	0.0491	4.032	**0.021**
	Sociolinguistic-Mixed	0.1446	0.0534	2.707	0.106
Both	Cognitive-Mixed	-0.0168	0.0397	-0.424	1
	Sociolinguistic-Cognitive	-0.0213	0.0323	-0.657	1
	Sociolinguistic-Mixed	-0.0381	0.0335	-1.136	0.898

Table 2. Post-hoc comparisons.

Analyzing the role of specific sociodemographic factors in our pool of data, we find that age is controlled for in 98.91% of studies (n=364/368), followed by gender which is assessed in 70.92% of studies (n=261). With reference to SES, this variable is unmentioned in 35.60% of studies (n=131), whereas 11.41% of studies (n=42) mention it in their introduction/discussion sections, without measuring or controlling for it. In the remaining 52.99% of studies (n=195), SES is controlled for in the matching of the tested samples.

With reference to the sociolinguistic factors that come into play in the emergence of bilingual effects, the most frequently encountered variables are those related to the sociolinguistic status of the languages (e.g., societal status, context of acquisition, and learning trajectory) and to the actual practice of using them in different contexts (e.g., language exposure/use, amount of switching). Overall, the sociolinguistic factors that come into play can be classified in terms of the following four tightly connected categories, which only together can outline the complexity of the bilingual nature.

1. Variables related to how bilinguals experience and use their languages. These variables amount to factors involved in the emergence of bilingual effects, and include age of acquisition, length of bilingual experience, proficiency measures, literacy competence, measures and domains of language use, both in relation to the amount of use specific to a given language —thus including measures of language switching—, and to specific contexts of use, and measures of language exposure, including language immersion.
2. Variables related to the sociolinguistic context where bilinguals use their languages. These concern the sociocultural and sociolinguistic properties of the environment: the societal status of a language, the culture and patterns of use associated with it, the learning context of a given language, the subsequent communicative and learning demands posed on speakers/signers.
3. Variables related to the sociodemographic profile of participants, that in turn can both affect their bilingual experience and act independently. These include age, gender, and aspects of SES, including education, parental education, and profession.
4. Variables related to linguistic factors. This category refers to the variability and diversification of the linguistic input as well as the typological properties, including script, of the languages at play.

While the classification of variables in the aforementioned categories serves organizational purposes, it does not entail the absence of gray areas between them. This means

that these categories are not rigidly demarcated, but host variables that occur on a continuum of influencing factors, as shown in Figure 5. In relation to the magnitude of contribution, Figure 6 shows the occurrence of each sociolinguistic factor individually in (i) the studies that find results that evoke a sociolinguistic/mixed origin and (ii) the overall pool of data (i.e., all studies that find evidence for bilingual adaptations, regardless of origin). Table 3 presents the overall occurrence of each factor in (i) the studies that find results that evoke a sociolinguistic/mixed origin, (ii) the overall pool of data, and (iii) the context of the entire range of sociolinguistics factors. With respect to (iii), a study may find evidence for more than one sociolinguistic factor, so the total instances of mentioned sociolinguistic factors and the total number of studies do not coincide.

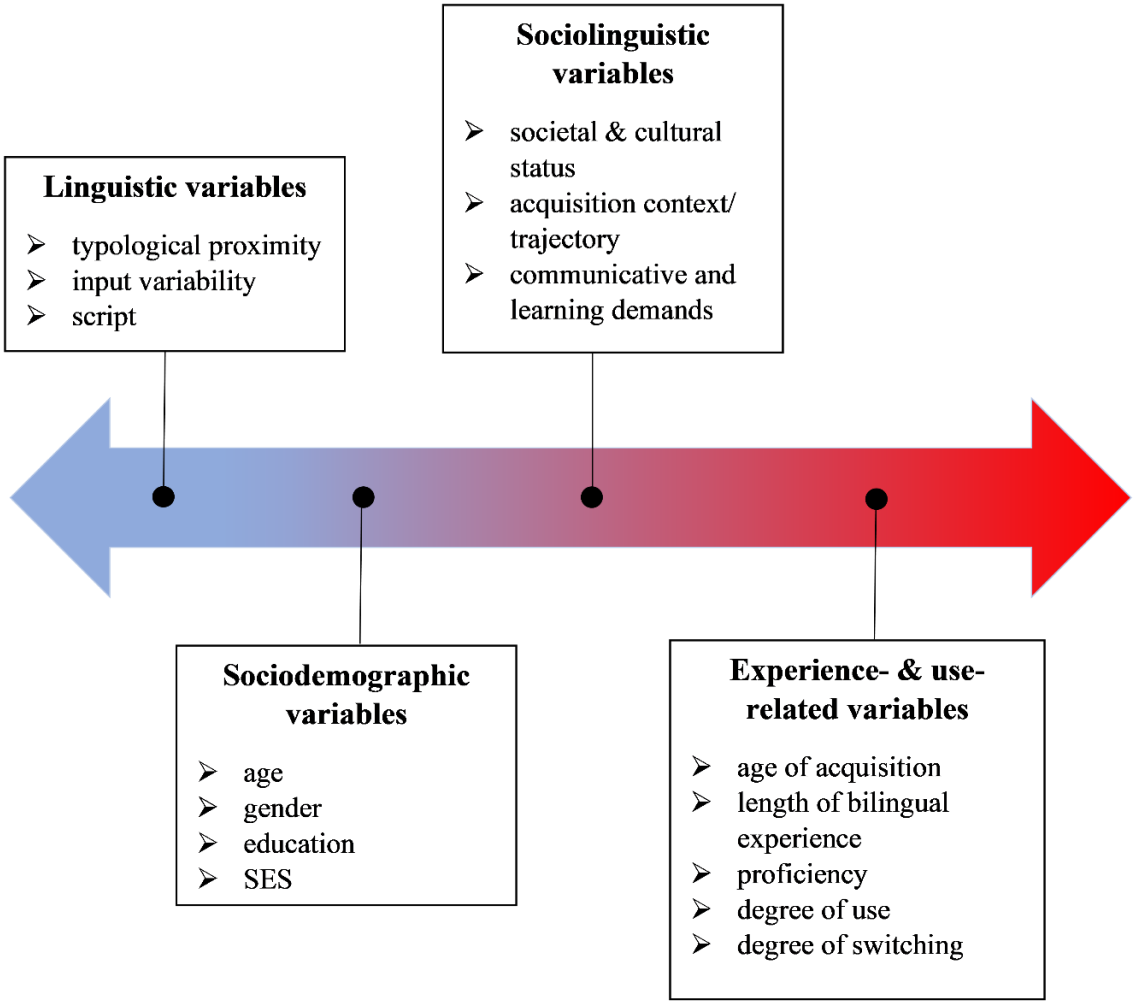

Figure 5. Sociolinguistic factors that have been linked to bilingual adaptations. Color warmth indicates the degree of occurrence in the pool of data.

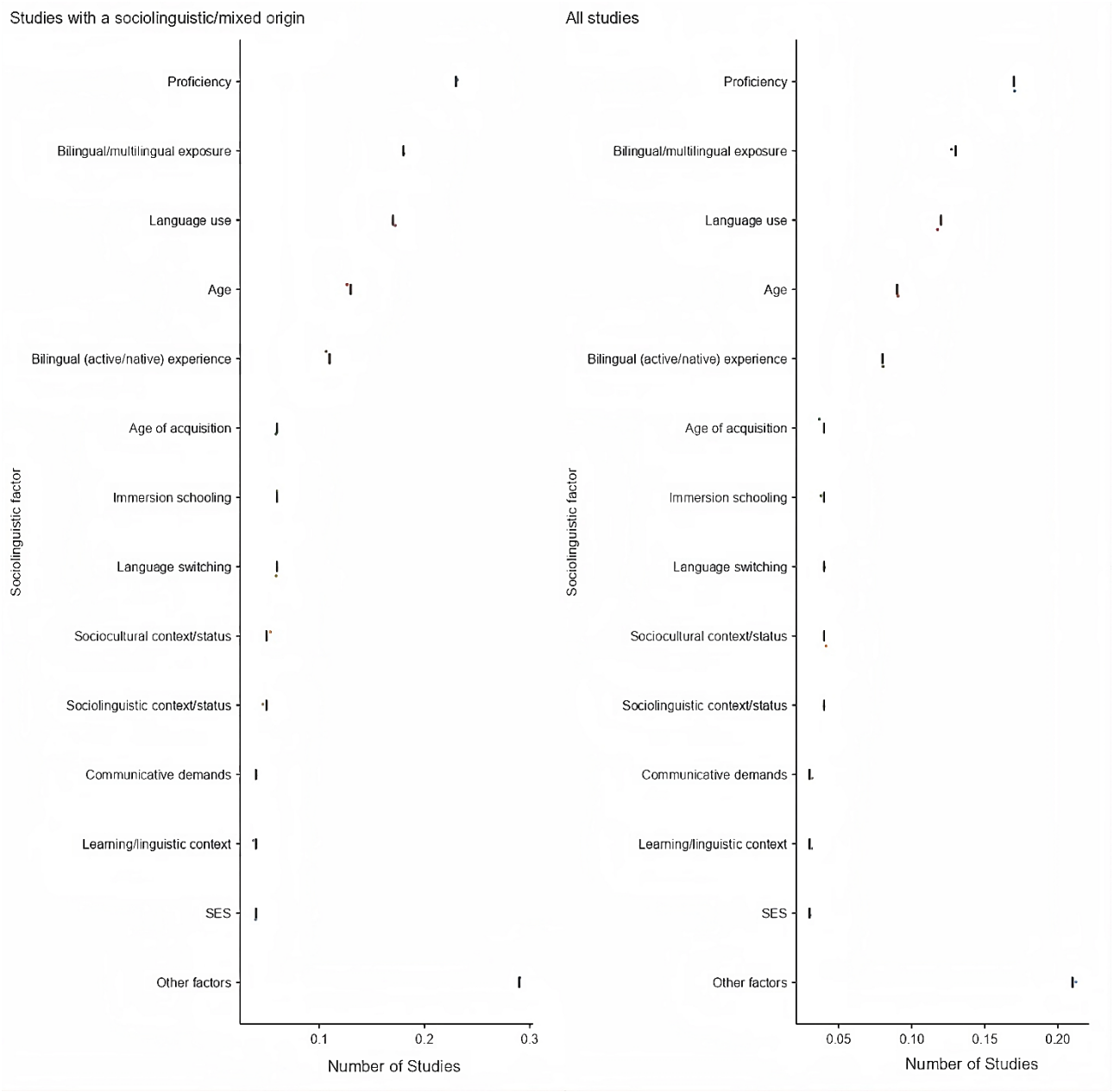

Figure 6. The occurrence of individual sociolinguistic factors in the pool of data. Other factors include language dominance, language similarity/typology, length of bilingual experience, biliteracy, vocabulary size, bilingual trajectory, profession, education, gender, minority language status, script, subtractive bilingualism, acculturation, input variation/diversity, age of literacy acquisition, personal motivation, multicultural identity, and parental education. The complete list is provided in Table 3. The x-axis values show the degree of occurrence in the overall pool of data on a 0-1 scale.

Sociolinguistic factor	**Occurrence in studies with a sociolinguistic/ mixed origin**	**Occurrence in the entire pool of data**	**Occurrence in the total range of sociolinguistic factors**
Proficiency	22.96%	16.85%	15.31%
Bilingual/multilingual exposure	17.86%	13.11%	11.90%
Language use	16.84%	12.36%	11.22%
Age	12.76%	9.36%	8.50%
Bilingual (active/native) experience	11.22%	8.24%	7.48%
Age of acquisition	5.61%	4.12%	3.74%
Sociocultural context/status	5.10%	3.75%	3.40%
Immersion schooling	5.61%	4.12%	3.74%
Language switching	5.61%	4.12%	3.74%
Sociolinguistic context/status	5.10%	3.75%	3.40%
Communicative demands	4.08%	3.00%	2.72%
Learning/linguistic context	4.08%	3.00%	2.72%
SES	4.08%	3.00%	2.72%
Language dominance	3.57%	2.62%	2.38%
Language similarity/typology	3.57%	2.62%	2.38%
Length of bilingual experience	3.57%	2.62%	2.38%
Biliteracy	3.06%	2.25%	2.04%
Vocabulary size	3.06%	2.25%	2.04%
Bilingual trajectory	2.55%	1.87%	1.70%
Profession	1.02%	0.75%	0.68%
Education	1.02%	0.75%	0.68%
Gender	1.02%	0.75%	0.68%

Minority language status	1.02%	0.75%	0.68%
Script	1.02%	0.75%	0.68%
Subtractive bilingualism	1.02%	0.75%	0.68%
Acculturation	1.02%	0.75%	0.68%
Input variation/diversity	0.51%	0.37%	0.34%
Age of literacy acquisition	0.51%	0.37%	0.34%
Personal motivation	0.51%	0.37%	0.34%
Multicultural identity	0.51%	0.37%	0.34%
Parental education	0.51%	0.37%	0.34%

Table 3. Magnitude of contribution for each sociolinguistic factor.

4. Discussion

Taking stock, our results suggest that bilingual populations can indeed be associated with robust adaptations to bilingualism, confirming the results of van den Noort et al. (2019) and Grundy (2020). Analyzing the occurrence of bilingual effects in our sample (Figure 3), a χ^2 Goodness of Fit suggests a significant difference in study outcome, with 72.55% of the studies in our pool of data finding evidence for bilingual effects (χ^2=74.9, $p < .001$). Recall that 73.41% of these studies attribute them to sociolinguistic factors.

Importantly, the reported bilingual effects include both advantages and disadvantages. An important matter that arises concerns the publication biases that have been argued to favor the publication of results that support positive outcomes (de Bruin et al. 2015). As Figure 7 shows, while bilingual advantages are the most frequent category (7a), if we follow the previous practice of grouping null and negative outcomes in one category (following the classification system in de Bruin et al. 2015), the negative/null category (7b) is not the least frequent one, as we expected based on the literature. At the same time, the classification system matters. If bilingual advantages and disadvantages form trade-offs (Leivada et al. 2021b), it is more reasonable to group negative outcomes with positive outcomes (7c) than with null effects (7b). A null result (i.e., failure to find an effect) is not the same as finding evidence for a

negative outcome, hence grouping them together may not do justice to the observed correlations between positive and negative outcomes.

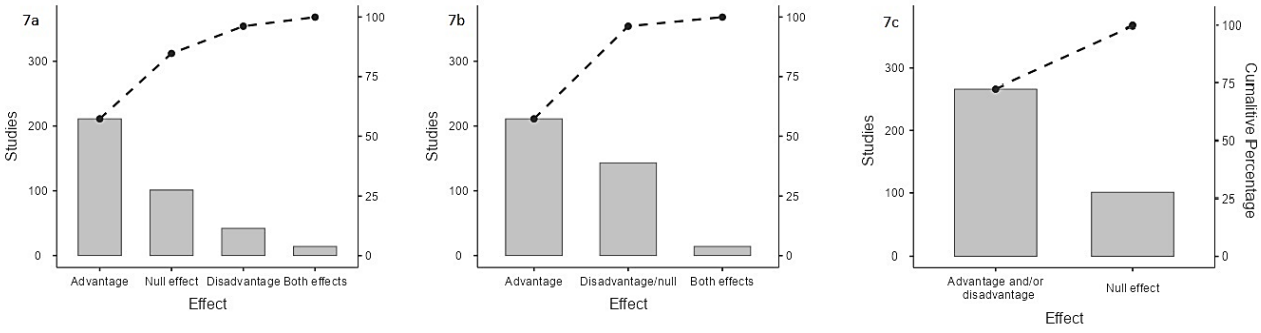

Figure 7. Different ways of grouping bilingual effects. In 7a, bilingual disadvantages and null effects are kept separate. In 7b, bilingual disadvantages and null effects are merged. In 7c, null effects are kept separate from bilingual (dis)advantages.

Overall, this review addresses three questions: What percentage of the studies that report bilingual effects control for sociodemographic factors (Research Question 1), what percentage of the studies reporting such effects attribute them to a cognitive, sociolinguistic, or mixed origin (Research Question 2), and what are the sociolinguistic factors most typically involved in studies that find bilingual adaptations (Research Question 3).

Regarding the first research question, it was found that all 368 articles in our pool of data controlled for at least one sociodemographic factor: age, gender, and/or SES. While only four studies did not account for age in their sample, almost 30% of the articles did not report their participants' gender, despite the potential impact of this variable (Kormi-Nouri et al., 2003; Tarighat & Krott, 2021). With reference to SES, more than 60% of studies at least mentioned it, and more than 50% either measured it or used it as a matching variable in sample selection.

In relation to the second research question, our results suggest that the observed effects are predominantly attributed to sociolinguistic factors. The relevance of sociolinguistic factors becomes even stronger if we consider the studies that ascribe their findings to both sociolinguistic and cognitive origins (Figure 3). These findings attest to the need for developing a social-based theory for explaining the origin of bilingual effects, further suggesting that bilingual adaptations are a mosaic trait that entails a large number of variables belonging to different domains. The bilingual status, in fact, is not enough, raising the question of "how bilingual one needs to be to benefit from a cognitive advantage" (de Cat et al. 2018, p. 125), or

more broadly, for advantageous and disadvantageous effects to be observed? Not only the outcome (which is variably described in terms of advantages, disadvantages, both effects, and null effects; Figure 2), but also the origin boils down to a mosaic of intertwined variables (Figure 5): There are many, both sociolinguistic and cognitive factors, that work together or compete in conferring cognitive adaptations (Valian, 2015). For example, profession is one of them: Interpreters are more likely to perform well in certain cognitive tasks that test specific abilities which are trained in the course of their work experience (Yudes et al., 2011; Henrard & Van Daele, 2017). The results of the present review seem to suggest that the more bilingualism is broken down into particular components that define different types of bilingualism (e.g., use, status, proficiency, etc.), the more likely it is that the ecologically broad *bilingual effect* may be ascribed to something more specific, which oftentimes happens to be of sociolinguistic, rather than cognitive, nature. It seems that the question concerning the origin of bilingual effects is hard to address, most notably because of the variability of the samples. While the terms "bilingualism" and "bilingual" are employed in such a way that their ecological validity seems to be faced with little to no exceptions, the tested samples in the analyzed studies have surprisingly little in common. Participant selection and group matching criteria are by no means fixed, which means that some variables that have been shown to influence results (e.g., SES) are sometimes considered, and sometimes not. Our hypothesis is that the rate at which bilingual advantages and disadvantages are attributed to sociolinguistic factors can be traced back to how bilingualism itself is conceptualized in study design and sample selection: The more multifaceted the bilingual experience is considered, the more likely it is that the origin of its effects will be traced back to a specific subcomponent of bilingualism, recognizing some of the many sociolinguistically-informed nuances of the bilingual experience.

The importance of breaking down the bilingual experience into all its components is also stressed by the significant correlation we found between type of effects and origin. Studies reporting bilingual advantages often attributed them to a cognitive origin, and these studies often focused on the cognitive dimension of the bilingual experience, without specific attention to its social aspects. Chabal et al. (2015), for example, inquired about how bilingualism influences attention in an object search task. The superior ability to focus on relevant information for bilinguals was associated with enhanced executive control. Importantly, the main purpose of the study was to observe whether the "bilinguals' advantage in cognitive control extends to real-world, multi-modal settings" (Chabal et al., 2015, p. 3), suggesting that authors had a pre-set cognitive approach to bilingualism and its outcomes in the executive

control domain. The executive control domain was also the focus of Clare et al. (2016), who however additionally stressed the importance of considering the confounding impact of social factors. The lack of enhanced executive control for their bilingual participants compared to monolinguals was traced back to the specific sociolinguistic context of the study. Indeed, bilingual participants were speakers of English and Welsh who were used to alternate their languages in a "a more automatic and less effortful process" compared to other bilingual profiles (Clare et al., 2016, p. 422). Thus, the weak lexical competition they experienced might have brought fewer demands on executive control and reduced training in this cognitive domain. Besides the tendency of linking bilingual advantages to cognitive origins and bilingual disadvantages to social origins, these examples suggest that considering the subcomponents of specific bilingual experiences could help in clarifying the apparent inconsistencies of results found in research on bilingualism (Marton et al., 2017).

Indeed, factorizing these subcomponents may be the key to finding the origin of bilingual effects. More concretely, we propose that tracing the effect of bilingualism back to cognitive or sociolinguistic factors partially depends on how gradually bilingual experience itself is represented (i.e., as a spectrum vs. a binary option that is based on the question "Does the participant know any language other than language X?", cf. DeLuca et al., 2019; Sulpizio et al., 2020). Defining bilingualism through isolated factors/parameters (i.e., L1/L2 proficiency or age of acquisition as stand-alone elements) may lead to an oversimplified view of this notion: being bilingual is not a dichotomous condition depending on just one factor, rather it is a gradient status where different sociolinguistic/cognitive factors play crucial roles, together with inter-individual variability. Delineating the whole range of the implicated variables as well as their strength of contribution (as in Figures 5 and 6) can be a successful way of approaching the bilingual mind. A better conceptualization of bilingualism is also the key to interpreting its effects (Diaz & Farrar, 2018). As previously mentioned, controlling different subcomponents of bilingualism enables a better linking of bilingual effects to specific factors of the bilingual experience. The upshot is that bilingualism should be perceived as the result of a thick network of sociolinguistic factors that influence each other in a chain-reaction fashion.

The resulting question, then, is about the specific sociolinguistic factors that give rise to bilingual effects; this was the third research question of the present research. Our results show that the sociolinguistic origins of bilingual effects can be ascribed to a continuum of social, sociodemographic, sociolinguistic, linguistic, and language experience/use factors (Figure 5). These variables appear to be intrinsically linked in a thick network, influencing each other, and defining the bilingual experience as the sum of each of these variables. The close

junction of sociodemographic and sociolinguistic factors is clearly shown by SES, a social variable frequently addressed in our pool of data, as previously discussed. With respect to SES assessment, the reviewed studies show a great variability of measures: some authors assert their sample homogeneity through explaining that only participants of the same neighbourhood or geographical area were recruited (e.g., Duñabeitia et al., 2014), others calculate SES by summing up different proxy variables such as educational level, type of occupation, and position in the occupation (e.g., Chrysochoou et al., 2020), while in other cases, especially in studies focusing on children, parental education is measured as an approximate value for SES (e.g., Goetz, 2003; Lesniak et al., 2014; Giguere et al., 2022). Overall, the way in which SES and bilingual experience interact shows that variables pertaining to both the core sociodemographic dimension and variables related to the actual experience of using two languages cannot be perceived as stand-alone factors; they are crucial components of the same thick weft of variables that together give rise to bilingual adaptations. Acknowledging the reality of individual differences entails that employing umbrella terms like "bilingual status", without pinpointing the sociolinguistic characteristics of the bilingual experience *specific* to the tested sample, may result in a substantially incomplete picture. Similarly, the mainstream practice of grouping in one bilingual mega-category a mix of people that speak or sign different L1s, acquired through variable developmental trajectories (e.g., heritage language users, immigrants that go through L1 attrition, sequential bilinguals, etc) raises similar concerns. In such cases, it is almost impossible to determine with a reasonable degree of confidence whether the claimed bilingual advantages and disadvantages are due to handling two or more languages or to some uncontrolled degree of sociolinguistic variation.

As Figure 5 suggests, variables pertaining to language use play an important role in the origin of bilingual effects. Proficiency is a clear example. Most of the reviewed studies find a positive correlation between higher degrees of proficiency and bilingual advantages (e.g., Bialystok & Majumder, 1998; Antoniou et al., 2016; Escobar et al., 2018; Segal & Gollan, 2018; Skoe & Karayanidi, 2019). Higher or lower proficiency may depend on different variables, such as language use, sociolinguistic status, context, and the consequent linguistic attitudes that speakers/signers have toward their language(s). While some studies tend to consider proficiency as a compact variable, and accordingly control for it in their samples, other studies spell out the connection of proficiency with other sociolinguistic factors. Woumans et al. (2015), for instance, explain their results by tracing enhanced cognitive control back to balanced language use and degree of language switching, that in turn results in higher proficiency. The prominence of proficiency as a primary measure to assess bilingualism can

also be ascribed to the fact that this has often been used as an umbrella-notion that includes other aspects of the bilingual experience, such as language use, and in some cases, this has led some scholars to ascribe bilingual effects to proficiency only. According to Verhagen et al. (2019), the impossibility of teasing apart the effects of language proficiency and other sociolinguistic variables stems from the absence of separate measures for each independent factor.

Among these factors, there are two that merit special mention: language exposure and language use (Bedore et al., 2012). The impact of exposure is most evident in research focused on bilingual children. Going back to our pool of data, the bilingual disadvantage found by Andreou et al. (2021) is a clear example: the lower performance of Albanian-Greek bilingual children is linked to the fact that their Albanian-speaking parents chose to use the societal language (Greek) at home despite their low proficiency in this language. Interestingly, this study shows once again the close connection between different aspects of the bilingual experience: besides the crucial role of immigrant status and parental language attitudes, the quality of language exposure influences bilingual children's linguistic abilities. This point has also been discussed by Rothman (2009), who argues that quantitative and qualitative variation in the linguistic input that bilingual speakers receive can affect their resulting grammar.

About language use, terminology matters. The term "language use" is usually ascribed to two main concepts of using a language. The first one concerns the amount of time spent speaking/signing a language, while the second one is strictly connected to the socio-communicative environment in which the language is used. In this second meaning, the interdependent network of sociolinguistic factors becomes once again clear. Referring to the factor "language use" entails considering the social context of use, which in turn can affect the percentage of time the language is spoken. Our results suggest that among the sociolinguistic factors linked to the emergence of bilingual adaptations, sociolinguistic context and communicative environment have a strong impact. The important role of sociolinguistic context in shaping bilinguals' language use is discussed in Lambert (1973) through the concept of *subtractive environment*: choosing to use one language instead of another is not a mere linguistic question, rather it entails social consequences for the speaker/signer.

Another interesting sociolinguistic factor linked to the bilingual communicative dimension is language switching. In most cases, it is drawn from other social components, and it is not independently operationalized, as are proficiency and language use (Verhagen et al., 2019). Similar to proficiency, the frequency of language switching is often found to be positively correlated with bilingual advantages (Woumans et al., 2019; Barbu et al., 2020), in

line with the code-switching hypothesis of Peal & Lambert (1962). According to this hypothesis, the bilingual experience of switching from one language to another helps in reinforcing symbolic reorganization, turning into both strengthened performance in tasks requiring conceptual reorganization and better communication skills. The low frequency of language switching is also brought into play to justify the absence of positive effects of bilingualism. For example, Scaltritti et al. (2017) explain the lack of bilingual advantages in their bidialectal Italian speakers through suggesting that the latter have fewer opportunities of language switching than other bilingual populations (e.g., Spanish-Catalan bilinguals). In this case, the importance of sociolinguistic context is evident, and it shows once again how different bilingual subcomponents are linked in a chain-reaction fashion: the social prestige of a linguistic variety affects the communicative contexts in which it is used and, in turn, the frequency of switching. In Italy, dialects are perceived as less prestigious than Standard Italian, therefore language switching from Italian to dialect is less frequent and occurs under few communicative dimensions. The more prestigious social status of Catalan, on the other hand, enables the use of the Catalan language in more contexts, with a consequent higher opportunity of language switching, which inevitably arises due to the need to address different monolingual Spanish-speaking interlocutors.

This picture suggests that sociolinguistic factors leave a cognitive imprint, such that the different origins of bilingual effects are intertwined (Blom et al., 2017; Marian & Hayakawa, 2021). This is relevant to the debate about the origins of bilingual effects because the status of some factors may seem ambiguous. For instance, we have classified switching as a sociolinguistic factor. However, it could be plausibly viewed as a cognitive factor: having to monitor external cues in order to be able to switch engages cognitive control regions in the brain (Blanco-Elorrieta & Pylkkänen, 2017). We argue that both findings are correct: language switching indeed has cognitive implications, but its occurrence is driven by sociolinguistic happenstance. Recognizing the cognitive repercussions of switching does not mean that this is a cognitive factor per se, or that all sociolinguistic factors that recruit and affect cognitive resources should be classified as cognitive in origin. Even SES (i.e., the classic textbook example of a social factor) has an impact on neurocognitive resources (Migeot et al., 2022), but this does not prevent us from recognizing its status as a social factor. In sum, given that all social experiences may leave an imprint on cognition, it is uninformative to think of all the sociolinguistic factors as cognitive factors or lump them together under the label “cognitive”. Instead, the emphasis should be on appreciating the individual characteristics of different *sociolinguistic ecologies* of speakers/signers (Rodríguez-Ordóñez et al., 2022). As Luk (2022,

p. 5-6) puts it, “when shifting the research focus to people and the way that they become multilingual, it is clear that any investigation of bilingual (dis)advantage needs to consider the social contexts where language experiences occur”.

Overall, our proposal about the social imprint on the cognitive impact of bilingualism does not mean to delineate a causal relation between social factors and their outcomes. Rather, the cognitive mechanisms leading to the emergence of bilingual effects should be perceived as mediating between the outcomes themselves and the environmental conditions that shape them. In this respect, potential cognitive mediators have been identified in the domain of attentional control (Bialystok & Craik, 2022) or in language selection (Calabria et al., 2012; cf. Blanco-Elorrieta & Caramazza, 2021 for a review). To offer a concrete example, Polinsky & Scontras (2020) propose that processing pressures experienced by heritage bilinguals are determined by social factors: In most communicative settings, the supremacy of the societal language entails less dominance in the heritage language, which affects both how online resources are handled in processing mechanisms, but also induces linguistic changes in the heritage language grammar (Polinsky & Scontras, 2020).

Last, an interesting observation that emerges from our analysis concerns the “null effect” group of studies. While some studies did not find any effect of bilingualism, others stressed the use of different cognitive strategies by monolingual and bilingual participants. Regardless of finding or not finding statistically significant differences in terms of task performance, it is important to highlight that bilingual experience *can* impact the use of specific cognitive strategies instead of others (cf. Bialystok et al., 2005a; Antoniou et al., 2013; Vaughn et al., 2018). The failure to find significant differences between monolinguals and bilinguals may be ascribed to factors other than sociolinguistic or cognitive variables, such as task structure and/or stimulus demands (e.g., Lee et al., 2000). What can be drawn from these results is that being bilingual, with all the sociolinguistic variables that bilingualism entails, may affect the way in which a person interacts with linguistic and non-linguistic input, and this in turn may inform processing strategies that may be differently employed by monolingual and bilingual speakers/signers.

5. Outlook

The main findings of the present review support the relevance of a sociolinguistic theory of bilingual effects. Through the analysis of 368 studies, we have determined the occurrence of

different sociolinguistic variables responsible for bilingual effects in more than 73% of the studies in our pool of data. Proficiency, language exposure, language use, communicative context, and sociolinguistic environment are the key factors behind bilingual effects, together with sociodemographic factors such as age, gender, and SES. Through adopting a sociolinguistic perspective, future studies on bilingual effects may strengthen their explanatory power by taking into account the dense network of sociolinguistic and environmental factors that characterize the bilingual experience and make bilingualism a gradient phenomenon. The take-home message is that sociolinguistic variables cannot impersonate secondary roles; their influence on results from tasks that are deemed as measuring primarily cognitive outcomes should be acknowledged. This conclusion advances our understanding of the bilingual experience, by showing that bilingualism, as a spectrum of dynamic experiences, cannot be isolated, neither from the cognitive mediators that sustain it nor from the social environment that shapes and nourishes it.

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Chapter 3

The role of minority language bilingualism in spotting agreement attraction errors: Evidence from Italian varieties

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Abstract

Bilingual adaptations remain a subject of ongoing debate, with varying results reported across cognitive domains. A possible way to disentangle the apparent inconsistency of results is to focus on the domain of language processing, which is what the bilingual experience boils down to. This study delves into the role of the bilingual experience on the processing of agreement mismatches. Given the underrepresentation of minority bilingual speakers of non-standard varieties, we advance a unique comparative perspective that includes monolinguals, standard language bilinguals, and different groups of minority language bilinguals, taking advantage of the rich linguistic diversity of the Italian peninsula. This comparative approach can reveal the impact of various sociolinguistic aspects of the bilingual experience across different bilingual trajectories. We developed an auditory acceptability judgement task in Italian, featuring Subject-Verb agreement mismatches. Participants evaluated the stimuli on a 5-point Likert scale and reaction times were recorded. The results do not reveal significant differences between the speakers of standard languages: Italian monolinguals and Italian-Spanish bilinguals. Instead, significant differences are found between monolinguals and the two groups of minority language bidialectals, as well as between the bidialectal groups themselves: Italian-Pavese bidialectals were faster than both Italian-Agrigentino bidialectals and Italian monolinguals, while Italian-Agrigentino bidialectals were less accurate than both Italian-Pavese bidialectals and Italian monolinguals. This intricate picture is explained through variables associated with second language use and language switching. Our findings suggest that if bilingualism is viewed as a yes/no phenotype, it is unavoidable that the bilingual experience will remain a mystery linked to intensely debated results. If, however, one accepts that bilingual adaptations are shaped by the environmental ecology of each trajectory, variation across bilingual processing outcomes is unsurprising. Overall, we argue that specific sociolinguistic factors behind each bilingual experience can reveal where bilingual adaptations on language and cognition stem from.

Introduction

Bilingualism has been associated with behavioral and anatomical effects stemming from the presence of more than one linguistic system in the brain [1-5 *inter alia*]. At both the behavioral and the anatomical front, such bilingual effects have been abundantly discussed, often in terms

of positive, negative, and null findings that come from various linguistic and non-linguistic domains [6,7]. On the one hand, the constant need to deal with two linguistic systems [8-10] has been associated with better performance in executive functions (EFs), metalinguistic and metacognitive awareness, abstract reasoning, and problem-solving [11-14]. On the other hand, studies testing EFs [15-17], as well as linguistic domains such as semantic and letter fluency [18,19] have often reported negative or null effects, leading to an apparent inconsistency of results [20] and an ongoing debate about the nature of the observed bilingual adaptations [21-24].

Seeing that the domain of EFs has given rise to largely contestable results, a possibly more reliable glimpse into the effects of bilingualism on cognition could come from focusing on language. Since the bilinguals' cognitive effort concerns managing different languages, bilingual effects in language processing are expected [25], especially when the tested stimuli take advantage of the parser's limitations. Indeed, although our cognitive parser can compute complex linguistic constraints, it is also likely to fail in the processing of some structures [26]. The parser's (in)success in computing certain structures has been described in terms of selective fallibility to the so-called *grammatical illusions*, which refer to stimuli that trick us in such a way that an ungrammatical sentence is considered acceptable [26].

One type of grammatical illusion concerns sentences that feature agreement attraction errors [26]. Such errors occur when a linguistic element and its grammatical controller do not agree. This lack of agreement is caused by a disrupting "distractor", which lies between them (1): Instead of agreeing with its controller, the mismatching element is attracted by the nearby distractor and follows its agreement features [27].

(2) *The key to the cabinets are rusty. [28]

While the resulting sentence is ungrammatical, users do not consistently recognize it as such, primarily because the parser still computes agreement, albeit inaccurately, on the wrong element (i.e., the distractor). Therefore, the term "illusion" is used to describe agreement mismatches, as they deceive the parser by featuring agreement, but in a non-target way. Different theories have been proposed to explain this phenomenon. On the one hand, representational accounts [29-34], and specifically percolation accounts [29-31], have ascribed agreement attraction errors to ambiguous representations of the subject of the sentence. The main idea is that the mismatching number features of a distracting noun phrase (NP) adjacent to the subject are transferred to the subject of the sentence. As a result, the number features of

the subject, which are used to compute the agreement on the verb, are faulty and lead to an agreement mismatch. On the other hand, retrieval accounts have interpreted agreement mismatches as a failure of the memory retrieval system [35-39]. Under this view, agreement mismatches stem from the retrieval process and are due to an overload of the working memory (WM) system, which is part of the EF domain. Rather than ascribing agreement mismatches to faulty representations of the subject itself, retrieval accounts posit that agreement mismatches arise due to the selection of an incorrect element, namely the distracting NP instead of the subject NP, during the retrieval process in the agreement region. Some studies within the retrieval account have suggested a positive correlation between enhanced EF abilities and lower susceptibility to attraction effects [40,41].

Among the agreement attraction phenomena which are more prone to interference effects, Subject-Verb number agreement stands out [26]. Subject-Verb agreement attraction errors have been amply investigated in both production and comprehension. Regarding production, several studies have analyzed the impact of different NP features on attraction errors such as the NP number, animacy and length [28 for English], the nature of the NP number information [42 for English], the impact of number mismatch between NP and subject [43 for Dutch], the semantic distributivity of the head noun [44 for Italian and English], the linear proximity of the NP to the verb [30 for English], and the semantic integration of the NP to the head noun [45 for English]. Regarding the notional distributivity of the NP, some studies have considered the impact of the morphological richness of languages [46 for Mexican and Dominican Spanish], revealing that the richer the language morphology is, the fewer notional effects on agreement occur. Taken together, the results highlighted some cross-linguistic trends, the most frequent being that plural NPs elicit more attraction errors than singular NPs. At the same time, similar patterns of Subject-Verb agreement processing have also been observed in comprehension studies [27,29,47,48 for English; 49 for French]. Once again, plural NPs elicited higher attraction effects compared to singular NPs [50 for English]. Furthermore, the grammaticality of the stimuli was found to affect agreement attraction, giving rise to the so-called *grammatical asymmetry* for which attraction "eases the reading of ungrammatical verbs" [51, p. 147 for Spanish].

What both production and comprehension studies suggest is that agreement attraction errors are highly selective to specific morphological and syntactic patterns. However, the cognitive mechanisms behind the parser's fallibility are still unclear [52]. Following the retrieval accounts [53], it has been hypothesized that enhanced inhibitory control could prevent the parser from selecting the wrong NP for agreement [52]. In this context, we expect to find

an effect of bilingualism on the computation of such grammatical illusions: If bilingualism leads to cognitive adaptations involving EFs, inhibitory control, and WM [9,54,55], testing grammatical illusions should reveal potential differences between monolingual and bilingual language processing [56].

This prediction is based on previous literature. Leivada, Mitrofanova, and Westergaard [25], for example, focused on comparative illusions and found that bilinguals were better at detecting them compared to monolinguals, but they were also slower in providing an answer as to the well-formedness of the stimuli. Regarding Subject-Verb agreement attraction errors, Foote [57] found that attraction was modulated by proficiency (i.e., more proficient bilinguals showed fewer attraction effects). The roles of age of acquisition (AoA) and proficiency were examined by Sagarra and Rodriguez [58], who found that Spanish monolinguals and English-Spanish bilinguals showed similar sensitivity to agreement violations. In particular, the processing patterns of adjacent Subject-Verb agreement in terms of reading times, gaze duration, and accuracy were found to positively correlate with perceptual salience, defined as "the ability of a stimulus to stand out from the rest and to attract attention by virtue of physical characteristics" [58, p. 16], and with L1 and L2 patterns of use, rather than AoA or proficiency. Similar rates of attraction for monolinguals and bilinguals were also reported by Lago and Felser [59], who compared German monolinguals and Turkish-German heritage speakers.

Crucially, while language processing has been examined in bilingual speakers of various standard/official languages, very few studies have focused on bilingual populations that use minority, regional, or non-standard varieties. Leivada [60] compared monolingual speakers of standard Greek and bidialectal speakers of Standard and Cypriot Greek in the detection of comparative illusions and reported a better performance for bidialectals. Regarding Subject-Verb agreement attraction errors, to the best of our knowledge, only Veenstra, Antoniou, Katsos, and Kissine [61] compared bilingual and bidialectal speakers. The tested populations were monolingual Dutch-speaking children, bilingual Dutch- and French-speaking children, and bidialectal Dutch- and West Flemish-speaking children. The three language groups did not show any difference in attraction error production, but a correlation between attraction rates, verbal WM, and inhibitory control was found in all groups: Participants with higher WM skills exhibited lower attraction rates compared to participants with weaker inhibitory control, who made more attraction errors.

Overall, considering the scarcity of research on bidialectal language processing, our study aims to add to the investigation of this severely understudied domain, by examining the processing of Subject-Verb agreement mismatches in various bilingual and bidialectal

populations, hence advancing a unique comparative perspective. Specifically, our research questions (RQ) are: (I) Is there a difference in how monolingual, bilingual, and bidialectal speakers detect Subject-Verb agreement mismatches? (II) Is there an effect of specific sociodemographic and sociolinguistic variables of the bilingual experience on processing grammatical illusions that feature morphological mismatches?

RQ I ascribes our research to the frame of bilingual language processing, adding a new tile, which concerns the inclusion of bidialectal speakers. We use the term "bidialectal" for speakers of a standard and a non-standard, minoritized language. To address RQ I, we will focus on the linguistic landscape of Italy, which is particularly rich in terms of linguistic diversity. Besides Standard Italian, a high number of local dialects is spoken from the north to the south of Italy, and they present great variability in terms of both structural and sociolinguistic traits [62]. Regarding the use of the term "dialect", an important terminological clarification is due. Italian dialects are not regional varieties of Standard Italian, but independent linguistic systems that evolved directly from Latin and present their own structural features [63-65]. The major difference between Standard Italian and these local dialects concerns the social prestige that speakers ascribe to them and their context of use. Although dialects are languages, the term "language" is usually reserved for the official, standard variety (i.e., Standard Italian), while the term "dialect" indicates a variety that can be variably used in various contexts, often exclusively in unofficial and informal settings. Importantly, every Italian bidialectal community presents its own features in terms of dialect use, with the latter exhibiting considerable differences between northern and southern Italian regions. A prevailing trend emerges in favor of heightened dialect use in the southern regions, where Standard Italian and dialects are more intricately intertwined [66,67]. We will consider two different Italian bidialectal groups, one from the north of Italy (i.e., Italian-Pavese bidialectals) and one from the south (i.e., Italian-Agrigentino bidialectals). Selecting two bidialectal groups that belong to different sociolinguistic realities offers a valuable opportunity to unveil the role of specific factors of diverse bilingual experiences as well as to tap into potential differences between them in terms of language practices. Regarding the phenomenon under study, Pavese and Agrigentino are similar to Standard Italian in that they both inflect the verb for number and person to agree with the subject. However, Pavese presents an additional morphological marker for Subject-Verb agreement, which consists of a subject clitic pronoun preceding the verb [68-70].

RQ II is motivated by a rich line of studies that stress the importance of considering social and sociolinguistic aspects of the bilingual experience while investigating the cognitive

effects of bilingualism [71-74 *inter alia*]. Considering different bilingual profiles may be the key to disentangling the role of factors such as proficiency, degree of use, social prestige, and personal attitudes towards different languages. Although bilingual and bidialectal speakers share the practice of regulating two linguistic systems, their main difference concerns the relation between these systems and their language use practices, as in the case of the Italian bidialectal communities we test. Since the Adaptive Control Hypothesis was developed [1], the context of use became a pivotal factor in defining different bilingual phenotypes. The role of context of use was further stressed by Beatty-Martínez and Titone [75], who propose that bilingual cognitive control is modulated by the degree of entropy, namely "the relative balance or diversity of language use and/or exposure within and across communicative contexts" (p. 4). Under this view, comparing bilingual and bidialectal speakers entails focusing on different ecological systems, where the relation between the two languages is strongly shaped by the sociolinguistic context and the prestige ascribed to the linguistic varieties [76]. In their review of the effects of bidialectalism and diglossia on cognition, Alrwaita, Houston-Price, and Pliatsikas [77] highlight the importance of considering the context of use: In their words, "if the contexts in which language varieties are used is key in explaining the lack of consistency in the bidialectal literature, the inconsistent results of studies involving bilingual speakers might benefit from similar consideration" (p. 18).

In this context, the present study advances a comparative perspective that involves different populations (monolingual, bilingual, and bidialectal), while tapping into an aspect of language processing that has the potential to reveal whether juggling more than one language sharpens the cognitive parser in a way that makes it less vulnerable to grammatical illusions. More importantly, by compiling a detailed sociolinguistic profile for the different groups of participants under study and their language practices, the critical question of *what makes bilinguals different* will be addressed and variables concerning language practices, such as language switching, will hold a primary position. In addition, sociodemographic variables that have been found to potentially impact language processing, such as gender [78] and age [79], will be taken into account as control factors.

Based on previous literature, we expect different findings regarding RQ I. While it is plausible to anticipate comparable attraction effects in both monolingual and bilingual/bidialectal participants [56-59], we can equally expect to find some differences in the rates bilingual and bidialectal individuals detect Subject-Verb agreement mismatches in comparison to monolinguals, due to the ongoing language monitoring involved in the bilingual experience [25,60]. Regarding RQ II, we predict that these differences may be modulated by

factors related to language use practices [59], which have been reported to affect cognitive control [1,75]. For both our RQs, the crucial dependent factors are accuracy in detecting agreement mismatches and reaction times (RTs) in providing a response. Besides the effect of language group, which will be investigated in our first analysis (RQ I), the effect of factors related to bilingual language use, such as time using the languages and switching practices, will constitute the independent variables of our further analysis (RQ II).

Methods

Participants

All participants were neurotypical adults. They were capable of providing informed consent and they gave their written informed consent prior to their participation in the study, in compliance with the Declaration of Helsinki. Most participants were recruited through invitations posted on social media platforms, while others were recruited in person. The recruitment period extended from December 2022 to April 2023. All participants completed the experiment on an online platform (Gorilla). In most cases, a researcher was actively involved during the recruitment phase of the experiment to ensure that participants could successfully access the provided link to the test. Subsequently, participants conducted the experiment in autonomy. The Ethics Committee for Research into People, Society and the Environment (CEIPSA) at Universitat Rovira i Virgili reviewed and approved the study protocol (approval number: CEIPSA-2022-TD-0032).

The original sample involved 278 participants, but 170 participants were excluded according to the following criteria: (i) Not completing the task (n = 152), (ii) presenting more than 20% errors in acceptability rates of fillers (n = 14), (iii) not presenting the proper linguistic profile to be included into one of the tested language groups (n = 4). The last criterion (iii) was assessed through participants' self-reported background measures. In particular, the 152 participants who did not complete the task were excluded because they only filled one section of the experiment, namely the background questionnaire, without starting or, in some cases, completing the acceptability judgement task before the end of the data collection session. The 4 participants excluded based on criterion (iii) were removed from the monolingual group. Our criterion to classify participants as monolinguals was based on pre-defined measures of language use. Specifically, only those participants who chose "never" or "few times" on a 5-point scale (i.e., "never", "few times", "sometimes", "often", and "always") that asked them

about speaking, reading, and writing in the dialect/other language were included in the monolingual group. The final sample includes 108 participants who are divided into 4 groups: Italian-speaking monolinguals (n = 27), Italian-Spanish bilinguals (n = 27), Italian-Pavese bidialectals (n = 26), and Italian-Agrigentino bidialectals (n = 28). Table 1 shows the participants' demographics. The bilingual group includes both bilingual speakers of Italian and Spanish and trilingual speakers of Italian, Spanish, and Catalan (22% of the bilingual sample). The Pavese bidialectal group includes speakers of Standard Italian and the Pavese dialect, and the Agrigentino group consists of speakers of Standard Italian and the Agrigentino dialect. All bilingual and bidialectal participants reported having a high level of proficiency in their languages. Monolingual participants reported some basic or intermediate knowledge of either English or another language. Few monolingual participants also reported having some knowledge of their local dialect, but it was generally limited to low degrees of proficiency, and they did not use the local variety actively. A clarification about our use of the term "monolingual" should be made. With the term "monolingual", we indicate those participants who primarily master and use one language (i.e., Standard Italian), but can have been passively exposed to other languages (i.e., local varieties in most cases or English as a foreign language at school). We believe that instead of the notion of "pure monolingual", which stems from the perception of bilingualism as a dichotomous condition, we should embrace the idea that being bilingual is a gradient status. Given that nowadays very few individuals have encountered only one language in their life, a more accurate classification of participants may involve expressions such as "more or less bilingual". Therefore, we opt to use the term "monolingual" just for the sake of simplicity, while emphasizing that it should be understood as the lower end of the bilingualism spectrum.

A demographic and sociolinguistic profile for each participant is available in Table 1 (for more detailed information see: https://osf.io/j4zqg/?view_only=e52f1e4facb9474984148cefac087b51).

Table 1. Participants' demographics. Self-rated proficiency is measured on a 5-point scale where 1 is the minimum value and 5 is the maximum value. For bilinguals and bidialectals, the percentage of language use of Italian, the percentage of language use of L2, the percentage of language switching, and the mean age of onset of the L2 (in years) are also reported.

	Monolinguals	**Bilinguals**	**Italian-Pavese bidialectals**	**Italian-Agrigentino bidialectals**
N	27(18F)	27(20F)	26(19F)	28(14F)
Age	26.7 (3.9 SD)	37.5 (10.9 SD)	46.3 (16.5 SD)	34.1 (13.2 SD)
Education	Secondary 5 Tertiary 22	Secondary 7 Tertiary 20	Primary 1 Secondary 13 Tertiary 12	Secondary 11 Tertiary 17
Self-rated proficiency in Italian (1-5)		4.78/5	4.58/5	4.54/5
Self-rated proficiency in the L2 (1-5)		4.67/5	3.38/5	4.46/5
Percentage of daily language use - Italian		51.96%	72.15%	58.04%
Percentage of daily language use - L2		38.52%	22.62%	37.57%
Percentage of language switching		59.26%	47.12%	54.64%
Mean age of L2 onset		14 y.o. (11.33 SD)	0 y.o. (0 SD)	0 y.o. (0 SD)

Task

An auditory timed acceptability task was developed and run in Gorilla (gorilla.sc) to collect both acceptability judgements on a 5-point Likert scale and RTs. Our task involved 120 auditory stimuli, split into 40 test items, 60 grammatical fillers, and 20 ungrammatical fillers, aiming for a 2:1 ratio between fillers and test items and a 1:1 ratio between grammatical and ungrammatical stimuli, following the experimental design proposed by Stowe and Kaan [80,

p. 52; 81,82,83]. The stimuli were specifically created for this study and constitute original material available at: https://osf.io/j4zqg/?view_only=e52f1e4facb9474984148cefac087b51. All the test items (n = 40) had the same syntactic structure: These were ungrammatical sentences with a Subject-Verb agreement mismatch and a plural NP serving as a disrupting distractor between the subject and the verb. In all the test items, the subject was notionally non-distributive and grammatically singular. We split the test items into two conditions: Half (n = 20) were presented in a high linguistic register (examples 2a and 3a), while the other half (n = 20) were presented in a low linguistic register (examples 2b and 3b). Linguistic register is defined as a variety of language shaped by different situational settings [84]. We included register variation in our stimuli to observe its potential effect on language processing and its interaction with the users' linguistic background. The test items in the high-register and low-register conditions were matched for semantic content. Each register condition had 10 items with animate NP distractors (2a and 2b) and 10 items with inanimate NP distractors (2a and 2b). The inclusion of both animate and inanimate NP distractors was driven by findings from previous literature [28], which reported an effect of animacy in the attraction rates of Subject-Verb agreement mismatches. The role of register and animacy of the test items will be separately discussed in another paper. We expect to find an effect of register variation on the detection of Subject-Verb agreement mismatches, further modulated by the participants' linguistic background. In terms of animacy, we aim to replicate previous findings [28], with animate distractors eliciting stronger attraction effects compared to inanimate distractors.

(2a) *Il documento dei poliziotti locali sono estremamente in disordine.
The document.NOUN.SG of the policemen.NOUN.PL local be.3PL extremely in mess
"The document of the local policemen are very messy."

(2b) *Il foglio degli sbirri comunali sono in un bordello assurdo.
The sheet.NOUN.SG of the cops.NOUN.PL local be.3PL in a mess crazy
"The sheet of the local cops are in a crazy mess."

(3a) *L'alloggio per le vacanze estive prevedono un costo elevato.
The accommodation.NOUN.SG for the holidays.NOUN.PL summer have.3PL a cost high
"The accommodation for the summer holidays are really expensive."

(3b) *La casa per le ferie estive costano un occhio della testa.

The house.NOUN.SG for the holidays.NOUN.PL summer cost.3PL an eye of the head
"The house for the summer holidays cost an arm and a leg."

Fillers involved both grammatical and ungrammatical sentences. The grammatical fillers consisted of sentences with correct Subject-Verb agreement (n = 40), which presented the same syntactic structure as the test items, and sentences with a different structure from the test items, which involved correct auxiliary choices for the verbs (n = 20). The ungrammatical fillers included sentences with wrong auxiliary choices for the verbs (n = 20).

All the linguistic stimuli were presented in Standard Italian. Before the experiment started, a brief warm-up session was run to ensure that participants had understood the task correctly and had set the audio of their devices properly. All participants encountered all the test items, which were presented in a randomized order. Participants listened to them one by one and were asked to judge the sentence on a 5-point Likert scale with the following values: 1 = "Completely wrong", 2 = "Wrong", 3 = "Neither wrong nor correct", 4 = "Correct", 5 = "Completely correct".

Participants did not have the option of skipping a sentence or listening to it twice. RTs were recorded as soon as the participant selected a value on the Likert scale. Then, the next auditory stimulus was automatically played. Before the experiment, all participants completed a detailed sociolinguistic questionnaire, which was based on the Language and Social Background Questionnaire (LSBQ) [85]. The entire experiment (i.e., background questionnaire and acceptability judgement task) lasted between 30 and 40 minutes. The task, the dataset, the sociolinguistic questionnaire, and the R script used to run the analyses are available at: https://osf.io/j4zqg/?view_only=e52f1e4facb9474984148cefac087b51.

Results

Analyses

Since all 108 participants encountered all test items, which consisted of 40 ungrammatical sentences with Subject-Verb agreement mismatches, 8640 data points were collected, 4320 for each measure (i.e., acceptability judgements and RTs). Data analyses included both accurate and inaccurate responses to the test items. The standard logarithm ($RT' = \log_{10}(RT)$) was applied to normalize RTs, and a 2.5 SD filter was used to detect outliers. Consequently, 67/4320 data

points have been removed from the RT measures (1.55%), and the corresponding acceptability judgements were also excluded. The results include 8506 data points for both acceptability judgements of test items and their corresponding RTs. The inclusion of both accurate and inaccurate responses and their corresponding RTs was done to comprehensively observe participants' behavior regarding agreement attraction errors, which is the main purpose of this study. By including RTs of both accurate and inaccurate responses, we seek to highlight potential trends in the time needed to give (in)correct responses, which have been highlighted in previous literature [60, 86]. In particular, recent research on the processing of Subject-Verb agreement mismatches showed that inaccurate judgements are associated with slower RTs compared to accurate judgements [87]. Furthermore, given that Italian-Pavese and Italian-Agrigentino bidialectals have never been examined in the processing of Subject-Verb agreement mismatches, and in general, in language processing research, we opted not to exclude a priori a significant portion of our database to entirely observe the processing behavior of these unstudied populations.

We used the lme4 package (version 1.1.33) in R [88] to run both a generalized linear mixed-effects model (GLME) and a linear mixed-effects model (LME) [89-94].

Accuracy analysis

First, we explored how the judgements of our 4 language groups differ in terms of accuracy (RQ I). To this aim, we selected a sum contrast for the Group variable, such that the monolingual group was set as the baseline level. The acceptability judgements on a 5-point Likert scale were coded as 1 for Accurate (i.e., judgements corresponding to either 1 or 2) and 0 for Inaccurate (i.e., judgements corresponding to 3, 4, or 5).

The GLME included accuracy as the dependent variable. As fixed effects, we included language group ("Monolinguals", "Bilinguals", "Agrigentino", "Pavese"). As control factors, we included the animacy of the NP distractors (sum contrast, two levels = "Animate", "Inanimate"), the register of the items (sum contrast, two levels = "High register", "Low register"), the chronological age of the participants (scaled), and gender (sum contrast, two levels = "Male", "Female"). As random intercepts, we included participants and items. We first fitted the maximal model following Barr, Levy, Scheepers, and Tily's recommendation [95], and if there were no convergence or singularities, we simplified it following Barr, Levy, Scheepers, and Tily [95] and Bates, Mächler, Bolker, and Walker [90]. To be more specific,

we started by removing the interactions in the slopes, then we proceeded to remove the slopes with lower explained variance until convergence was reached. The final model included both participants and test items as random intercepts.

To observe the potential role of variables related to bilingual and bidialectal language practices (RQ II), we built a further model that did not include monolingual participants. In this model, we set the sum contrast for the Group variable with the bilingual group as the baseline. We included accuracy as the dependent variable. We kept language group as a fixed factor ("Bilinguals", "Agrigentino", "Pavese"). As additional fixed factors, we added the percentage of language switching (scaled), the percentage of Italian language use (scaled), the percentage of second language use (scaled), and their interactions with language groups. The percentage of language switching was calculated considering the mean value between the frequency of switching that participants reported for different contexts (i.e., home, university/work, other places) and with different interlocutors (i.e., relatives, friends, strangers). We kept the same control factors as the basic model, namely animacy, register, age, and gender, and both participants and test items as random intercepts. In both models, we consider significant any fixed effect with a t-statistic value not included between -2 and 2.

RTs analysis

Besides accuracy, we explored how the judgements of the different language groups differ in terms of RTs (RQ I). Moreover, we examined whether RTs were modulated by acceptability judgements. To this aim, we selected a sum contrast for the Group variable, such that the monolingual group was set as the baseline level. To shed light on the role of acceptability judgements on RTs, we transformed the 1-5 Likert score to get a normal distribution by scaling the continuous variable. The LME included log-transformed RTs as the dependent variable. As fixed effects, we included the language group of the participants ("Monolinguals", "Bilinguals", "Agrigentino", "Pavese"), the acceptability judgement given to the stimulus (scaled), and the interaction between them. As control factors, we included the animacy of the NP distractors (sum contrast, two levels = "Animate", "Inanimate"), the register of the items (sum contrast, two levels = "High register", "Low register"), the chronological age of the participants (scaled) and the biological sex of the participants (sum contrast, two levels = "Male", "Female"). As random intercepts, we included participants and items. As we did for accuracy, we first fit the maximal model and if there were no convergence or singularities, we

simplified it [95]. Again, we started by removing the interactions in the slopes, then we removed the slopes with lower explained variance until reaching convergence. The final model included both participants and test items as random intercepts.

To inquire about specific variables of the bilingual experience (RQ II), we did a further analysis including both language use and language switching for bilingual and bidialectal participants. Once again, we excluded monolingual participants and we set the sum contrast for the Group variable with the bilingual group as the baseline level. This second LME for RTs included log-transformed RTs as the dependent variable. As fixed factors, we kept the language group of the participants ("Bilinguals", "Agrigentino", "Pavese"), the acceptability judgement given to the stimulus (scaled), and the interaction between them. As additional fixed factors, we added the percentage of language switching (scaled), the percentage of Italian language use (scaled), the percentage of use of the other language (scaled), and their interactions with language groups. The control factors were the animacy of the NP distractors, the register of the test items, age, and gender, and both participants and test items were set as random intercepts.

The effect of language group on Accuracy and RTs – RQ (I)

Accuracy

Fig 1 shows the mean accuracy rates for each language group. Italian-Agrigentino bidialectals record the lowest accuracy rates compared to all the other language groups. Italian-Pavese bidialectals show the highest rates, followed by monolinguals and bilinguals, who record similar accuracy values. Setting the monolingual group as the baseline level in our model, a significant difference in accuracy rates is found only between monolinguals and Italian-Agrigentino bidialectals ($t = -3.46$, S1 Table, Supporting Information), with bidialectals performing worse than monolinguals.

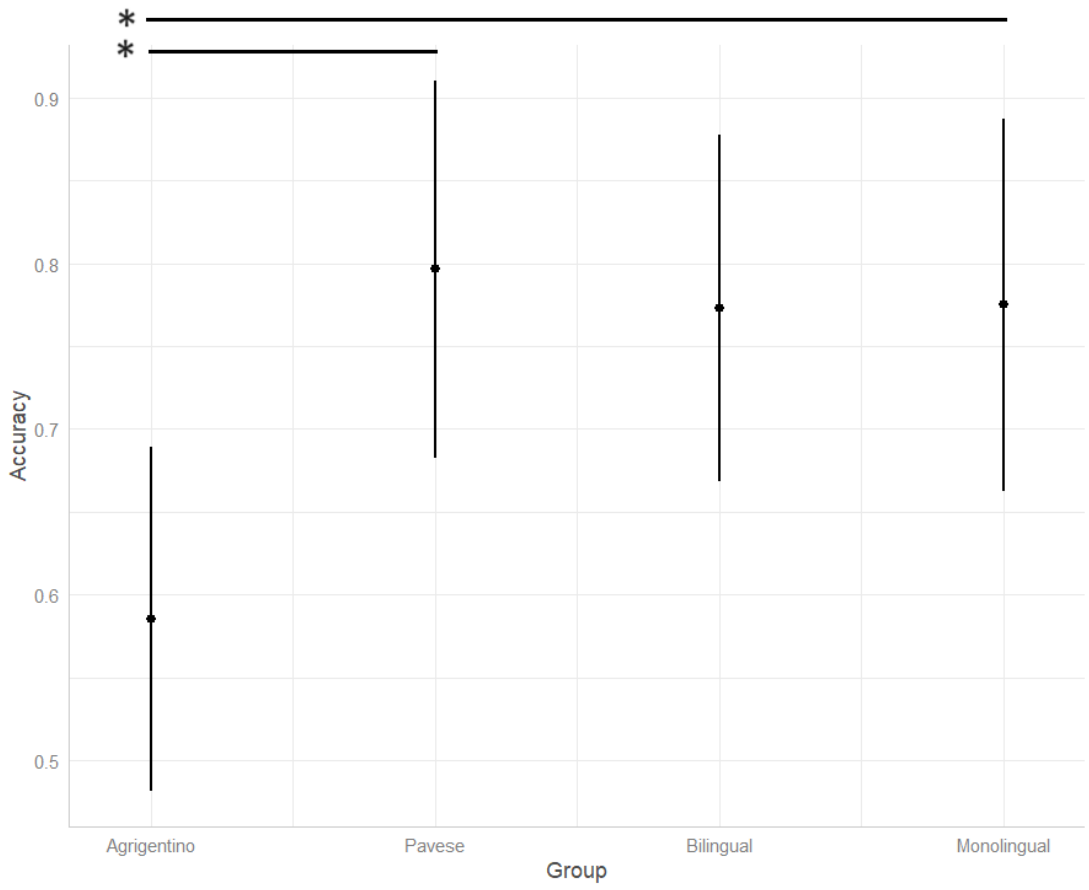

Fig 1. Accuracy rates for each language group. The x-axis represents the language groups, while the y-axis shows the mean accuracy rates from 0 (i.e., "Inaccurate") to 1 (i.e., "Accurate"). The vertical lines represent standard errors.

To inquire about possible differences between bilinguals and bidialectals, we reran the model setting the Italian-Pavese bidialectal group as the baseline level (S2 Table, Supporting Information). This analysis reveals a statistically significant difference between the two populations that use minority languages, with Italian-Agrigentino bidialectals recording lower accuracy rates compared to Italian-Pavese bidialectals (t = -3.46).

Regarding the control factors included in the model, a main effect of age is found (t = -3.05), with older participants being less accurate across all the language groups. Moreover, there is a main effect of Register with high-register sentences being evaluated less accurately compared to low-register ones (t = -2.06). To ensure that the model predictions are not influenced by the controlled factors, we calculated the collinearity coefficient between each fixed factor (VIF), which reveals that there is no correlation between them (S3 and S4 Tables, Supporting Information).

RTs

In our first RT analysis (S5 Table, Supporting Information), we find that Italian-Pavese speakers are the fastest to provide an answer, followed by the bilingual and the monolingual groups. The slowest group is the Italian-Agrigentino bidialectal group (Fig 2). Setting the monolingual group as the baseline level, the only statistically significant difference concerns the comparison between monolingual speakers and Italian-Pavese bidialectal speakers (t = -2.11). The only other comparison close to the significance threshold is the one between monolinguals and Italian-Agrigentino bidialectals (t = 1.80).

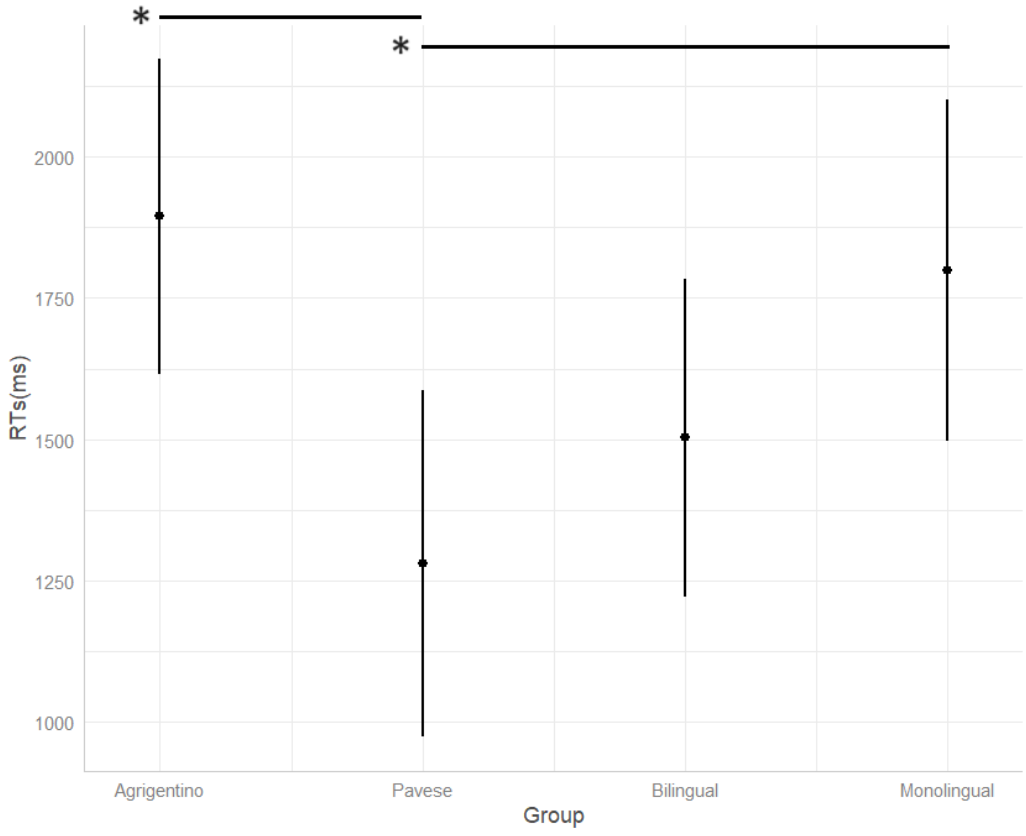

Fig 2. RTs for each language group. The x-axis represents the language groups, while the y-axis shows RTs in milliseconds recorded for each language group. The vertical lines represent standard errors.

To further delve into the comparisons between the two groups of minority language bilinguals, we reran the analysis, setting the Italian-Agrigentino group as the baseline (S6

Table, Supporting Information). The new model reveals that the Italian-Agrigentino speakers are significantly slower than the Italian-Pavese group (t = -2.11).

Fig 3 illustrates a more detailed distribution of RTs for each language group. Monolingual, bilingual, and Italian-Pavese bidialectal speakers show a similar distribution. Conversely, the Italian-Agrigentino bidialectal group shows the highest level of variation in the distribution of RTs.

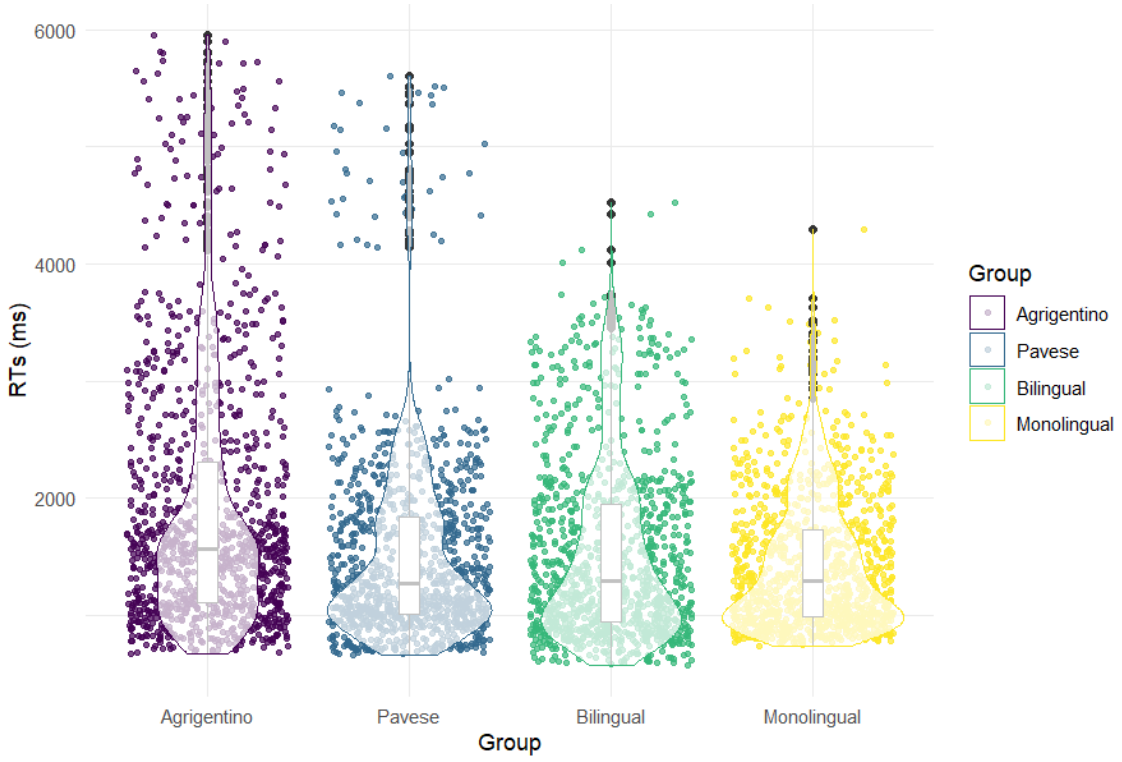

Fig 3. Distribution of RTs for each language group. The x-axis represents the distribution of RTs across various language groups. The y-axis reports RTs in milliseconds. The violin shapes represent data density, while the box plots represent standard deviations.

We also find a main effect of the acceptability judgement (t = 9.39, S5 Table, Supporting Information). The results show that the accurate detection of the Subject-Verb agreement mismatches, which corresponds to lower acceptability judgements, is associated with reduced RTs, while the acceptance of incorrect stimuli, which is reflected in higher acceptability judgements, corresponds to longer RTs. In other words, the more participants think of the stimuli, the more likely it is that they provide an inaccurate answer, not spotting the morphological mismatch. It is worth recalling that in this analysis the judgement values are included as a continuous, scaled variable rather than a binary one, as was done for accuracy

analyses. Interestingly, there is an interaction between acceptability judgements and language groups (t = -2.25, S5 Table, Supporting Information), revealing that while monolingual participants show a prominent difference between RTs associated with accurate vs. inaccurate judgements, such that inaccurate judgements are associated with longer RTs, the difference is less pronounced for Italian-Agrigentino bidialectal speakers, who exhibit only a minor difference in the time required to provide accurate or inaccurate judgements, as Fig 4 shows.

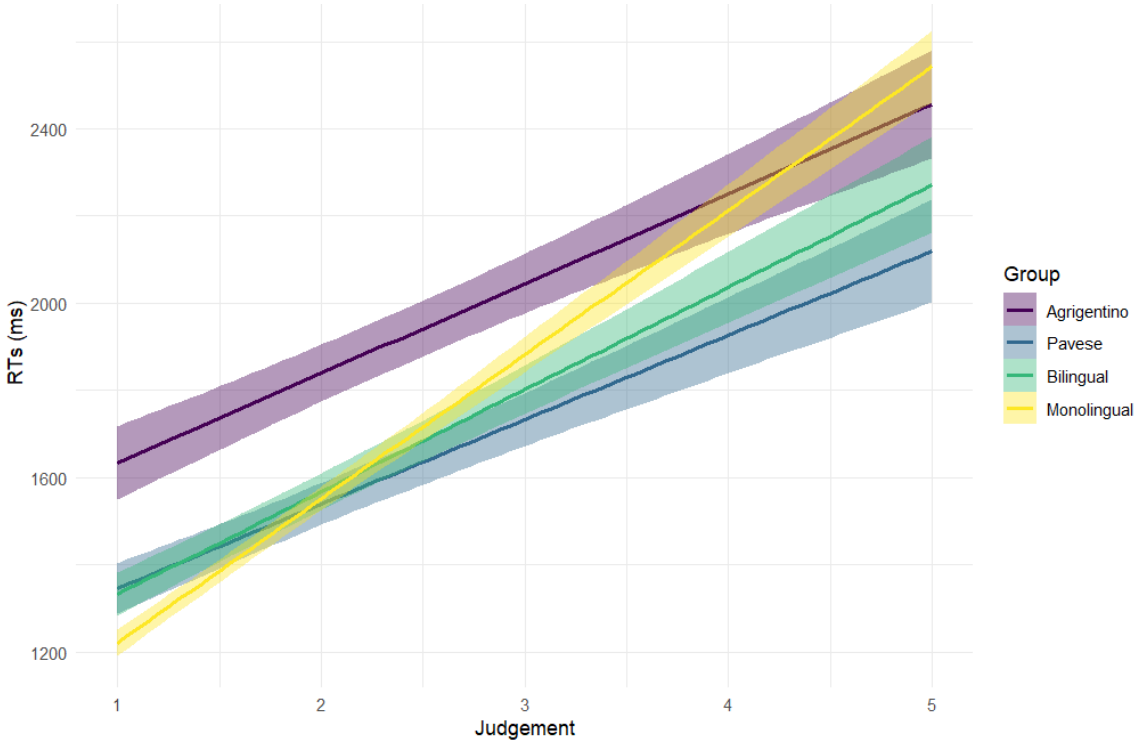

Fig 4. Interaction between Acceptability Judgment and Language group on RTs. The x-axis shows the acceptability judgements given to the stimuli. The y-axis reports RTs in milliseconds. The error ribbons represent 95% confidence intervals.

Consistent with what we reported for accuracy, a statistically significant effect of age is found (t = 3.76): Older participants show slower RTs compared to younger participants across all language groups. To ensure that the model predictions are accurate, we calculated VIF, which reveals that there is no correlation between fixed effect factors (S7 and S8 Tables, Supporting Information).

The effect of language practices on Accuracy and RTs of bilingual and bidialectal participants – RQ (II)

Accuracy

Our second GLME with accuracy as the dependent variable was run to determine whether the percentage of use of Italian vs. the other majority or minority language, together with the frequency of language switching, modulates accuracy rates. For variables related to switching and percentage of language use, we do not find any statistically significant effect of language group on accuracy, thus we do not find differences between bilingual and bidialectal groups. Setting the bidialectal groups as the baseline instead of the bilingual group, the effect of language group is still not statistically significant.

In line with the previous model of accuracy, the results presented in the Supporting Information (S9 Table) show that there is a main effect of age and register. Older participants are less accurate than younger participants and low-register sentences record higher accuracy rates compared to high-register sentences.

RTs

For this second LME with RTs as dependent variable, we are interested in seeing whether variables related to the language practices of bilingual participants with minority vs. majority languages modulate RTs. As we did in the second GLME of accuracy, we inquire about the effect of the percentage of use of Italian vs. the other language (henceforth, L2), and the percentage of language switching on RTs. For this purpose, we set these variables as fixed factors, together with the language groups, setting the majority language bilingual group as the baseline. We find a main effect of the percentage of daily L2 use (S10 Table, Supporting Information). Fig 5 shows that higher percentages of daily use of L2 (i.e., dialect for bidialectals and Spanish for bilinguals) correspond to faster RTs in providing an answer. However, when examining the main effect of the percentage of use of Italian (i.e., participants' L1), we do not find any statistically significant effect on RTs.

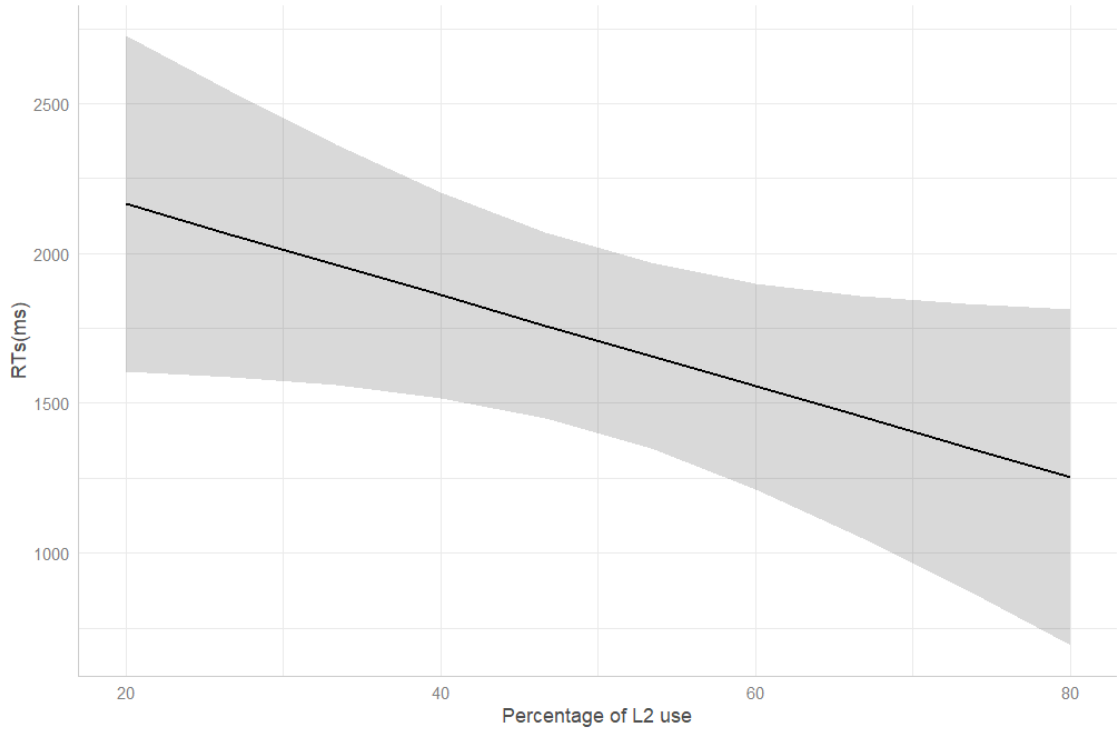

Fig 5. Main effect of the percentage of L2 use on RTs. The x-axis shows the percentage of time using the L2, while the y-axis reports RTs in milliseconds. The error ribbon represents 95% confidence interval.

There is a statistically significant interaction between language group and the percentage of language switching. In particular, bilinguals and Italian-Pavese bidialectals show opposite trends (t = 2.33): Fig 6 shows that, for Italian-Pavese bidialectals shorter RTs correspond to lower percentages of language switching. For bilinguals, instead, higher percentages of language switching are associated with shorter RTs.

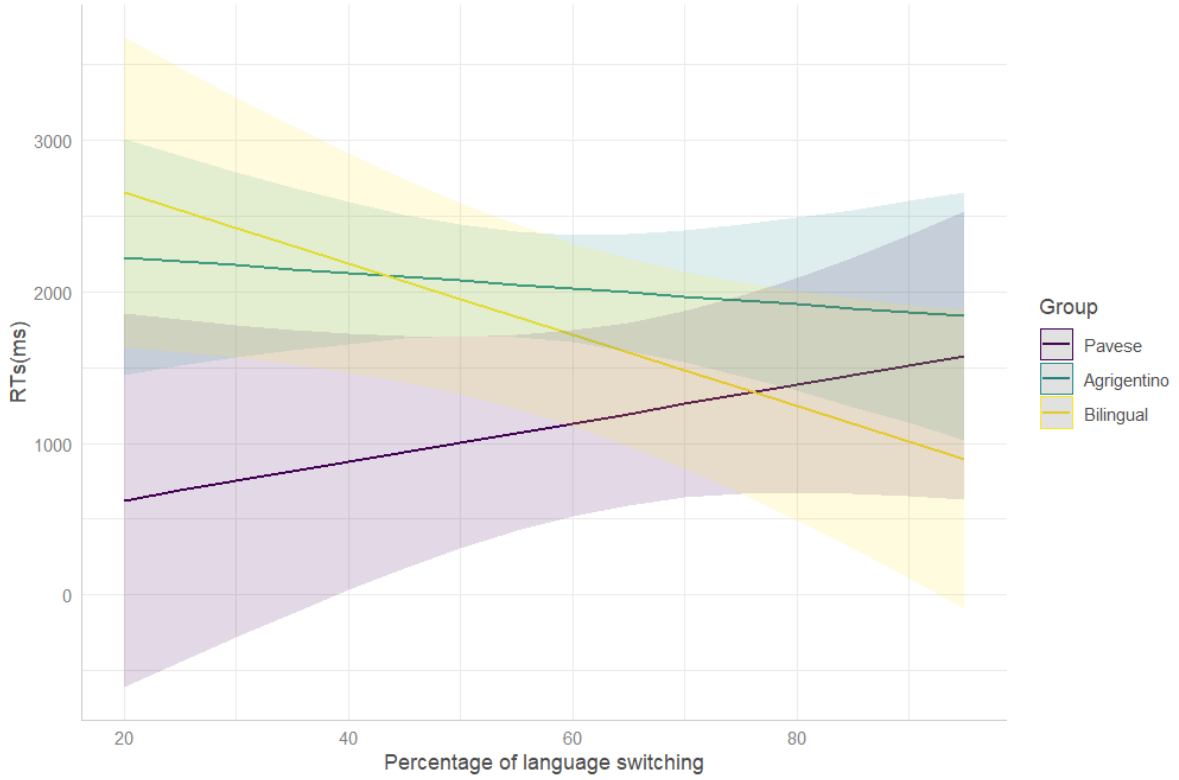

Fig 6. Interaction between the percentage of language switching and Language group. The x-axis shows the percentage of language switching. The y-axis reports RTs in milliseconds. The error ribbons represent 95% confidence intervals.

As in the previous model for RTs, a statistically significant effect of age on RTs is found (t = 3.21): Older participants show longer RTs compared to younger participants.

In order to reveal potential differences between the two minority language-speaking groups, we reran the model setting the Italian-Agrigentino group as the baseline (S11 Table, Supporting Information). We find an interaction between language group and percentage of language switching. In particular, we observe a statistically significant difference between Italian-Agrigentino speakers and both Italian-Pavese speakers (t = 2.33) and bilingual speakers (t = -2.87). Contrary to what we found for bilinguals and Italian-Pavese speakers, the performance of the Italian-Agrigentino group does not show crucial changes in RTs according to higher or lower percentages of language switching.

Discussion

The goal of the present study is to explore how bilingualism influences the linguistic processing of agreement attraction errors. The language of testing is Italian, which amounts to the only native language of the monolingual group and one of the native languages of the bilingual/bidialectal groups. In this regard, three possible scenarios have been proposed [56]: (i) Greater processing difficulties for bilinguals compared to monolinguals, (ii) better bilingual performance in spotting agreement mismatches, since bilinguals' executive control components are regularly trained to suppress linguistic interference, and (iii) similar attraction effects between bilinguals and monolinguals. Our overall findings do not squarely fit into one of these predictions; instead, they fall into different scenarios according to the linguistic profile of the participants.

This study addresses 2 RQs: First, we are interested in observing whether there is a difference in monolingual and (minority vs. majority language) bilingual processing in comprehension tasks. Second, we want to shed light on whether there is an effect of specific sociodemographic and sociolinguistic variables of the bilingual experience, such as language switching practices and language use, on the processing of morphological mismatches. Regarding RQ I, the comparison between monolingual, bilingual, and bidialectal processing of attraction errors does not reveal significant differences between monolingual and bilingual speakers of standard languages (i.e., Italian and Spanish) either in accuracy or in RTs (Figs 1 and 2). This result is in line with previous literature, which reported similar processing outcomes for monolingual and bilingual speakers of standard languages [see 56 for Greek-German bilinguals; 58 for Spanish-English bilinguals; 59 for Russian-German bilinguals]. Additionally, a common trend is found for all monolingual, bilingual, and bidialectal participants: All participants show longer RTs when they give inaccurate, non-target answers. This finding too is in accordance with previous studies which reported faster decisions for correct judgements compared to incorrect judgements [58,96]. Since our experiment includes auditory stimuli that could only be played once, it is possible that sentences that sounded somewhat incorrect or dubious were carefully reinterpreted in an effort to search for and get a possible meaning assigned. Inevitably, this process increases the reaction window for making a decision and selecting a judgement.

Interestingly, a significant difference concerns monolinguals and minority language bilinguals: Italian-Agrigentino speakers show lower accuracy rates and longer RTs compared

to their monolingual peers. Contrarily, Italian-Pavese bidialectals show higher accuracy rates compared to Italian-Agrigentino bidialectal participants and shorter RTs compared to both the monolingual baseline and the Italian-Agrigentino bidialectals. These findings stress the importance of differentiating between bilingual phenotypes when analyzing language processing outcomes [71,75,77]. Indeed, finding a significant difference between monolinguals and bidialectals, but not between monolinguals and bilinguals of standard, majority languages leaves room for hypothesizing that variation in language processing is intimately connected to the sociolinguistic dimension of language development and use.

Our explanation about the lower accuracy of Italian-Agrigentino bidialectal speakers boils down to two factors. The first one concerns how Italian-Agrigentino bidialectals use their two languages. In this linguistic community, Standard Italian and the Agrigentino dialect are not rigidly demarcated: The two linguistic systems coexist in different contexts and there is no strict norm about how and when one of the two languages should be used. The consequence is that Italian-Agrigentino speakers do not need to make a constant mental effort to keep their two linguistic systems strongly separated, so the amount of cognitive control employed in suppressing the interference of the second language is considerably reduced compared to other bilingual and bidialectal communities. The special role of dialects in the southern regions of Italy, and specifically in Sicily, where Agrigentino is spoken, is attested by data from Istituto Nazionale di Statistica (ISTAT) [66] which distinguishes southern regions from most of the northern Italian regions (with some exceptions such as Veneto and Friuli Venezia Giulia). In the specific case of Sicily, the prominent role of the dialect is also acknowledged in previous literature [97,98], which reports a strong fusion between the standard language (i.e., Italian) and the dialect in the Sicilian panorama. This picture is confirmed by the results of this study, where Italian-Agrigentino bidialectals report higher proficiency in their dialect and higher percentages of dialect use compared to their Italian-Pavese bidialectal peers. Moreover, the blurred boundaries between Standard Italian and the Agrigentino dialect are confirmed by the short interactions that the experimenter had with some of the Italian-Agrigentino bidialectal participants during data collection: Despite not being part of the Agrigentino ingroup, the experimenter was often addressed in a linguistic variety which presented evident dialectal elements and, sometimes, in the dialect itself. The sociolinguistic situation of Agrigento can be traced back to a dynamic of language cooperation [75]: Driven by social conventions, bidialectal speakers in Agrigento might not feel the need to strongly monitor their linguistic behavior in terms of which is the appropriate variety to use. Importantly, having to continuously monitor external cues in order to be able to appropriately switch between

languages engages cognitive control regions in the brain [99]. In terms of bilingual effects on language processing, the lack of constant exercise in inhibiting one of the two languages would explain the absence of an overall bilingual advantage in suppressing distracting information [52,53], such as the distractor behind the mismatching number in our stimuli. The wide degree of freedom with respect to language use and the low entropy that characterize language practices in Agrigento would not be comparable to a situation of language competition [75] nor to the dual language context described by the Adaptive Control Hypothesis, which instead could lead to enhanced inhibitory control [1].

Why would Italian-Agrigentino bidialectals perform worse than monolinguals in terms of spotting attraction errors (Fig 1), if monolinguals do not develop any special inhibition abilities either? This question leads us to our second point about the performance of Italian-Agrigentino bidialectals, which concerns the linguistic features of the varieties spoken in Agrigento. More specifically, the boundaries between the use of Italian and the dialect are very nuanced in Agrigento. The thick linguistic contact between Italian and Agrigentino results in a dense exchange of linguistic traits from one system to another [65,100]. Thus, the type of Italian spoken in Agrigento is strongly characterized by dialectal features, and the same happens to the dialect, which includes linguistic elements of Italian, especially in the lexical domain. The higher percentages of language switching reported by Italian-Agrigentino bidialectals (Table 1) further support this claim: In those sociolinguistic contexts where Italian and the dialect overlap across different communicative domains, as happens in Agrigento, the frequent language-switching practices lead to a fusion between the codes, something less likely to happen in contexts where the two codes are kept more separated [101].

As a result, Agrigento is characterized by a linguistic *continuum* where Standard Italian is deeply influenced by dialectal traits [see 102 for Sicily; 103-106 for Italy]. In this context, we explain the results of the Italian-Agrigentino group by highlighting the constant use of a strongly influenced linguistic system, where traits belonging to another language (in this case, the dialect) are not only accepted but may further lead to a higher tolerance with respect to what does not conform to the expected linguistic norm (e.g., grammatical deviations such as agreement mismatches). This is very likely to occur in sociolinguistic contexts where a standard language and a non-standard language co-exist since the latter is not defined by linguistic standardization [107-110]. In contrast, in bilingualism with standard languages, the two linguistic systems may be more rigidly demarcated, and rather than being on a linguistic continuum where structural traits from different languages are mixed, they are separately used by the speaker in a more defined code-switching mode [see 111 for the specific situation of

Italian dialects; 112,113]. This brings to the fore the critical issue of *language proximity*: The closer two varieties are, the more likely it is that, if sociolinguistic conditions permit, they may result in a mixed lect that incorporates elements from both in certain contexts.

The concept of linguistic continuum introduced for the Italian-Agrigentino community can also explain our results for the Italian-Pavese bidialectals, who showed reduced RTs compared to both their Italian-speaking monolingual peers and the Italian-Agrigentino group. In this case, the common denominator behind the performance of Italian-Agrigentino and Italian-Pavese bidialectals concerns the relation between the dialect and Standard Italian. Similar to what was described for Agrigentino, the boundaries between Pavese and Italian are more blurred compared to what would be expected if two standard languages were involved. However, what differentiates Pavia from Agrigento is the sociolinguistic function ascribed to the dialect: While in Agrigento the dialect and Standard Italian co-exist in most communicative settings, the use of dialect in Pavia is limited to specific contexts, and the free interchange between dialect and Standard Italian is less frequent [66]. This leads to a situation in which Italian-Pavese bidialectal speakers pay attention to the communicative context in which they use their dialect. Consequently, Italian-Pavese bidialectals need to (i) regulate the use of the dialect in settings where free switching is less common, and (ii) differentiate between two linguistic systems that exist along a continuum. The need of selecting the proper language to use and of disentangling between two tightly connected varieties could potentially strengthen their language control skills. This could explain the Italian-Pavese bidialectals' faster performance compared to monolinguals and Italian-Agrigentino bidialectals and their higher accuracy rates compared to Italian-Agrigentino bidialectals. Bilingual speakers who are used to making an effort to keep their two close systems separate could benefit from this training in a task that requires the inhibition of distracting information. Thus, the higher accuracy of the Italian-Pavese group could be interpreted as the effect of the specific sociolinguistic landscape in Pavia, where a more careful distinction between Standard Italian and dialect is required.

Our interpretation of the results highlights once again the importance of considering the sociolinguistic dimension of the bilingual experience. Indeed, although the Italian-Agrigentino and Italian-Pavese groups both include bidialectal speakers of a majority and a minority language, they differ in terms of language practices. For the sake of clarity, the distinction made by Berruto [104] between social bilingualism, diglossia, dilalia, and bidialectalism (Table 2) could aid in understanding the degrees of variation which characterize our bidialectal communities. While the sociolinguistic context of Agrigento can be identified as a situation of dilalia that resembles bidialectalism, the Italian-Pavese community can be more accurately

described as a situation of dilalia which, to some extent, is closer to diglossia. While in a situation of diglossia, users associate each of their codes to specific social contexts (i.e., "high code"/Standard Italian in official and formal settings vs. "low code"/dialect in informal settings), in a dilalic context, the two codes can overlap in different communicative situations [114-117].

Table 2. Criteria for the identification of four linguistic repertoires. Table adapted from Berruto [104, p206].

Criteria	Social Bilingualism	Diglossia	Dilalia	Bidialectalism
Different sensibility between A and B	/	+	+	-
Use of both A and B in ordinary conversations	+	-	+	-
Clear functional difference between A and B	-	+	+	?
Overlap of A and B in different domains	+	-	+	+
Standardization of B	/	+	-	-
B socially marked	/	-	+	+
Continuum between A and B	/	-	+	+
A has high social prestige	/	+/-	+	+
A and B both present in primary socialization	/	-	+	+
Possibility of promoting B as alternative code of A	/	+	+	-
Frequent code-switching between A and B	+	-	+	?
Literary tradition for B	/	+/-	+	-

The absence of different sensibility towards the two varieties which characterizes bidialectalism (Table 2) reflects the linguistic dynamics in Agrigento, where Italian-Agrigentino bidialectals might not need to strongly monitor switching between their varieties

and, consequently, they treat them similarly. On the other hand, the lack of overlap between the two linguistic systems, which Berruto [104] ascribes to a situation of diglossia, is more typical of the sociolinguistic contexts of Pavia, where speakers tend to pay more attention to the proper language to use in different contexts.

With respect to potential differences between bilingualism with standard/majority vs. non-standard/minority languages, our analysis of the role of specific factors related to language use reveals interesting findings. The analyzed factors concern language use in terms of time speaking the languages and the percentage of language switching. Based on the comprehensive sociolinguistic questionnaire data we collected, our findings demonstrate that language processing outcomes can significantly change together with variables associated with specific language practices (i.e., RQ II). In particular, we find a negative relation between RTs and the percentage of L2 use. A possible explanation for this could be traced back to heightened awareness of the demarcation between the two distinct language systems, resulting from more time spent using the second language. This might lead to shorter RTs in a task involving just one of the two languages [118].

Besides the percentage of L2 use, another sociolinguistic factor that seems to play a role on RTs is language switching. An interesting difference is observed between bilinguals and Italian-Pavese bidialectals. While higher percentages of switching are associated with shorter RTs in bilinguals, the opposite trend is recorded for Italian-Pavese bidialectals (Fig 6). The negative relation between switching and response latencies found in bilinguals may suggest that the constant juggling between two languages trains the parser, leading to a faster performance [8-10,119]. However, the absence of a main effect of switching, the opposite patterns found in Italian-Spanish bilinguals and Italian-Pavese bidialectals, and the lack of interaction between switching and language group in the further analysis of bilinguals' and bidialectals' accuracy rates do not allow further speculations on the possible advantages of language switching for our bilingual participants. The main explanation could be related to the employed task. Seeing that monolinguals perform almost at ceiling in spotting attraction errors, task granularity concerns [7] become relevant: If monolinguals already perform at ceiling in a task, possible bilingual effects will not be found, not because they do not exist, but because the task is not sensitive enough to reveal potential differences between the different groups.

Contrary to majority language bilinguals, Italian-Pavese bidialectal speakers show longer RTs when higher percentages of switching between Standard Italian and dialect are reported (Fig 6). Once again, this finding can be attributed to the difference between the linguistic systems involved in the bilingual experience. Majority language bilinguals might

have clearer boundaries between their two standard languages, while minority language bilinguals who use non-standard varieties may encounter greater challenges in distinguishing between two linguistic systems that exist on a continuum. This difficulty in disentangling the linguistic systems can potentially result in longer RTs during language processing for those bidialectal participants who report frequently switching practices between Standard Italian and dialect, reflecting a greater degree of "fusion" between the two languages. Consequently, when the bidialectal participants are asked to make a judgement in just one of their linguistic systems, they may require additional time to disentangle their tightly interconnected languages and focus on only one of them. This interpretation of results might seem contradictory to our previous explanation for shorter RTs of Italian-Pavese bidialectals compared to their monolingual peers (Fig 2). However, there are two main differences between the two sets of results: (i) First, longer RTs are associated with higher percentages of language switching, a variable that was missing in the first analysis; (ii) second, RTs of Italian-Pavese bidialectals are longer compared to bilinguals, not to monolinguals. The crucial difference between the two apparently inconsistent findings should be ascribed to the role of language switching and how it is shaped by the bilingual communities under study. Language switching might be different for bilingual speakers of standard and non-standard languages. Despite the fact that we define both practices with the same term "language switching", bidialectals who report frequently switching between Italian and dialect might behave differently from bilinguals: Rather than a proper switching between the standard and non-standard variety, a higher frequency of alternation between the two close systems might result in the use of a mixed variety, which allows for the coexistence of traits from both languages [111].

Moreover, considering our hypothesis that longer RTs are associated with frequent switching practices in Italian-Pavese bidialectals, it is reasonable to expect a similar performance for our Italian-Agrigentino bidialectal group. However, Fig 6 shows that the impact of language switching on the RTs of Italian-Agrigentino speakers is less pronounced than their Italian-Pavese peers. This result stresses once again the presence of variation across bilingual and bidialectal trajectories, which can be traced back to differences in the sociolinguistic contexts and, in turn, in linguistic practices between Pavia and Agrigento.

Taken together, the effects of time of language use and language switching confirm the importance of considering different variables of the bilingual experience and interpreting results according to the specific sociolinguistic context behind each bilingual profile. While some sociodemographic factors play a similar role across different bilingual populations, as shown by finding longer RTs for older participants in all language groups, the role of other

variables seems to vary according to the social context of bilingualism and the status of the languages themselves.

Conclusions

The present study focused on the effect of majority vs. minority language bilingualism on the processing of agreement attraction errors. Our results did not reveal significant differences between monolingual and bilingual speakers of standard languages in terms of accuracy or RTs. Instead, differences were found between Italian-speaking monolinguals and the two bidialectal groups that use Standard Italian plus a minority language: Italian-Agrigentino bidialectals were less accurate than monolinguals in spotting agreement mismatches and they were also slower in providing an answer, while Italian-Pavese bidialectal speakers showed a faster performance in RTs compared to their monolingual peers. Additionally, different processing outcomes were observed for bilinguals and bidialectals when variables related to language use were considered: Frequent switching practices led to shorter RTs in bilingual speakers of standard languages, while Italian-Pavese bidialectal participants showed the opposite trend. Interestingly, some degree of variation was also found between the two bidialectal groups: Italian-Pavese bidialectals were faster and more accurate than their Italian-Agrigentino peers.

These results suggest the importance of differentiating between specific bilingual profiles and considering the environmental ecology of bilingual communities. Indeed, being bilingual is not limited to having more than one linguistic system in the brain. Rather, the key focus lies in understanding how these languages coexist and how they are employed in different contexts, settings, and registers. Variables such as standardization, minority vs. majority status, language use, and language switching should not be perceived as isolated values since they interact with each other and are shaped by the environment in which bilingual speakers live. A clear example comes from the bidialectal participants tested in this study. Their unique bilingual profiles entail different relations between the two languages, which are shaped by the sociolinguistic norms of use ascribed to each language. Indeed, language practices can influence the degree of “fusion” observed among the two co-existing varieties, leading to different processing outcomes. Thus, our findings corroborate the need for considering the sociolinguistic ecologies of bilingual communities [71,74,120], especially in situations where non-standard, minority, or regional varieties are involved, because these further invest the

bilingual profile with significant variation. Devoting attention to the specific factors behind each bilingual experience could help us figure out where the cognitive effects of bilingualism stem from; an insofar open question with significant repercussions for the overall ability of the field to explain the results in terms of a coherent theory [22].

Among the limitations of our work, we would like to highlight the issue of adequate sampling and representation of minority language users who come from multidialectal communities that show considerable variation. Future work on larger and more diverse samples could add to our claims as well as clarify the impact of individual differences among participants. Furthermore, replicating our research while using different language groups will provide further insights into the role of various sociolinguistic variables, helping us to pinpoint the key factors that affect language processing. All in all, if we manage to ascribe bilingual effects to specific environmental conditions, the apparent inconsistency of results in bilingualism research could possibly be justified and explained as variation caused by the distinct sociolinguistic factors that synthesize every linguistic experience.

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Chapter 4

Register variation and linguistic background modulate accuracy in detecting morphosyntactic errors

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Abstract

Linguistic register is defined as a variety of language shaped by different situational settings. Adapting to register is crucial for successful communication and involves the processing of language features related to register variation. Nevertheless, few studies have focused on the impact of linguistic register on language processing. Our research investigates whether register variation affects the detection of linguistic errors. To determine if linguistic background further impacts the way we deal with register, our sample includes monolingual, bilingual, and bidialectal participants. All groups completed an acceptability judgement task in Italian that features Subject-Verb agreement mismatches presented in high and low register. The results reveal a significant impact of linguistic register on accuracy: Morphosyntactic errors are better detected in low-register stimuli. Furthermore, different trends characterize the tested groups. While monolinguals show similar accuracy rates for low- and high-register sentences, the bilingual groups tend to better spot errors in low-register stimuli. Our findings suggest that register plays an important role in the processing of morphosyntactic errors, highlighting the need to consider both its cognitive and social dimensions. Moreover, the variation observed among the tested groups underscores that language processing can be influenced by factors related to the sociolinguistic dimensions of each linguistic community.

Keywords: linguistic register variation, language processing, bilingualism, bidialectalism.

1. Introduction

Adapting our language to the communicative context is crucial for effective communication. Imagine yourself in a rush, with only 5 minutes before your train departs, and you need to encourage people to head toward the platform. The way you express yourself would vary based on the setting. If you are with friends enjoying a beer, you might say “come on, guys, we’ll miss the train!”. If you are with new colleagues at a work lunch, you might opt for a more formal phrasing like “perhaps it might be a good idea to make our way to the platform?”. Although both sentences convey the same message, they belong to different registers.

Linguistic register is defined as a variety of specialized language shaped by specific situational features, linguistic functions, social contexts, and communicative purposes (Biber & Conrad, 2009; Pescuma et al., 2023). The term “register” was used for the first time with

this meaning in 1956, to point out that people "on different occasions speak or write differently according to what may roughly be described as different social situations" (Reid, 1956: 32). From this definition, two main features stand out: The variation that characterizes linguistic register (Matthiessen, 2019), and the pivotal role of the context of use in shaping this variation (Małinowski, 1923; Goulart et al., 2020).

Over the years, register has been the focus of different linguistic and cognitive models. Within the former, the SPEAKING model (Hymes, 1974) achieved significant resonance and focused on how register variation is shaped by different elements of the communicative context in which language interactions occur (i.e., setting, channels, goals, speech act interactions, manner, norms, and genre). Among the latter, van Dijk (2005; 2008) proposed a model that provides insights into the acquisition of register knowledge by interlocutors, enabling them to appropriately adapt their language use in various communicative and situational settings. Starting from the assumption that "social structures, participant roles, actions, time or place, etc. simply have no way to influence discourse directly, and cannot be influenced directly by discourse either" (van Dijk, 2005, p. 75), van Dijk hypothesized the existence of a cognitive interface between communicative situations and linguistic acts. This led to the proposition of *context models*, namely mental models which concern the situational settings where different communicative acts take place. People develop context models by associating mental models of events with specific conversational outcomes characterized by distinct linguistic features. Crucially, context models encompass both the cognitive and the social dimension simultaneously. In Keller's (2021: 60) words, they are "language-specific instantiations of a domain-general psychological process". Through context models, people acquire register background knowledge, which allows them to process specific language features arising from register variation.

Although linguistic register plays a role in language processing (Keller, 2021), few studies have explored the link between the two. Among these, Bentum et al. (2022) investigated whether word expectation is influenced by the register of the speech input, by comparing generic, register-specific, and register-mismatch word surprisal, and found that listeners are sensitive to variation of linguistic register with consequences on language processing. Pescuma et al. (2022) focused on the effect of context formality-register congruence on language processing during comprehension. Their results revealed longer reading times for both register mismatches and sentences rated as more formal, suggesting that register information is integrated during online sentence processing.

An effective method for investigating the impact of linguistic register on language processing could involve the employment of acceptability judgements (AJs), which have been argued to offer insights into language processing mechanisms (Myers, 2017). In the context of linguistic register and AJs, Schütze (1996) brought attention to a notable gap in the literature: While the sociolinguistic field has often focused on linguistic register, no language processing studies tested its possible confound effect on acceptability. To this day, few studies have used AJs to delve into the effects of linguistic register on language processing. Rotter & Liu (2022) focused on the role of register effects on linguistic phenomena related to negation in different varieties of English (i.e., American vs. British English). They elicited appropriateness ratings by manipulating variables related to the linguistic context (i.e., formal vs. informal) and the degree of confidence between speakers and found that negative concord was perceived as less appropriate in formal contexts compared to informal ones. Although not strictly categorized as an AJ task, Wiese et al. (2022) applied a similar technique, namely the newspaper correction method, to investigate the acceptability of contact linguistic features in a formal written register. This technique consists of asking participants to correct improper language use as if they were the editors of a newspaper. Participants showed a systematic difference in the way they corrected stimuli, and this difference was led by register variation.

Given the scarcity of research on the impact of linguistic register on language processing, our study aims to contribute towards filling this knowledge gap, by focusing on a specific linguistic phenomenon, namely Subject-Verb agreement mismatches. These mismatches amount to morphosyntactic errors where the verb agrees not with its subject, but with a distracting element that lies between the subject and the verb. The aim is to examine whether a more (in)formal linguistic register strengthens or weakens the ability to detect morphosyntactic errors, eventually shedding light on the role of linguistic register as a potentially independent domain within our language system. This would result in a better conceptualization of linguistic register, broadening its definition beyond mere cultural or social aspects of language use and leading to a more comprehensive understanding of it as a psychological phenomenon (Keller, 2021).

To achieve this aim, we employ a comparative perspective that includes monolingual and bilingual populations that use different minority and majority languages. If we consider register knowledge as an inherent component of users' linguistic repertoires, it is reasonable to expect that individuals with different linguistic backgrounds exhibit some variation in the way they navigate the demands of various linguistic registers (Wiese & Rehbein, 2016). This difference could stem from the quantity and type of the received linguistic input: People with

diverse linguistic trajectories may vary in the situational and communicative contexts in which they learn and use their languages (Backer & Bortfeld, 2021; Leivada et al., 2021 *inter alia*), and this could, in turn, affect their competence in handling register variation in their languages. Within this line of research, previous literature revealed that monolingual and bilingual speakers show different patterns of linguistic register use, and further variation has also been found between different bilingual communities (Kostina & Siegal, 2021 for English-Hebrew vs. Russian-Hebrew bilinguals; Bunk, 2021 for Turkish-German bilinguals).

In this context, the research questions (RQs) we seek to address are the following: (I) Does register modulate the ability to detect morphosyntactic errors? (II) Does register variation play the same role in detecting such errors in monolingual and bilingual populations?

2. Materials and methods

2.1 Participants

Our sample consists of 108 neurotypical adult speakers who were split into 4 language groups: Italian-speaking monolinguals (n = 27), Italian-Spanish bilinguals (n = 27), Italian-Pavese bidialectals (n = 26), and Italian-Agrigentino bidialectals (n = 28). The bilingual group includes mainly Italian L1-Spanish L2 bilinguals, but also trilingual speakers of Italian, Spanish, and Catalan, which constitute 22% of the group. The bidialectal groups include speakers from two different Italian bidialectal communities that feature minority languages, one from the north of Italy (i.e., Pavia), and one from the south (i.e., Agrigento).

Both bilingual and bidialectal participants reported high levels of proficiency in their respective languages. In the monolingual group, few participants reported some basic or intermediate knowledge of English or another language, and in some cases, they declared to have minimal knowledge of their local dialect, which is common in the Italian linguistic landscape. We classified participants as monolingual based on pre-defined measures of language use. Specifically, those participants who chose “never” or “few times” on a 5-point scale (i.e., “never”, “few times”, “sometimes”, “often”, and “always”) that asked about speaking, reading, and writing in the dialect/other language were included in the monolingual group. Furthermore, inclusion in the monolingual group required that their proficiency was limited to passive knowledge of the dialect. Proficiency was assessed through self-reported measures gathered using a granular sociolinguistic background questionnaire based on the LSBQ (Anderson et al., 2018), which also included questions about sociodemographic

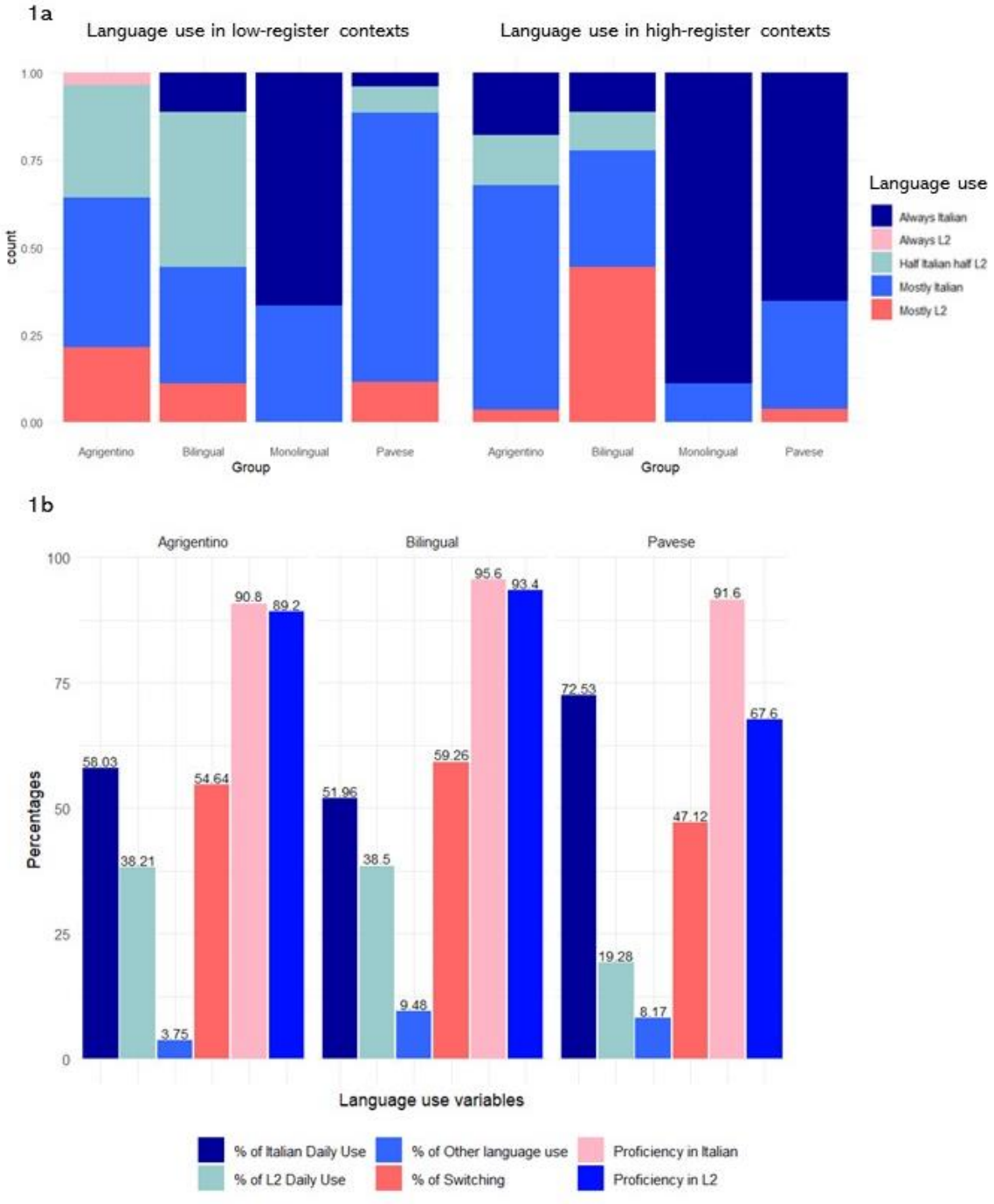
information, language use, and language attitudes. Regarding our use of the term "monolingual", a clarification is due. Although the participants included in our monolingual group reported to have only limited knowledge of dialect/other languages, this does not entail the existence of "pure monolinguals" in our sample (Figure 1a). We embrace the concept that bilingualism exists on a continuum rather than as a binary condition. Thus, we will use the term "monolingual" for the sake of simplicity, while acknowledging that it denotes the lower end of the continuous spectrum of bilingualism.

Table 1 illustrates the participants' demographics, while Figure 1 shows specific patterns of language use across high and low registers (1a), together with variables related to bilingual and bidialectal language use and proficiency (1b). More details about the participants, together with the sociolinguistic questionnaire they completed, are available at: https://osf.io/gwdq3/?view_only=0aa86eb7b42d478d80a616d657da9bdc

Table 1. Participants' demographics.

	Monolinguals	**Bilinguals**	**Italian-Pavese bidialectals**	**Italian-Agrigentino bidialectals**
N	27(18F)	27(20F)	26(19F)	28(14F)
Age	26.7 (3.9 SD)	37.5 (10.9 SD)	46.3 (16.5 SD)	34.1 (13.2 SD)
Education	Secondary 5 Tertiary 22	Secondary 7 Tertiary 20	Primary 1 Secondary 13 Tertiary 12	Secondary 11 Tertiary 17

Figure 1. Panel 1a: Patterns of language use for each language group. Panel 1b: Linguistic variables for bilinguals and bidialectals. Italian language use, second language (L2) use, other language use, language switching, and self-rated proficiency are reported in percentage.



2.2 Procedure

Before taking part in the experiment, all participants gave written informed consent to participate voluntarily, in compliance with the Declaration of Helsinki. Data collection started

in December 2022 and ended in April 2023. Participants were recruited both through invitations posted on social media platforms and in person. The Ethics Committee for Research into People, Society and the Environment (CEIPSA) at University Rovira i Virgili reviewed and approved the study protocol (approval number: CEIPSA-2022-TD-0032).

The experiment was run in Gorilla (gorilla.sc) and consisted of two parts. The first part included a sociolinguistic self-assessment, using a modified version of the LSBQ (Anderson et al., 2018). In the second part, participants completed an auditory timed AJ task in Standard Italian. Before starting the experiment, a brief warm-up session took place to confirm participants' comprehension of the task and to ensure that they had appropriately adjusted the volume of their devices. The entire experiment lasted between 30 and 40 minutes. The task, the dataset, the sociolinguistic questionnaires, and the R script used to run the analyses are available at: https://osf.io/gwdq3/?view_only=0aa86eb7b42d478d80a616d657da9bdc

2.3 Task

The task collected AJs on a 5-point Likert scale and reaction times (RTs). Aiming for a 2:1 ratio between fillers and test items and a 1:1 ratio between grammatical and ungrammatical stimuli (Stowe & Kaan, 2006), the task involved 120 auditory prompts presented in Standard Italian, split into 40 test items, 60 grammatical fillers, and 20 ungrammatical fillers. The test items consisted of ungrammatical sentences that featured Subject-Verb agreement mismatches. They were divided into 2 conditions: Half of the test items (n = 20) were presented in a low linguistic register (examples 1a and 2a), while the other half (n = 20) were presented in a high linguistic register (examples 1b and 2b). The semantic content of low- and high-register sentences was the same, as examples (1) and (2) illustrate. Importantly, the register variation in our stimuli was manipulated by modifying lexical items and does not encompass changes in the syntactic structure of the sentences, which remains consistent across both low- and high-register stimuli. To ascertain a clear distinction in linguistic register between high- and low-register stimuli, we ran a pilot test on a sample of 6 neurotypical adult speakers of Italian, who were not subsequently included in the final sample. The pilot sample was balanced for age, gender, and region of origin in Italy. This approach ensured that low-register sentences, which included idioms, were universally perceived as such by Italian speakers across the entire Italian peninsula. For each condition (low vs. high register), 10 items included animate noun-phrase (NP) distractors (1a and 1b), while the other 10 items presented inanimate NP distractors (2a and 2b).

(1a) *L’incontro tra gli insegnanti nuovi sono un buco nell’acqua.
The meeting.NOUN.SG between the new teachers.NOUN.PL be.3PL a hole in the water
‘The meeting between the new teachers make a hole in the water.’

(1b) *L’assemblea tra i docenti nuovi non giungono a nessun accordo.
The meeting.NOUN.SG between the new teachers.NOUN.PL not lead.3PL to any deal
‘The meeting between the new teachers do not lead to any deal.’

(2a) *La proposta per i progetti futuri non sono farina del suo sacco.
The proposal.NOUN.SG for the projects.NOUN.PL upcoming not be.3PL flour of her/his bag
‘The proposal for the new projects are not in her/his wheelhouse.’

(2b) *La proposta per i progetti futuri non derivano da una sua idea.
The proposal.NOUN.SG for the projects.NOUN.PL upcoming not come.3PL from a her/his idea
‘The proposal for the upcoming projects do not come from an idea of her/his.’

Some of the grammatical fillers (n = 40) had the same syntactic structure as the test items but with correct Subject-Verb agreement. The rest of the grammatical fillers (n = 20) presented a different structure from the test items and involved sentences with correct auxiliary choices for the verbs. The ungrammatical fillers (n = 20) were sentences with wrong auxiliary choices for the verbs. For fillers involving (un)grammatical auxiliary choices, we selected both verbs located at the extremes of the Auxiliary Selection Hierarchy (i.e., verbs denoting change of location or state; Sorace, 2000) and reflexive verbs, which require the auxiliary “be” in Italian (Rastelli, 2023). In this way, we obtained sentences that could be easily recognized as (un)grammatical, and we avoided cases in which more variation is allowed for the auxiliary selection, potentially leading to more ambiguous acceptability judgements. All the prompts (i.e., test items and fillers) were presented in a randomized order.

Participants listened to the prompts one by one and were instructed to express a judgement about their acceptability. They were not given the choice to skip a sentence or replay it. AJs were collected on a 5-point Likert scale where values 1 and 5 were specified as follows: 1 = “completely wrong. The sentence sounds bad” and 5 = “completely correct. The sentence

sounds good". RTs were recorded once a value on the Likert scale was selected, and then the next prompt was automatically played.

3. Analyses

Data analyses were performed on a total of 8640 data points, which included measures for AJs (n = 4320) of the 40 test items (i.e., ungrammatical sentences presenting Subject-Verb agreement mismatches) and the corresponding RTs. RT normalization was obtained using the standard logarithm ($RT' = \log_{10}(RT)$), and outliers (n = 67) were detected using a 2.5 SD filter. Together with RT outliers, the corresponding AJs were also removed from the dataset. Data analyses were then conducted on 8506 data points for both AJs and RTs, using generalized linear mixed-effects models (GLME) and linear mixed-effects models (LME), as implemented in the lme4 package (version 1.1.33) in R (Bates et al. 2015b; Wickham, 2016; Kuznetsova et al., 2017; Lüdecke, 2018; R Core Team, 2020; Wickham et al., 2023a; Wickham et al., 2023b). We created two sets of models: One for accuracy and one for RTs.

3.1 Models for accuracy

For the analysis of accuracy rates, we were interested in seeing whether register variation had an impact on acceptability (i.e., the ability to reject sentences that feature agreement mismatches as ill-formed). To this end, we selected a sum contrast for register. We re-coded the AJs, which were collected on a 5-point Likert scale, in a binary variable where 0 corresponds to inaccurate judgements (i.e., values 3, 4, and 5) and 1 corresponds to accurate judgements (i.e., values 1 and 2). Accuracy was set as the dependent variable of the model. As fixed effects, we included the register of the stimuli (sum contrast, 2 levels = "low register", "high register"), the language group of the participants (sum contrast, 4 levels = "monolinguals", "bilinguals", "Agrigentino", "Pavese"), and their interaction. The control factors of the model were the animacy of the NP distractors (sum contrast, two levels = "animate", "inanimate"), the chronological age of the participants (scaled), the gender of the participants (sum contrast, 2 levels = "male", "female"), and the level of education (sum contrast, 7 levels = "postgraduate degree", "graduate degree", "high school diploma", "professional school diploma", "secondary school diploma", "primary school diploma", "other"). As random intercepts, we included participants and test items. In the random structure of participants, we included the register as a random slope, while in the random structure of

items, we included the language group as a random slope. We fitted the maximal model first (Barr et al., 2013), and, in case of non-convergence or singularities, we simplified it following the recommendations of Bates et al. (2015a). The final model included the random slope of register for participants and the intercepts for participants and items.

To explore whether the impact of register variation on the processing of morphosyntactic errors correlates with language experience and use, we ran a second model for accuracy, which only concerned bilingual and bidialectal participants. This second model replicated the structure of the first model but with the inclusion of additional fixed factors. Besides register (sum contrast, two levels = "low register", "high register") and language group (sum contrast, 3 levels = "bilinguals", "Agrigentino", "Pavese"), the other fixed factors (all scaled, apart from dominance) were proficiency in Italian, the percentage of language switching, the percentage of Italian language use, the percentage of L2 use, the patterns of language use in low- and high-register contexts, and language dominance (sum contrast, 3 levels = "Italian", "Italian and L2 equally", "L2"). The interactions between register and the other fixed factors were also analyzed. The percentage of language switching corresponds to the mean value between the frequency of switching that participants reported for different contexts (i.e., home, university/work, other places) and with different interlocutors (i.e., relatives, friends, strangers). The patterns of language use in low- vs. high-register contexts were calculated based on participants' responses about how frequently they use Italian vs. the L2 in various situational settings. Information about language patterns in situational settings ascribed to low-register use was gathered by asking participants which language they use for (i) gossiping, (ii) joking, (iii) talking about emotional issues, (iv) talking about hobbies, and (v) talking with friends. Information about language use patterns in formal situational settings was collected through questions related to language use (i) at work, (ii) at municipality offices, (iii) at hospital/medical settings, (iv) talking about politics and society, and (v) about cultural issues. For both sets of questions, the response options were: "always Italian", "mostly Italian", "half Italian half L2", "mostly L2", and "always L2", and these answers were subsequently re-coded in 5 values, ranging from 1-5 respectively. Then, the average of values derived from the responses about language usage patterns in low-register and high-register contexts was calculated.

The control factors of the second model for accuracy were the same as in the basic model, namely animacy, register, age, gender, and education. As random intercepts, we included participants and test items. The final model included participants and test items as

random intercepts. We consider significant any fixed effect with a t-statistic value not included between -2 and 2.

3.2 Models for RTs

We aimed to investigate whether the detection of grammatical errors had an impact on RTs depending on the linguistic register in which the stimuli are presented. Thus, we selected a sum contrast for the register of the stimuli, and we set log-transformed RTs as the dependent variable of the model. For the main RT model, we kept all the fixed and control factors presented above for the first accuracy model. The final model included participants and items as random intercepts.

For RTs, we built an additional model to explore the role of variables related to language use for the bilingual and bidialectal groups. We included all the fixed and control factors included in the second model for accuracy. We kept the same control factors as the basic model, namely animacy, register, age, gender, and education. Again, the final model included both participants and items as random intercepts.

4. Results

4.1 Results for accuracy

We find a main effect of register (t = -2.208; p = 0.02) for the whole sample that involves all 4 language groups (Table 2). As Figure 2 shows, Subject-Verb agreement mismatches are detected more frequently in low-register stimuli as opposed to high-register stimuli.

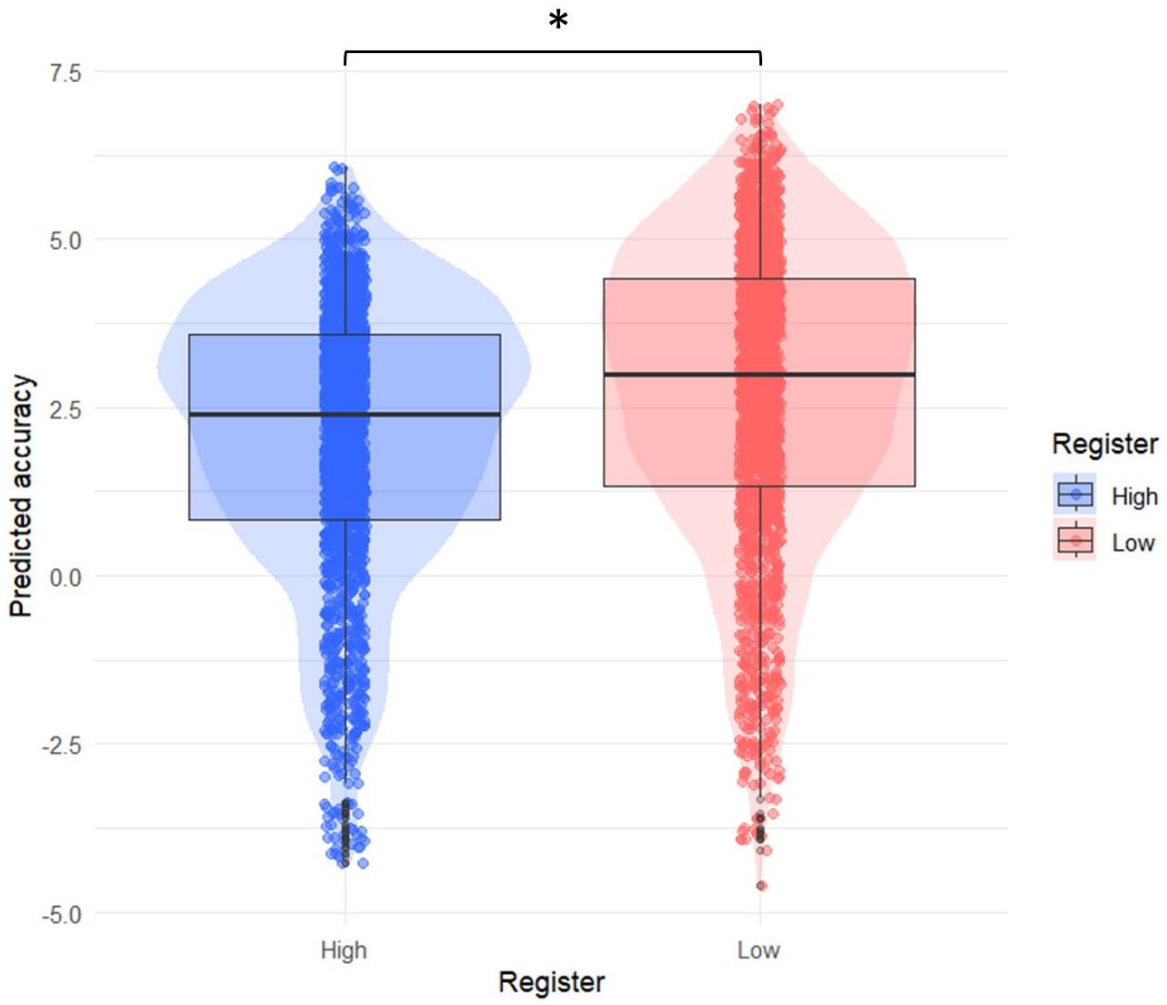
Table 2. Fixed and random effects from the GLME of accuracy. Accuracy rates are set as the dependent variable, register and language group are set as fixed factors. Animacy, register, gender, age, and education are set as control factors (* = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001).

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	0.770849	0.551421	1.397932	0.162133	1.8777	0.5850

Register	-0.23093	0.10457	-2.20839	0.027217*	0.1148
Comparison between Monolingual and Agrigentino groups	-1.15869	0.340545	-3.40245	0.000668***	
Comparison between Monolingual and Pavese groups	0.785883	0.388602	2.022334	0.043142*	
Comparison between Monolingual and Bilingual groups	0.205952	0.379458	0.542752	0.587301	
Animacy	-0.17321	0.103484	-1.67376	0.094178	
Gender	-0.26323	0.208734	-1.26106	0.207287	
Age	-0.51115	0.255259	-2.00248	0.045233*	
Comparison between Primary school and “Other” levels of education	1.624944	1.740178	0.933781	0.350417	
Comparison between Primary school and Postgraduate degree	0.932307	0.759189	1.228029	0.219436	
Comparison between Primary school and Degree	0.945425	0.621803	1.520459	0.128396	
Comparison between Primary school and High school diploma	0.959261	0.608461	1.576537	0.114902	

Comparison between Primary school and Professional school diploma	0.266755	1.077756	0.247509	0.804514
Comparison between Primary school and Secondary school diploma	-0.61605	1.075551	-0.57278	0.566793
Register x Comparison between Pavese and Bilingual groups	-0.02722	0.078112	-0.34843	0.727518
Register x Comparison between Pavese and Monolingual groups	-0.00988	0.08867	-0.1114	0.911297
Register x Comparison between Pavese and Agrigentino groups	-0.03264	0.082785	-0.39429	0.693369

Figure 2. Accuracy rates for low- vs. high-register stimuli across all language groups. The y-axis reports the mean of accuracy levels, ranging from inaccurate (-5.0) to accurate (7.5). * = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001. The violin shapes represent data density, while the box plots represent standard deviations.

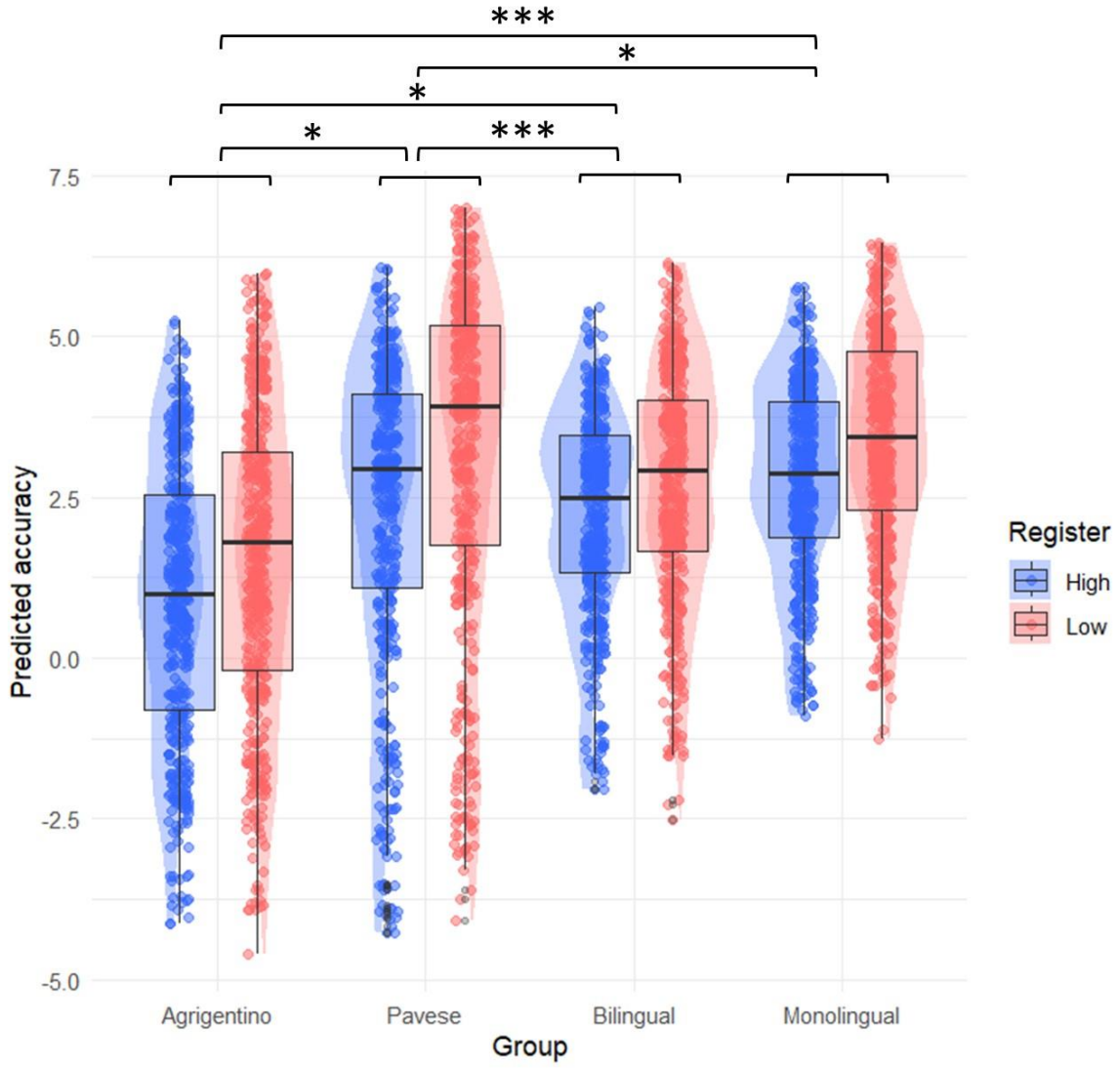


A significant effect is also observed for the comparison between Italian-Agrigentino, Italian-Pavese bidialectal participants, and monolinguals in their accuracy rates. To further explore between-group comparisons, we ran further analyses in which we set the bilingual group as the baseline (Table 1, Supplementary material). We find that Italian-Agrigentino bidialectals are less accurate than the monolingual group, which in turn is slightly less accurate than the Italian-Pavese bidialectal group. About Italian-Spanish bilinguals, they report higher accuracy rates compared to the Italian-Agrigentino group, but lower accuracy rates compared

to Italian-Pavese bidialectals. Regarding register variation, it is noteworthy that bilingual participants, and especially bidialectals, tend to be more accurate in low-register sentences compared to high-register sentences and the difference between ratings in high- vs. low-register stimuli is more pronounced compared to monolinguals (Figure 3). In other words, bidialectal participants seem to spot morphosyntactic errors better when these appear in low register. Importantly, as Figure 3 shows, the main difference between the bilingual and bidialectal groups concerns the general levels of accuracy: the Italian-Agrigentino bidialectal group is significantly less accurate than all the other groups.

We also find an interaction between age and accuracy rates: Older participants report lower accuracy rates compared to younger participants. To ensure that the model predictions are not influenced by such controlled factors, we calculated the collinearity coefficient between each fixed and control factor (VIF), which revealed no correlation between any of them (register = 1.00; group = 2.04; animacy = 1.00; gender = 1.10; age = 1.84; education = 2.15; register:group = 1.05).

Figure 3. Accuracy rates for low- vs. high-register stimuli per language group. The y-axis reports the mean of accuracy levels, ranging from inaccurate (-5.0) to accurate (7.5). * = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001. The violin shapes represent data density, while the box plots represent standard deviations.



To mitigate any potential impact stemming from our categorization of the intermediate value 3 of the Likert scale as "inaccurate", we reran the model omitting value 3 from the data (Table 2, Supplementary material). The results remain the same in terms of significant effects of register and accuracy across different language groups.

In the second analysis for accuracy, we seek to determine whether different patterns of language use in bilingual and bidialectal participants influence accuracy. The results do not reveal any significant effect of variables related to language practices. The only significant results concern the effect of register and the group differences in terms of accuracy, already

found in our first model for accuracy. Again, we reran the analysis excluding the intermediate value 3 from the AJ data and the results do not change.

4.2 Results for RTs

Our main model for RTs does not show a main effect of register. However, Table 3 shows statistically significant interactions concerning sociodemographic variables such as gender ($t = 2.10$; $p = 0.03$), age ($t = 2.96$; $p = 0.003$), education, and the interactions between register and different language groups.

Table 3. Fixed and random effects from the LME of log-transformed RTs. Log-transformed RTs are set as the dependent variable, register and language group are set as fixed factors, while animacy, register, gender, age, and education are set as control factors (* = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001).

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.237526	0.04871	66.46497	2.122958	0.17100	0.03395
Register	0.002823	0.006772	0.4169	0.679165		
Comparison between Monolingual and Agrigentino groups	0.045669	0.030569	1.493952	0.138468		
Comparison between Monolingual and Pavese groups	-0.08324	0.033662	-2.47283	0.015164*		
Comparison between Monolingual and Bilingual groups	0.023299	0.033966	0.685955	0.494396		
Animacy	0.0024	0.006771	0.35445	0.725019		

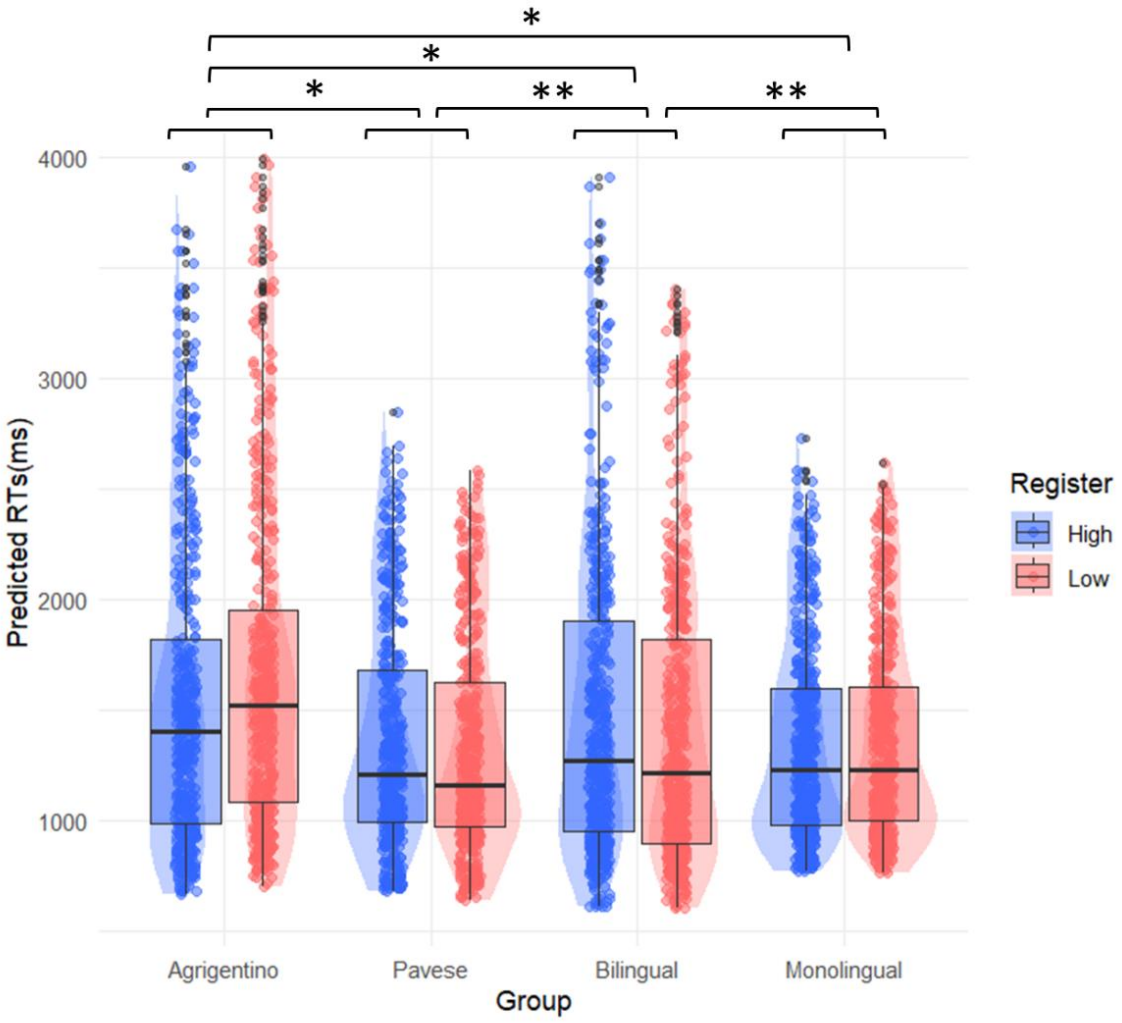
Gender	0.039456	0.018758	2.103461	0.038041*
Age	0.067993	0.022927	2.965606	0.003812**
Comparison between Primary school and “Other” levels of education	-0.03965	0.156253	-0.25375	0.800234
Comparison between Primary school and Postgraduate degree	-0.20949	0.067524	-3.10244	0.002522**
Comparison between Primary school and Degree	-0.05506	0.055501	-0.99209	0.323649
Comparison between Primary school and High school diploma	-0.08686	0.054564	-1.59189	0.114702
Comparison between Primary school and Professional school diploma	0.089412	0.096887	0.922852	0.358402
Comparison between Primary school and Secondary school diploma	0.254252	0.098551	2.579914	0.011397*
Register x Comparison between Monolingual and Agrigentino groups	-0.01765	0.00708	-2.49366	0.012683*

Register x Comparison between Monolingual and Pavese groups	0.003449	0.007235	0.476648	0.633638
Register x Comparison between Monolingual and Bilingual groups	0.018617	0.007139	2.607849	0.009144**

The main effect of age suggests that older participants are slower than younger participants in providing an answer. We also observe an effect of gender, with male participants being slower than female participants. With respect to levels of education, respondents holding a postgraduate degree show faster RTs compared to participants with a primary school qualification ($t = -3.10$; $p = 0.002$), who in turn are slightly faster compared to participants holding a secondary school diploma ($t = 2.57$; $p = 0.01$). To ensure that the model predictions are not influenced by such controlled factors (i.e., age, gender, level of education), we calculated the collinearity coefficient between each fixed and control factor (VIF), which revealed no correlation between any of them (register = 1.00; group = 1.92; animacy = 1.00; gender = 1.10; age = 1.82; education = 2.15; register:group = 1.00).

Another significant comparison concerns the interaction between register and different language groups. Figure 4 shows that, while for monolingual participants RTs are almost the same for low- vs. high-register stimuli, bidialectals and bilinguals show different patterns. Our results show that Italian-Agrigentino bidialectals are faster in judging high-register stimuli compared to low-register stimuli, while bilinguals and Italian-Pavese bidialectals display the opposite trend, with high-register sentences judged slightly more slowly compared to low-register sentences. These differences are statistically significant (Table 3 and Table 4, Supplementary material).

Figure 4. RTs in milliseconds for low- vs. high-register stimuli split per language group. * = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001. The violin shapes represent data density, while the box plots represent standard deviations.



As we did for accuracy, we reran the model excluding the RTs corresponding to the intermediate value 3 from the data. The results replicate the statistically significant interactions found in the previous model (Table 5, Supplementary material).

In the additional analysis of RTs, we seek to determine the effect of different variables related to language practices and use (Table 6, Supplementary material). Besides the significant effect of education, which was also found in the basic model of RTs, the effect of the percentage of daily use of Italian is statistically significant. Higher percentages of Italian language use are associated with reduced RTs for bilinguals and bidialectals (Figure 5). A further significant result concerns the interaction between the percentages of language switching and register

variation. As Figure 6 shows, higher percentages of language switching are associated with reduced RTs for both low- and high-register stimuli. However, the RT difference is more pronounced for low-register stimuli.

Figure 5. Interaction between % of Italian daily use and RTs in milliseconds in bilinguals and bidialectals. The error ribbon represents the 95% confidence interval.

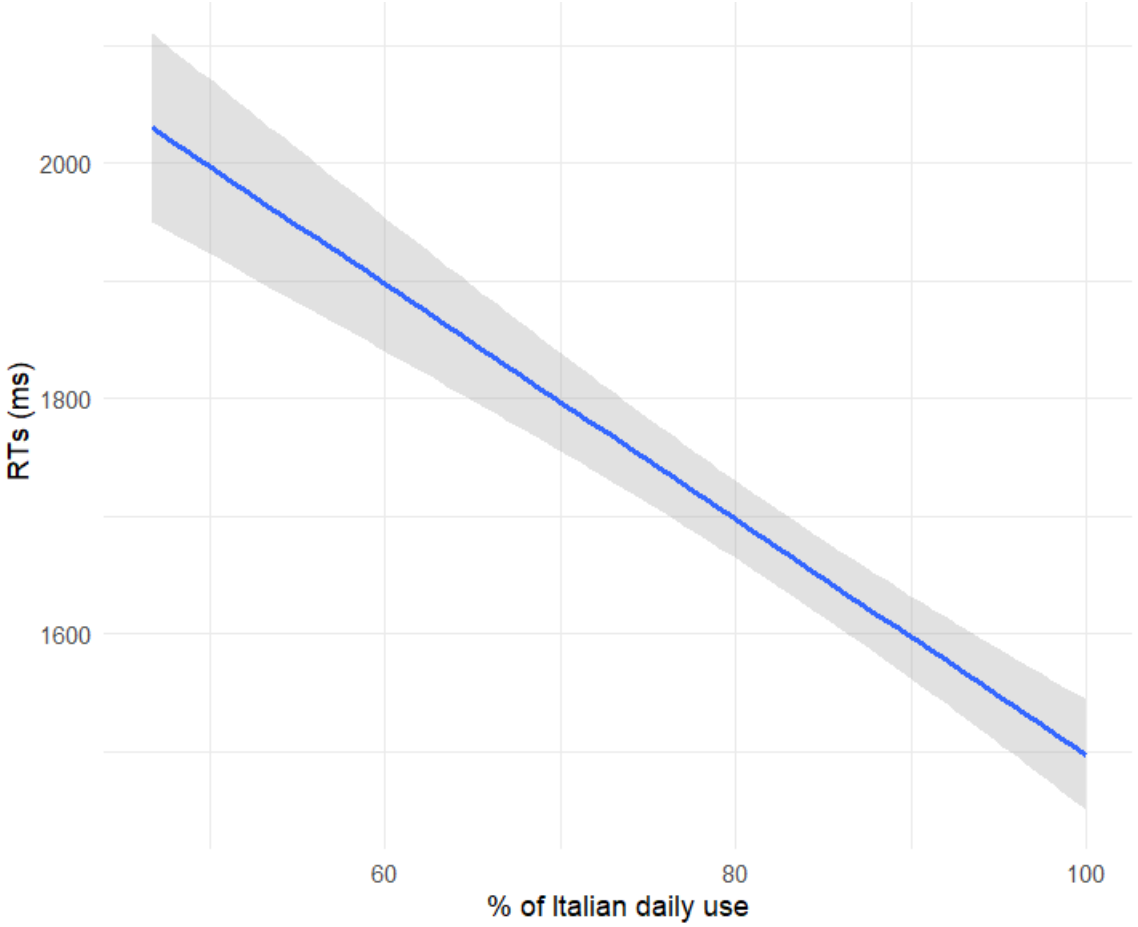
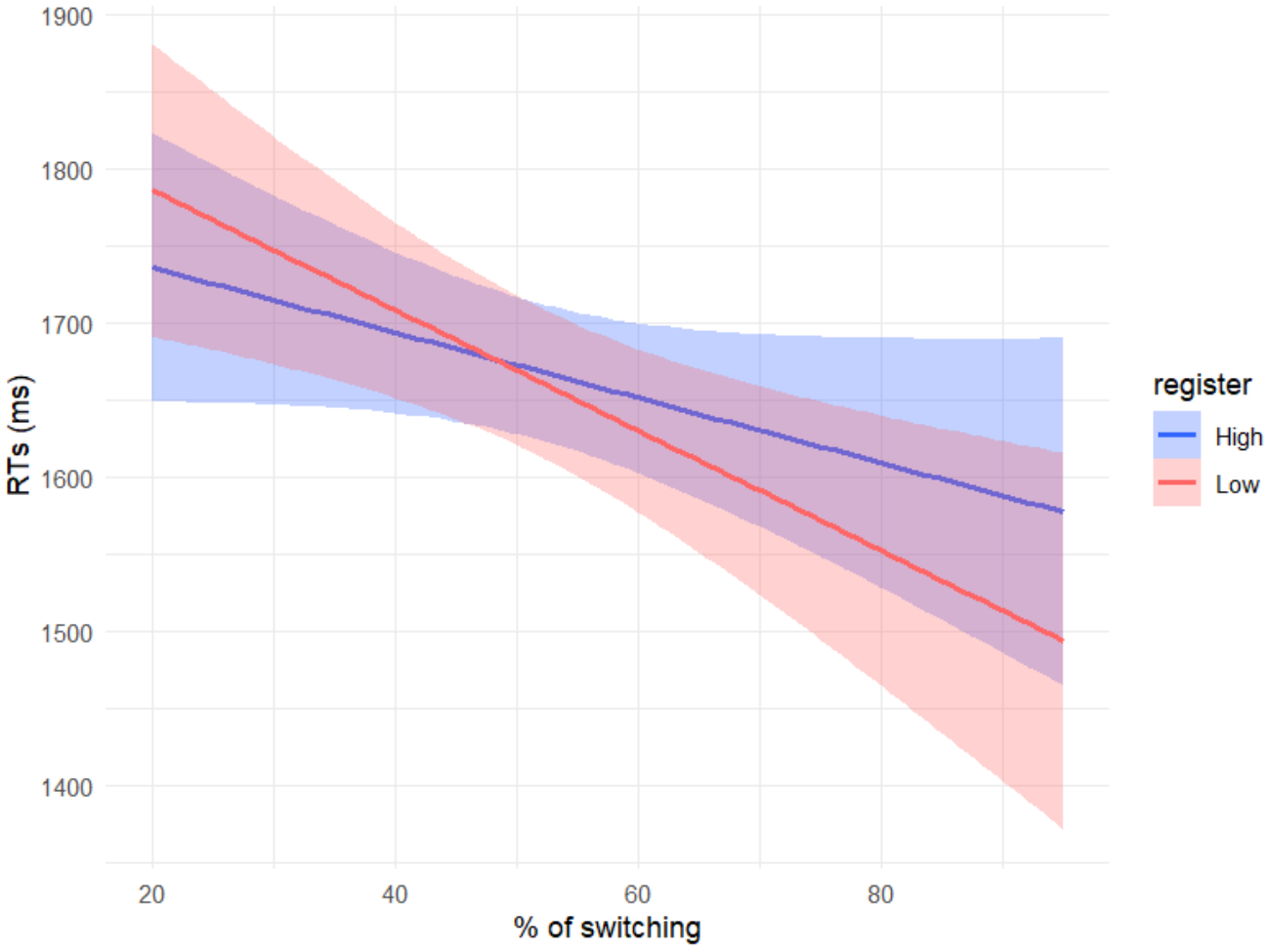


Figure 6. Interaction between RTs in milliseconds and % of language switching for low- vs. high-register stimuli in bilinguals and bidialectals. The error ribbons represent 95% confidence intervals.



Setting the Italian-Pavese bidialectal group as the baseline level, we also find an effect of language group on RTs, with Italian-Pavese bidialectals being faster than bilinguals (t = 2.60; p = 0.009) and Italian-Agrigentino bidialectals (t = -2.49; p = 0.01) in providing an answer.

As we did for the basic model of log-transformed RTs, we reran the analysis excluding the intermediate value 3 from the data and we found the same significant effects as in the previous model, except for the percentage of Italian use, which does not reveal a significant effect anymore (Table 7, Supplementary material).

5. Discussion

The present study aims to examine the role of linguistic register variation on the processing of morphosyntactic errors and to determine the impact of linguistic trajectory on such processing. More specifically, RQ1 concerns the impact of register on the ability to detect Subject-Verb agreement mismatches. Our analyses revealed a significant effect of register: Agreement errors were better detected in low-register sentences compared to high-register sentences. This result suggests that there is an interaction between the processing of morphosyntactic features and one's communicative expectations about linguistic correctness, which are built on the basis of linguistic register. In our results, this translates into register modulating the ability to detect morphosyntactic errors. This finding is in accordance with what has been reported in the literature, regarding the interplay between register congruence and semantic and/or syntactic processing (Patarroyo et al., 2022; Maquate et al., 2023; Pescuma et al., 2023; Plesca et al., 2023).

Finding that the same type of morphosyntactic error is detected variably depending on the linguistic register in which it is encountered suggests that linguistic register may exert processing effects independently from or additionally to other domains of language. Put differently, this finding entails that register could function as a separate domain contributing to morphosyntactic processing, raising challenges for claims supporting the autonomy of morphology or syntax (cf. Radford's 1988 *Autonomous Syntax Principle*, according to which no syntactic rule can make reference to pragmatic, semantic, or phonological information). Claims about the autonomy of levels of linguistic analysis have been a matter of controversy, sparking intense debate across different frameworks (Newmeyer, 2017). Our findings are compatible with weak autonomy theses that posit that although morphology or syntax are not reducible to other levels of linguistic analysis, they do interact with them (Adger, 2018; Esher & O'Neill, 2022). Ultimately, our results highlight the role of context in core morphosyntactic processing (Grodner et al., 2005), providing evidence against strong modularity hypotheses.

This interpretation of the main result relies on both social and cognitive dimensions of linguistic register, which constitute its core components. Considering that we have specific context models for the representations of the situational settings where different linguistic registers are implied (van Dijk, 2008), it follows that the use of low and high registers is connected to distinct communicative contexts. Typically, high register aligns with more formal settings, where the occurrence of grammatical errors is reduced or, at least, less expected

compared to informal settings. This could have led our participants to assume that high-register sentences were correct because of this implicit association of high register with more formal contexts, explaining the lower accuracy rates for the detection of morphosyntactic errors that we observed in high-register stimuli. For low-register sentences, instead, participants might have been anticipating possible grammatical errors due to the link between low register and informal contexts, where generally grammatical norms receive less attention.

An alternative interpretation for the higher accuracy rates observed in low-register sentences, that delves deeper into the cognitive dimension of register, concerns the level of familiarity that users have with a particular register variety. If linguistic register functions as a separate domain that influences processing, much like morphology or syntax, it should be susceptible to comparable processing effects, among which there is the impact of familiarity and frequency of the linguistic input. Considering that familiar linguistic structures entail lower processing demands (Bybee, 2013 *inter alia*), we can put forth the hypothesis that handling a register variety to which we are highly accustomed would incur fewer costs compared to a variety we encounter less frequently. According to Giménez Moreno (2006), the coexistence of different communicative settings in our daily life is leading to a general relaxation of registers, with a growing inclination towards the adoption of less formal varieties. Thus, low register could be considered as the "less marked" variety in comparison to high register, representing the more familiar and frequent form for most users. Under this view, it is possible that for low-register stimuli, our participants dedicated less cognitive effort to the processing of register-specific features, given their familiarity with the variety in question. Consequently, they could have reserved more cognitive resources for the processing of other linguistic features, including morphosyntactic characteristics, leading to improved detection of grammatical errors in low-register prompts.

RQ2 concerns the comparison between monolingual, bilingual, and bidialectal speakers of minority and majority languages in the processing of morphological errors across different registers. Through our comparative perspective, we observed different tendencies across language groups. The monolingual group is the only one presenting comparable accuracy rates and RTs for low- and high-register stimuli. Regarding accuracy, both the bilingual and the bidialectal groups tend to better spot agreement mismatches in low-register stimuli compared to high-register stimuli. A noteworthy difference is found between monolinguals and Italian-Agrigentino bidialectals: while monolinguals show similar accuracy rates for low- and high-register stimuli, Italian-Agrigentino bidialectals tend to better detect grammatical anomalies in low-register sentences. With respect to RTs, similarly to what we found for accuracy, while

the monolingual group shows comparable response latencies for both low- and high-register stimuli, the Italian-Agrigentino and the bilingual and Italian-Pavese bidialectal groups show statistically significant differences that correspond to opposite trends: Italian-Agrigentino participants are faster at judging high-register sentences, while bilinguals and Italian-Pavese bidialectals are faster when evaluating low-register stimuli (Figure 4).

These findings are interpretable by examining the context of language use, which is a pivotal feature for linguistic register variation. Since the monolingual speakers' linguistic repertoire is largely dominated by the use of only one language, this language is present in most communicative and situational settings, covering both low- and high-register contexts. Thus, the monolingual competence in low vs. high registers may not present significant differences, leading to similar processing outcomes for both linguistic registers, as our results show. For bilingual and bidialectal communities, instead, language use is more diversified: For some bilinguals, both languages can be used across communicative settings, while for others, the use of one language over the other is systematically contingent on the situational contexts in which interactions take place. In the case of Italian bidialectal speakers, linguistic practices are characterized by a situation of diglossia, where Italian is generally ascribed to formal contexts, and the local variety is used in more informal settings (Trumper, 1993; Berruto, 2006; Cerruti, 2011). Thus, the dichotomy between Italian vs. the local variety is clearly defined by contexts of use. Considering that context of use is also a modulating factor for register choice (Biber & Conrad, 2009), it follows that formal contexts - which imply high-register language - are more frequently associated with Italian, while informal contexts, characterized by a prevalence of the low-register variety, involve either the coexistence of both Italian and the local variety, as also shown by our data (Figure 1a) or, in some cases, the predominance of the local variety, especially for the Italian-Agrigentino bidialectal group.

In this context, the decreased accuracy in detecting agreement errors in high-register sentences, which was more evident in Italian-Agrigentino bidialectals, could be traced back to the dichotomy between Italian and formal contexts vs. local varieties and informal contexts. When stimuli are presented in a more formal register, bidialectal participants may be affected by the higher linguistic prestige associated with Italian. This could lead Italian-Agrigentino speakers to perceive high-register stimuli as accurate primarily due to their implicit association with the dominant societal language. The concept of linguistic prestige ascribed to Italian could also explain the shorter RTs recorded for high-register stimuli in Italian-Agrigentino bidialectals (Figure 4). When they are exposed to a high-register prompt, the ingrained connection between high register, formal contexts, and Italian may lead them to presuppose

the correctness of the stimulus. As a result, they do not anticipate (and consequently do not detect) the existence of possible grammatical errors, saving processing time. This interpretation of our results, which is rooted in the dynamics of language prestige, finds support in previous literature addressing linguistic ideologies towards dialects in Italy. Unexpectedly, Italian regions where dialect use is more widespread, such as the south of Italy (i.e., Agrigento), tend to show a greater degree of dialect stigmatization when compared to areas where dialect use is less prevalent, like the north-west of Italy (i.e., Pavia), where more favorable attitudes toward dialects prevail (ISTAT 2012, Berruto, 2018). These dynamics are partially reflected in our sample. Although both Italian-Agrigentino and Italian-Pavese bidialectals expressed similar positive attitudes toward their dialects, when they were asked about the general societal perception of dialect, the Italian-Agrigentino group more frequently associated the dialect with low cultural status.

Interestingly, a different RTs pattern is observed in Italian-Spanish bilingual speakers: They show longer RTs in high-register stimuli (Figure 4). This result underscores the need to approach bilingualism and its impact on language processing as a multifaceted phenomenon. Indeed, Figure 1a shows a marked difference between the two language groups: While Italian-Agrigentino bidialectals tend to use mostly Italian in high-register contexts, Italian-Spanish bilinguals report a higher use of their L2 (i.e., Spanish). For low-register contexts, instead, Italian-Agrigentino bidialectals report higher use of their L2 (i.e., dialect) compared to both Italian-Spanish bilingual and Italian-Pavese bidialectal participants. These patterns of language use could explain why the RTs of Italian-Spanish bilinguals are faster in low-register stimuli compared to high-register ones, while the opposite trend is observed for Italian-Agrigentino bidialectals. In particular, the longer RTs for low-register stimuli recorded by Italian-Agrigentino bidialectals could reflect a reduced level of familiarity with the use of Italian in informal contexts, where the Agrigentino dialect is generally more spread.

Another interesting aspect of the results, which further highlights the impactful role of variables related to bilingual language use, comes from the significant interaction between the percentage of daily use of Italian and RTs. For both bilinguals and bidialectals, higher percentages of Italian language use are associated with faster RTs in judging stimuli in both linguistic registers (Figure 5). These findings stress the need to consider variables related to language practices when examining bilingual language processing: Bilingual and bidialectal speakers who use Italian more frequently may encounter this language in a broader spectrum of contexts and this exposure to the Italian language could contribute to faster RTs for sentences in registers associated to different communicative settings. However, the impact of this variable

would need more exploration, since the significant effect of Italian language use on RTs disappeared when the middle value of the Likert scale (i.e., value 3) was excluded from the analysis.

Another variable that has a significant impact on bilinguals' and bidialectals' RTs concerns language switching. Higher percentages of language switching are associated with faster RTs, with a more pronounced difference in low-register sentences (Figure 6). This result can be linked to a higher likelihood of switching in low-register contexts (Poplack, 2004; Gardner-Chloros, 2009; Baker & Wright, 2021). If language-switching practices tend to occur more frequently in informal settings, it follows that individuals who engage in frequent switching are used to experiencing their languages in low-register contexts. As a result, this familiarity with low registers may lead to shorter RTs in evaluating low-register stimuli compared to high-register stimuli.

In summary, our findings underscore that our language experience leads to diverse processing outcomes when dealing with linguistic register variation. Therefore, it is crucial to assess variables associated with language practices (e.g., language switching) as well as consider the sociolinguistic contexts of language use in different communities, when seeking to determine the role of register in language processing outcomes.

6. Conclusions

The present study aimed to investigate the role of linguistic register variation in the processing of Subject-Verb agreement mismatches. Our findings suggest that register variation plays an important role in the processing of morphosyntactic features: Subject-Verb agreement mismatches were identified less accurately in high-register vs. low-register stimuli. These results hint at the possibility that linguistic register may separately influence the processing of other linguistic domains such as morphosyntax. Under this view, the theorization of linguistic register could be broadened and, besides features related to situational and social aspects of language use, our conceptualization of register could also embrace its cognitive dimensions and its impact on language processing (Keller, 2021).

Our findings also revealed crucial differences between Italian monolingual, Italian-Spanish bilingual, and Italian bidialectal participants, who use different combinations of majority and minority languages, supporting the idea that the handling of different linguistic registers is strongly shaped by factors related to various language practices (i.e., use, switching)

and sociolinguistic contexts. These results stress the need to consider the language use conventions of each specific linguistic community when it comes to studying language processing, and more specifically, the processing of linguistic register variation (Giménez Moreno, 2006). Further insights on this point could come from the comparison between the AJs in both the languages of the bilingual participants. Such comparisons may reveal more details about the interplay of the two languages in specific communicative settings, shedding light on the differences between the language practices of each bilingual/bidialectal group.

Furthermore, it would be interesting to investigate the role of additional languages in our sample, such as the limited knowledge of Catalan in a few speakers of our Italian-Spanish bilingual group or the school-based knowledge of English for our Italian monolingual and Italian bidialectal participants. For future steps of this work, we also consider the possibility of replicating our research by adding metalinguistic and working memory abilities measures (CELF-5 Metalinguistics, Wiig & Secord, 2014; Verbal and spatial immediate memory span, Orsini et al., 1987), which could unveil further correlations with language processing outcomes of our participants.

Taken together, our findings highlight the composite nature of both linguistic register and language processing. Concerning the former, both cognitive and social dimensions hold a significant role and should not be perceived as stand-alone features in defining linguistic register. Regarding the latter, morphosyntactic processing is evidently not a monolithic concept shaped exclusively by domain-specific, invariable underpinning mechanisms. Rather, it is driven by a mosaic of factors that pertain to different linguistic domains and that may play out in different ways across distinct linguistic communities.

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Chapter 5

General discussion and conclusions

5.1 General discussion

This dissertation aimed to delve into the social dimension of bilingualism and language processing through different steps, which consisted in (i) examining the origin of bilingual effects on cognition, and the role of social and sociolinguistic factors in shaping such effects (Chapter 2); (ii) inquiring into how the processing of Subject-Verb agreement mismatches is influenced by bilingualism involving standard and non-standard languages (Chapter 3); (iii) analyzing the impact of linguistic register variation on the processing of Subject-Verb agreement mismatches, both jointly and independently from speakers' linguistic background (Chapter 4). In this section, I will summarize the results from all three chapters of my dissertation, which stress the importance of considering variables of the social dimension when investigating bilingualism and language processing.

The first goal of the dissertation was addressed through a systematic review of 368 articles on bilingual cognitive adaptations (Chapter 2). The main objectives of the systematic review were (i) defining how frequently studies on bilingual adaptations control for sociodemographic and sociolinguistic factors, (ii) determining how frequently studies reporting bilingual adaptations attribute their results to social, cognitive, or mixed origin, and (iii) examining which are the sociolinguistic factors more often ascribed to these adaptations. The systematic review allowed me to explore a substantial portion of research on bilingualism, which is still dominated by two main debates. On the one hand, experimental results from studies on bilingual adaptations report different outcomes in terms of positive, negative, and null findings across different tasks and populations, leading to an apparent inconsistency of results (Leivada, Westergaard, et al., 2021; Dentella et al., 2024). On the other hand, an unanimously shared explanation on the origin of bilingual adaptations is still missing. While our review focused on the latter point, the results revealed a possible link between these two debates. According to our findings, the apparent inconsistency of results that characterizes research on bilingualism could be explained by the intricate network of social factors that shape the bilingual experience, which varies for each bilingual population. If we acknowledge the

gradient nature of bilingualism (DeLuca et al. 2019, Sulpizio et al., 2020), the presence of different results should become less surprising because different cognitive outcomes would derive from specific features of each bilingual experience. The analyses revealed that all the 368 articles included in our pool of data controlled for at least one sociodemographic factor (i.e., age, gender, SES) and that most of the studies that reported bilingual adaptations attributed them to factors related to the sociolinguistic dimension of bilingualism. In particular, 73.41% of the reported bilingual adaptations in our database have been linked to either a social or a mixed socio-cognitive origin. Furthermore, a significant correlation was found between the type of effect (i.e., advantage vs. disadvantage) and the origin of effect (i.e., social, cognitive, mixed): Studies reporting advantages were more likely to attribute their findings to cognitive origins, while studies reporting disadvantages tended to link them to social factors. Regarding the latter, our results were translated into a complex network of variables that belong to different spheres of the sociolinguistic dimension of bilingualism (see Figure 5, Chapter 2). To help conceptualize this complex network, we can imagine an intricate mosaic where each tile connects to the other. The full image of the mosaic becomes apparent only when all the tiles are viewed together. We can perceive the bilingual experience as the whole figure of the mosaic, and the single tiles as the sociolinguistic variables of the bilingual experience: Only by appreciating the sociolinguistic factors in all their complexity, we can have a holistic picture of bilingualism. Our results suggest that, in this mosaic of sociolinguistic factors, variables related to language use and practices hold a prominent position. This category encompasses various elements beyond the commonly used measures of language proficiency, or the amount of time dedicated to speaking each language (Surrain & Luk, 2019). It also includes language-switching practices and the specific communicative contexts in which languages are used. These factors collectively shape the frequency with which a language is spoken, and, by extension, they influence the proficiency level reached in that language. This underscores the importance of appreciating that sociolinguistic factors of the bilingual experience are not isolated variables; rather, they influence each other in a chain-reaction fashion. Consequently, the sociolinguistic variables of bilingualism, including language proficiency, should not be viewed as monolithic and independent factors (Woumans et al., 2015; Verhagen et al., 2019).

As a result, defining bilingualism solely based on proficiency or, through a very limited set of variables, without acknowledging the sociolinguistic dynamics by which they are shaped, fails to provide a comprehensive understanding of bilingual effects on cognition, making it challenging to attribute them to specific aspects of the bilingual experience. Moreover, chapter 2 underscores the significance of acknowledging the link between the social and cognitive

dimensions of bilingualism: Only by appreciating them together we can have a comprehensive picture of bilingual adaptations. Indeed, the cognitive mechanisms defining the bilingual experience can be seen as a bridge between the environmental conditions in which bilingualism takes place and the outcomes observed in experimental results. If we consider bilingualism as a multifaced phenomenon and operationalize it through specific subcomponents that describe the sociolinguistic dynamics of each bilingual group, thus shifting the attention "from processes to *people*" (Luk, 2022: 5), we could finally link (seemingly) contradictory bilingual adaptations to specific sociolinguistic factors, solving the apparent inconsistency of results.

The social-based approach to bilingual adaptations proposed in Chapter 2 is crucial for interpreting the experimental findings of Chapter 3. The comparison between Italian-speaking monolinguals, Italian-/Spanish-speaking bilinguals, Italian-/Agrigentino-speaking bidialectals, and Italian-/Pavese-speaking bidialectals on a timed AJT involving Subject-Verb agreement mismatches revealed different patterns in terms of accuracy rates and RTs for the four language groups. If bilingual and bidialectal participants had been described solely by their "bilingual status", that is, through a categorical approach that perceives bilingualism as a dichotomous condition (i.e., speaking more than one language or not), different patterns of language processing for each bilingual/bidialectal group might have appeared contradictory. The key approach to interpreting these different processing outcomes consisted of considering the specific sociolinguistic dynamics of each bilingual/bidialectal community. Taking into account the sociolinguistic environment of each language group entails operationalizing a large set of variables which not only include how frequently and how fluently the languages are spoken, but also the specific language choices made according to the interlocutors and the communicative contexts, the speakers' linguistic attitudes towards the languages, and the societal status of the languages themselves. Despite its complexity, this practice is essential when investigating the cognitive outcomes of different bilingual experiences, especially the ones that involve non-standard languages, as already pointed out by previous literature (see Chapter 1, Labov, 1996; Auer, 2000; Cornips, 2006 *inter alia*).

The choice of testing two Italian bidialectal groups was driven by two reasons. First, I wanted to underscore the importance of considering the sociolinguistic dimension in exploring bilingual language processing. In this regard, the bidialectal experience offers a fertile ground to examine how the interaction of different sociolinguistic variables shapes language practices and, in turn, language processing. While some forms of linguistic prestige might be less present in the bilingualism of standard languages, language use, as well as linguistic outcomes in bidialectal communities are strongly shaped by linguistic ideologies (See Chapter 1, Labov,

1996; Trudgill, 1999). Indeed, the main differences between standard and non-standard languages which share similar linguistic features concern the sociolinguistic values ascribed to the language, which in turn affect how languages are perceived and used in each bilingual/bidialectal community (Rowe & Grohmann, 2013). Comparing bidialectal speakers to bilingual speakers of standard languages with analogous language-pair distance allowed me to investigate whether differences in language processing could be ascribed to factors related to the sociolinguistic dimension of each language group.

Second, I wanted to approach the topic of cognitive adaptations by focusing on a type of bilingual speakers that has generally been understudied. As outlined in Chapter 1, research on bilingualism tends to involve bilingual speakers of standard languages, leaving aside speakers of non-standard languages. In the specific case of Italy, research on bilingual adaptations involving bidialectal populations is very limited (Garraffa et al., 2017; Scaltritti et al., 2017; Sanfelici & Roch, 2021) and no study has investigated the Italian-/Agrigentino-speaking and the Italian-/Pavese-speaking bidialectal populations before this dissertation. Examining two different Italian bidialectal communities, one from Lombardy and one from Sicily, allowed me to inquire into the diversified sociolinguistic patterns that characterize bidialectal language practices in the north and in the south of Italy (see Chapter 1, §1.4). Despite both speaking Italian and a non-standard language, the Italian-Agrigentino and Italian-Pavese communities differ in language use, identity, and attitudes towards their languages, with significant consequences in language processing patterns.

The findings presented in Chapter 3 unveil differences in language processing between monolingual and bidialectal participants, as well as between bilingual and bidialectal participants. Interestingly, no differences emerged between monolingual and bilingual speakers of standard languages (i.e., Italian-/Spanish-speaking bilinguals), in line with previous literature (Lago & Felser, 2018; Paspali, 2019; Sagarra & Rodriguez, 2022). Regarding the differences between monolingual and bidialectal participants, distinct processing patterns have emerged for our bidialectal groups, emphasizing the variation within the bilingual experience. While Italian-/Agrigentino-speaking bidialectals showed lower accuracy rates and longer RTs compared to both Italian-speaking monolinguals and Italian-/Pavese-speaking bidialectals, the latter group showed faster RTs compared to Italian-speaking monolinguals. Such differences between the bidialectal groups have been interpreted as the result of the different sociolinguistic environments of Pavia and Agrigento (see Chapter 1, ISTAT 2012; Berruto, 2018). Despite sharing the use of Standard Italian and a non-standard language (i.e., the local dialect) which is comparably distant from the standard one, the two bidialectal communities show different

language use patterns. On the one hand, in Agrigento, the use of the local dialect is spread in most communicative contexts, and consequently, the boundaries between Agrigentino and Standard Italian are blurred because of this thick contact. On the other hand, the use of the Pavese dialect in Pavia is more ascribed to specific situational settings and interlocutors, and Italian-/Pavese-bidialectal speakers need to pay more attention to choosing the appropriate language. This entails that, while Agrigento is characterized by the use of a linguistic variety that does not have clear boundaries and where the degree of fusion between Standard Italian and the local dialect is high (i.e., variety of continuum), in Pavia there is a more rigid demarcation between the two linguistic systems. In this regard, the distinction between macro- and micro-diglossia made in Chapter 1 helps to illustrate the differences between language practices across these two Italian bidialectal communities. Agrigento represents a clear example of a macro-diglossic context, which is characterized by frequent switching practices between Standard Italian and the local dialect. On the contrary, Pavia resembles a micro-diglossic context where the switching between the two languages may occur to a lesser extent and in specific settings only. Consequently, more defined boundaries are set between Pavese and Standard Italian.

In terms of cognitive outcomes, previous literature has emphasized the role that different bilingual language practices can have on language control processes (Grosjean, 2012) both in production (Green & Abutalebi, 2013; Jiao et al., 2020) and comprehension (Beatty-Martinez & Titone, 2021, Navarro-Torres et al., 2019; Han et al., 2023). Our findings align with the patterns illustrated by previous research, which are summarized in Table 1.

	Interactional context		
	Green & Abutalebi (2013)		
Control processes	Single language	Dual language	Dense-Code switching
	Beatty-Martinez & Titone (2021)		
	Language competition	Language regulation	Language cooperation
Goal maintenance	+	+ +	=
Conflict monitoring	+	+ +	=
Interference suppression	+	+ +	=

Salient cue detection	=	+	=
Selective response inhibition	=	+	=
Task disengagement	=	+	=
Task engagement	=	+	=
Opportunistic planning	=	=	+ +

Table 1. Demands on language control mechanisms in bilingual speakers according to different communicative contexts. = indicates equal demands for bilingual speakers compared to monolingual speakers in a monolingual context; + indicates increased demands for bilingual speakers compared to monolingual speakers in a monolingual context. The most heightened bilingual demands concern contexts marked by + +. Table adapted from Green & Abutalebi (2013: 519).

Italian/Pavese bidialectalism can be described as a situation of dual-language context (Green & Abutalebi, 2013) or language regulation (Beatty-Martinez & Titone, 2021). In such cases, both languages are used, but typically with different speakers and in varying conversational situations. Switching may occur in specific conversations, but it is less frequent within a sentence. According to Beatty-Martinez & Titone (2021), in such interactional contexts, proficient monitoring of the two languages is crucial, requiring speakers to discern and select the most suitable one. This constant training would lead to enhanced conflict monitoring and interference suppression abilities (Green & Abutalebi, 2013) and this would explain why Italian-Pavese bidialectals show faster RTs compared to both Italian-speaking monolinguals and Italian-/Agrigentino-speaking bidialectals and better accuracy rates compared to Italian-/Agrigentino-speaking bidialectals, who instead experience a situation of language cooperation. Regarding the processing of Subject-Verb agreement mismatches, better interference suppression and conflict monitoring abilities would help in overcoming the interfering effect of the distracting NP (Bock & Cutting, 1992; Hartsuiker & Barkhuysen, 2006). The same conflict monitoring abilities would not be constantly required in single-language contexts (Green & Abutalebi, 2013) or language competition contexts (Beatty-Martinez & Titone, 2021), which resemble the situation of the Italian-/Spanish-speaking bilinguals of our sample. In such instances, each language is linked to a distinct communicative context, making the choice of the appropriate language to use more predictable than in dual-language contexts. As a result, inhibitory skills may be less trained in such scenarios. This could explain why Italian-/Spanish-speaking bilinguals did not show enhanced processing

abilities compared to their Italian monolingual peers. Lastly, Italian-Agrigentino bidialectalism could be described by a situation of dense code-switching context (Green & Abutalebi, 2013) or language cooperation (Beatty-Martinez & Titone, 2021), where both languages are constantly and interchangeably used by speakers. This would favor an "open control mode" (Beatty-Martinez & Titone, 2021: 6) where speakers are not required to constantly monitor their language choices.

While on the one hand, the lack of trained interference abilities would explain the absence of a processing advantage in terms of accuracy rates and RTs for Italian-/Agrigentino-speaking bidialectals compared to Italian-speaking monolinguals, on the other hand, their worst performance could be interpreted through the concept of linguistic continuum between Standard Italian and the dialect (see Figure 1, Chapter 1). The constant use of a variety of continuum which includes non-standard features may foster increased tolerance toward linguistic forms deviating from the norm, such as Subject-Verb agreement mismatches in our experiment. This could explain the lower accuracy rates of Italian-/Agrigentino-speaking bidialectals compared to Italian-speaking monolinguals. Besides the notion of linguistic continuum between standard and non-standard varieties, the situation characterizing Pavia and Agrigento recalls the concepts of relative acceptability and language proximity overviewed in Chapter 1 (Labov, 1996; Cornips, 2006; Auer, 2005; Cerruti & Regis, 2014).

Choosing between different varieties of the same language has been argued to require specific cognitive mechanisms (van Dijk 2005, 2008; Szmrecsanyi & Engel, 2022). According to the situational setting in which they are, users need to select specific linguistic varieties that differ in various features, among which there is linguistic register. Thus, we should consider that the umbrella concept of "linguistic experience" also encompasses the ability to use one language across its different linguistic registers. The role of linguistic register variation as part of speakers' linguistic experience has been highlighted in the findings reported in Chapter 4, which show that register variation influences language processing together and independently from speakers' linguistic background. More specifically, Chapter 4 reports a significant effect of linguistic register variation on the detection of Subject-Verb agreement mismatches: Participants spotted such grammatical errors more frequently in low-register sentences than in high-register sentences. This pattern of results can be interpreted in different ways which bring together both the cognitive and the social dimensions of linguistic register. On the one hand, following van Dijk's context models (2005, 2008), which posit the existence of cognitive interfaces that associate specific linguistic features to distinct communicative contexts, high register and low register should be linked to different situational settings, corresponding to

formal and informal contexts respectively. While formal contexts typically adhere to the linguistic norm, such that grammatical errors are not actively expected, in informal contexts, linguistic forms that do not conform strictly to the norm are frequently encountered. This may have predisposed participants to anticipate linguistic forms that deviate from the norm in low-register sentences, resulting in an enhanced identification of Subject-Verb agreement mismatches.

Another possible interpretation of these results relies on the hypothesis that linguistic register functions as a distinct linguistic domain in language processing, which is separate from morphology or syntax, although it can interact with them (Adger, 2018; Esher & O'Neill, 2022). Under this assumption, processing effects, such as familiarity and frequency of the tested linguistic phenomenon, would also affect the computation of linguistic register features. Given that our everyday speech tends to be characterized by a more informal linguistic register (Berruto, 1987; Giménez Moreno, 2006), low register would be more familiar to participants compared to high register. This would entail reduced processing costs for computing low-register features, leaving more cognitive resources for the processing of other features belonging to distinct linguistic domains, which are directly involved in Subject-Verb agreement computation (i.e., morphology and syntax).

These different interpretations highlight the pivotal role of both the cognitive and the sociolinguistic dimensions when it comes to explaining how linguistic register variation influences language processing. While the association of high vs. low register with formal vs. informal contexts is dictated by speakers' sociolinguistic practices, the impact of such practices on language processing can be appreciated only if we consider the cognitive mechanisms underpinning the processing of linguistic register which, as any other linguistic domains, is influence by the general mechanisms of cognition. Furthermore, the appreciation of both the social and the cognitive dimension of linguistic register has significant implications for its theorization, which, besides a sociolinguistic approach, should include a cognitive perspective and define the role of register as a psycholinguistic phenomenon (Keller, 2021).

The role of linguistic register variation as an inherent part of our linguistic experience is further attested by the results concerning the second research question of Chapter 4. Specifically, I examined whether register variation plays the same role in the detection of Subject-Verb agreement mismatches for monolingual and bilingual populations. The sample was the same as Chapter 3. The findings revealed that different language groups show distinct processing outcomes across different linguistic registers, and this can be traced back to their language practices. While monolingual speakers tend to use only one language across different

situational settings, thus being familiar with all its different register varieties, bilingual and bidialectal speakers exhibit more diversified language practices and, in some cases, they may link each of their languages to distinct communicative contexts. This would result in the association of a specific language to formal/informal contexts, and thus to a high/low register. While all groups tended to spot agreement mismatches more frequently in low-register stimuli, this tendency was more pronounced for Italian-/Agrigentino-speaking bidialectals. Regarding RTs, while monolingual participants showed comparable tendencies for low- vs. high-register stimuli, the bilingual and bidialectal groups reported different patterns. Italian-/Agrigentino-speaking bidialectals were faster at judging high-register sentences, while Italian-/Pavese-speaking bidialectals and Italian-/Spanish-speaking bilinguals were faster when evaluating low-register stimuli. Once again, these differences can be linked to the specific sociolinguistic dynamics of each language group. As described in Chapter 1, the relation between Standard Italian and Italian dialects is characterized by a diglossic situation where Standard Italian is ascribed to more formal contexts, where high register is normally used, while the dialects are spoken in more informal contexts, associated with low register (Trumper, 1993; Berruto, 2006; Tamburelli, 2010; Cerruti & Regis, 2005). This sociolinguistic pattern is dictated by the higher prestige attributed to Standard Italian compared to local dialects, which are paradoxically more stigmatized in those Italian regions where their use is more widespread (i.e., southern Italy, including Agrigento; ISTAT 2012, Berruto, 2018).

The more prestigious status of Standard Italian, which is intrinsically associated with formal contexts, and thus to the high register, can explain (i) the more pronounced tendency for Italian-/Agrigentino-speaking bidialectals to spot attraction errors in low-register stimuli compared to the other language groups and (ii) their faster RTs when judging high-register stimuli. The link between Standard Italian, formal contexts, and high register may have led Italian-/Agrigentino-speaking bidialectals to more promptly judge high-register sentences as accurate. Although presenting similar trends in terms of accuracy, Italian-/Pavese-speaking bidialectals and Italian-/Spanish-speaking bilinguals showed different tendencies for RTs compared to Italian-/Agrigentino-speaking bidialectals, with longer response latencies for judging high-register stimuli compared to low-register ones. For Italian-/Pavese-speaking bilinguals, this could be explained by the language use patterns of Pavia. Italian-/Pavese-speaking bidialectals declared to use Standard Italian in low-register contexts more frequently than Italian-/Agrigentino-bidialectal speakers, which instead tend to speak their local dialect (Figure 1a, Chapter 4). This would mitigate the dichotomy between Standard Italian and formal contexts vs. dialect and informal contexts for Italian-/Pavese-speaking bidialectals, who may

perceive the prestige of Italian on the dialect to a lesser extent, relying more on familiarity effects to a specific linguistic register than on linguistic prestige. Thus, the higher familiarity towards low register would lead to faster RTs for stimuli presented in such register variety. For Italian-/Spanish-speaking bilinguals, instead, the longer RTs recorded in high-register stimuli, which were presented in Italian, can be explained through the patterns of language use reported by the participants (Figure 1a, Chapter 4). Our Italian-/Spanish-speaking bilingual group tends to use Italian in low-register contexts more frequently than in high-register contexts. This would bring to less familiarity with Italian in high-register contexts, leading to longer RTs for evaluating high-register stimuli presented in such language.

Taken together, experimental results from Chapters 3 and 4 stress the need to embrace a social-based approach when examining language processing mechanisms and the effects of the bilingual/bidialectal experience on them. The need to comprehensively appreciate both the social and the cognitive side of linguistic experience has been highlighted not only by our review of studies on the cognitive adaptations of bilingualism (Chapter 2) but also by experimental findings on the impact of register variation on processing mechanisms (Chapter 4). Furthermore, the operationalization of the sociolinguistic variables of the linguistic experience, including the situational settings in which users speak their language(s), was essential both for the comparison between bilingual and bidialectal language processing (Chapter 3) and for studying the role of register on the processing of Subject-Verb agreement (Chapter 4). In sum, the obtained results stress the need to account for the complex network of situational and social factors of our linguistic experience when investigating bilingual cognitive adaptations and language processing mechanisms. In light of this, the following section will be devoted to potential future developments aimed at addressing this complexity.

5.2 Future perspectives: Applying network models to represent the complexity of the bilingual and bidialectal experiences

The overarching message conveyed by the findings reported in this dissertation could be summarized as follows: We need to embrace as many sociolinguistic variables as possible when investigating the cognitive adaptations of linguistic experience. The importance of appreciating the gradient nature of bilingualism becomes essential especially if we consider that the concept of a "monolingual benchmark" in bilingualism research is becoming an impractical standard (Salig et al., 2021; Rothman et al., 2023; Leivada et al., 2023). Thus, rather

than comparing "pure" monolinguals to bilinguals, we should assess the degree of bilingualism of different users on a continuum, embracing the complex network of factors related to people's language use and practices. However, appreciating the complexity of the bilingual experience is as crucial as it is challenging.

In the last years, one way of meeting this challenge was the development of network models, which are the product of interdisciplinary cooperation that resulted in Network Science (Tiv et al., 2020). Network models adeptly capture the interplay of distinct variables by representing them within a web-like structure. The essential components of network models are (i) the nodes and (ii) the edges, which are the connections between nodes. Properties, such as the direction and the strength of correlations between nodes, are determined by the distribution and the weight of the edges. According to the distribution of nodes and edges, networks vary in size and density. Among the most widespread network models in linguistics, there are semantic networks, focused on how words are connected and co-activated, neural networks, used to describe how linguistic information is diffused among brain regions, and social networks, which depict how people interact among each other (Vitevitch & Castro, 2015; Vitevitch, 2019). Social networks turned out to be particularly suitable for the description of language use in different contexts and communities. In most social network models, language users represent the nodes, while the interaction between people across situational contexts is represented by the edges (Maheshwari & Albert 2020; Burger, 2021).

Among the different applications of network models in bilingualism research, many studies focused on bilingual language use. Gullifer & Titone (2019) borrowed the concept of entropy from physics to explain the different language use dynamics across distinct bilingual communicative contexts. In research on bilingualism, the concept of entropy has been defined as "the relative balance or diversity of language use and/or exposure within and across communicative contexts" (Beatty-Martínez & Titone, 2021). Through a linguistic background questionnaire, the authors estimated the number of possible languages used in various situational contexts and calculated five entropy scores concerning language use at home, at work, for social exchanges, and during reading and speaking activities. Results showed that entropy scores correlated with other indices of the bilingual experience gathered through the background questionnaire. The concept of entropy was also crucial for Tiv et al. (2020), who represented patterns of language use in the French-English bilingual community of Montréal. By collecting information about language use across different communicative contexts (i.e., home, work, etc.) and topics (i.e., politics, sports, moral issues, etc.), they created network graphs where the nodes were the conversational topics, while the edges connected topics which

were discussed in the same context. The authors found different degrees of entropy for various communicative contexts, which were lower in work environments and higher in social settings.

One of the possible future developments of this dissertation could be readapting Tiv et al.'s (2020) methodology to our bilingual and bidialectal populations. Building network models for the representation of language use across distinct bilingual and bidialectal groups could facilitate the description and comparison of different sociolinguistic dynamics for each community. Gathering information about language use across different contexts, topics, and interlocutors, something which I did through the detailed sociolinguistic questionnaire of my studies, would be the starting point. Indeed, by conceptualizing conversational topics and communicative settings as network nodes, I could depict the language dynamics of the community by establishing connections between nodes that exhibit similar language use patterns. The thickness of the edges and the color of the nodes would correspond to the degree of similarity in language use patterns between the connected nodes. The thicker an edge is, the more similar language use the two contexts (i.e., nodes) would share. Likewise, nodes that have a similar color would share comparable language use patterns (see Figure 1).

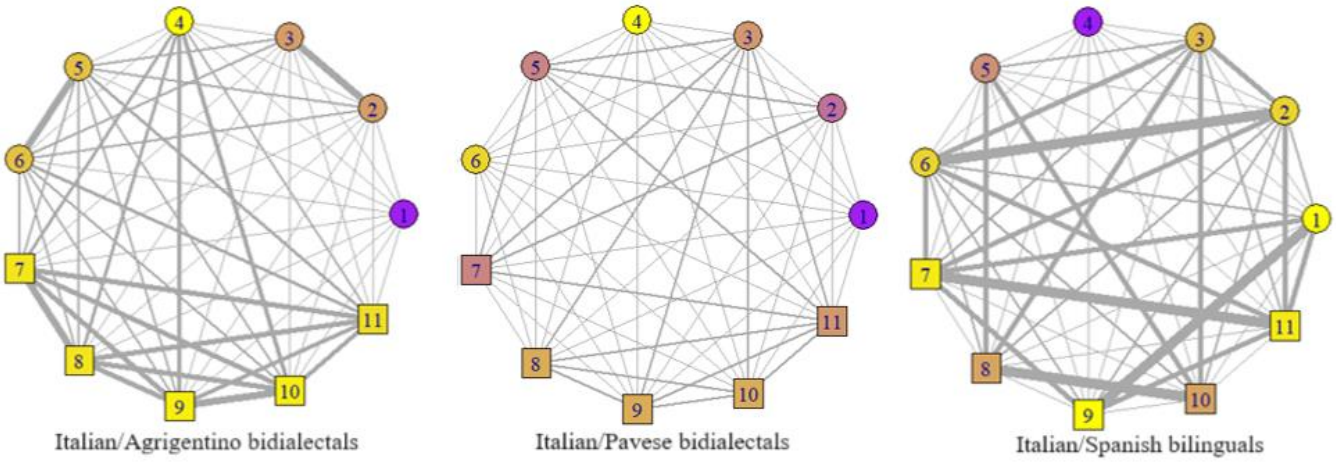

Figure 1. Example of the possible representation of language use across different conversational topics for our bilingual and bidialectal groups. The nodes' numbers correspond to the following topics: 1 = "talking about family", 2 = "talking about emotional issues", 3 = "talking about private issues", 4 = "talking about school/job", 5 = "talking about your hobbies", 6 = "talking about sport", 7 = "talking about politics and society", 8 = "talking about current events", 9 = "talking about religion", 10 = "talking about culture", 11 = "talking about health". Nodes with a circular shape indicate topics generally discussed in low register, while nodes with a square shape indicate topics generally discussed in high register. Nodes with similar

colors denote comparable language use patterns, while thicker edges between nodes further emphasize these relationships.

Besides bilingual language use patterns, network models can also help in describing whether and how different factors of the bilingual experience correlate. In this regard, Kałamała et al. (2023) compared the outcomes of a factor model and a network model, which differ in how social and experiential variables of the bilingual experience are represented. The factor model builds on a latent variable framework in which multiple variables are seen as the expression of a unique common factor that underlies the bilingual experience. However, such variables belong to different dimensions (i.e., language use, social status of the language, individual and emotional factors, etc.), and reducing them to a unique common denominator would prevent us from appreciating their unique impact on the bilingual experience. Differently from the latent variable framework, the network model sets the single variables as nodes, while the edges depict how these variables interact with each other. In this way, it is possible to represent different variables independently and, at the same time, observe their interactions. Kałamała et al.'s (2023) network model turned out to be better than the factor model in grasping the role of specific factors of the bilingual experience: Variables that occupied a central position in the network were the ones that showed greater variability in the bilingual experience, and thus deserve more attention.

The future application of Kałamała et al.'s (2023) network model to the bidialectal groups included in this dissertation can reveal (i) whether this approach is also suitable for representing the bidialectal experience, where the interaction between sociolinguistic factors is particularly complex, and (ii) whether the network structures of bilingual and bidialectal groups share some properties. The potential finding of shared properties would lead to theoretically loaded insights for research on bilingualism. Indeed, recognizing shared central positions of (socio)linguistic variables across distinct bilingual and bidialectal populations could lead to prioritizing such variables when operationalizing bilingualism. If instead, significantly different network structures are found for each bilingual and bidialectal group, we will still have an informative result, which suggests that, for each specific bilingual experience, we should examine the network structure to accurately assess and assign appropriate weight to each variable. The first step for this potential future development would consist of recruiting a larger number of participants from our bidialectal communities in Pavia and Agrigento. However, other issues might need to be addressed too, such as the non-normal distribution of

the sociolinguistic factors of the bilingual experience to build network graphs, which is typical of the variables examined in social sciences (Olvera Astivia, 2020; Knief & Forstmeier, 2021).

Besides the possibility of analyzing data from the bilingual and bidialectal communities through network models, future work could concern the analyses of the fillers included in the AJT, as well as the experimental stimuli presented in dialect to Italian-/Agrigentino-speaking and Italian-/Pavese-speaking bidialectals. The first point would allow me to expand my exploratory work to other linguistic phenomena besides Subject-Verb agreement mismatches. In particular, the fillers of our AJT involve auxiliary selection, which could be an interesting phenomenon to investigate in light of the variation characterizing the second languages of our bilingual and bidialectal participants (i.e., Agrigentino, Pavese, Spanish). Regarding the analyses of the dialectal stimuli, the comparison between the acceptability ratings of our bidialectal participants for sentences presented in Standard Italian vs. their minority language (i.e., Agrigentino or Pavese) could offer insights into the interplay of these two systems from a linguistic and sociolinguistic perspective, revealing further potential differences between our bidialectal communities.

5.3 Conclusions

Human beings possess the unique characteristic of engaging in linguistic communication. Linguistic activity is characterized not only by the complex cognitive mechanisms entailed in successfully speaking/signing but also by the social and identitarian values that language carries (Tajfel, 1978; Jaspal, 2009). This dissertation aimed to delve into the social dimension of language from different perspectives, which covered the topics of bilingual cognitive adaptations, linguistic register variation, and their effect on language processing.

The systematic review presented in Chapter 2 emphasizes the importance of integrating cognitive and social factors while examining bilingual cognitive adaptations, which can be comprehensively understood only by recognizing the equal significance of both the social and cognitive dimensions in the bilingual experience. The experimental results of Chapter 3 support this need. Specifically, the inclusion of Italian bidialectal speakers was particularly relevant to highlight the impact of the sociolinguistic dimension on language processing, suggesting the importance of considering underrepresented populations of non-standard languages for a deeper understanding of how social factors shape language practices. Chapter 4 unveiled the significant impact of linguistic register variation on language processing mechanisms,

revealing its joint contribution alongside speakers' linguistic background. Finding that linguistic register variation influences how we process specific linguistic structures underscores the need for including the cognitive dimension of register in its theorization, complementing its sociolinguistic description.

All in all, the findings presented in this dissertation convey a common message: We need to embrace a social-based approach when investigating the mechanisms underlying language processing and, more in general, linguistic cognitive adaptations. This could foster the development of new theoretical frameworks that encompass the linguistic experience from a more holistic perspective, where both the cognitive and the social dimension are equally valued and explored.

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Appendix A – Sociolinguistic questionnaire for bidialectal participants

Questionario Sociodemografico

Il seguente questionario raccoglierà informazioni sul tuo background linguistico (quali lingue usi e come). Le informazioni personali verranno trattate nel **rispetto della privacy** e la tua **identità** rimarrà **anonima**. Le domande contrassegnate con asterisco saranno obbligatorie per continuare, quindi assicurati di dare una risposta. Altre invece saranno facolative. Grazie in anticipo per il tuo tempo!

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1. Genere*

- Femmina
- Maschio
- Non binario

2. Livello di istruzione*

3. Professione attuale*

- Lavoratore / tempo pieno
- Lavoratore / part-time
- Disoccupat@
- Pensionat@
- Studente (specifica anno di studi e facoltà)

4. Sei destro o mancino?*

5. La tua data di nascita*

6. Hai problemi d'udito?*

- Sì
- No

Se sì, porti un apparecchio acustico/audioprotesi?

- Sì
- No

Con questi sussidi, riesci a sentire bene?

- Sì
- No

7. Hai mai avuto una lesione alla testa?*

- Sì
- No

Se sì, specifica che tipo di problema hai avuto:

8. Hai problemi di vista?*

Se sì, indossi occhiali o lenti a contatto?

- Sì
- No

13. Con questi sussidi, la tua visione si corregge?

- Sì
- No

9. Hai qualche deficit neurologico riconosciuto? (e.g., epilessia, ecc)*

Se sì, specifica:

10. Stai seguendo una cura psicoattiva (assumendo psicofarmaci o altri medicinali)?*

- Sì
- No

Se sì, specifica che tipo di farmaco assumi:

11. Per favore, indica le seguenti informazioni sui tuoi genitori:*

	Nessun titolo	Licenza elementare	Licenza media	Qualifica di scuola professionale	Diploma di scuola media superiore	Laurea	Titolo post-laurea
Madre							
Padre							

12. Qual è la professione attuale di tua madre?*

13. Qual è la professione attuale di tuo padre?*

14. Qual è/ quali sono (se ne ha più di una) la/e lingua/e madre/prima lingua (o dialetto) di tua madre?*

15. Qual è/quali sono (se ne ha più di una) la/e lingua/e madre/prima lingua (o dialetto) di tuo padre?*

16. Specifica quali altre lingue/dialetti parla tua madre*. (Se non ne parla altre/i, scrivi "0")

17. Specifica quali altre lingue/dialetti parla tuo padre*.(Se non ne parla altre/i, scrivi "0")

18. Sei nato in Italia?*

- Sì
- No

Se **non** sei nato in Italia, specifica dove sei nato:

Se **non** sei nato in Italia, specifica a che età ti sei trasferito in Italia:

19. In quale città vivi attualmente?

20. Hai mai vissuto in un luogo in cui l'Italiano non è la principale lingua per comunicare?*

- Sì
- No

21. Se hai vissuto in un luogo in cui l'Italiano **non** è la lingua principale, indica dove e per quanto tempo:

Sezione Linguistica 1

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1. Oltre all'Italiano, parli un dialetto?* Non importa il tuo grado di competenza, anche se sai solo qualche frase, rispondi "sì". Nelle domande successive avrai modo di specificare come lo parli.

- Sì
- No

Se sì, specifica quale (es. pavese/agrigentino/milanese, ecc):

2. (Se parli dialetto) Tra italiano e dialetto quale lingua, in generale, parli più facilmente?

- Italiano
- Dialetto
- Altro

3. Elenca tutte le lingue e i dialetti che parli e capisci, compreso l'Italiano. Elencali mettendo per prima la lingua/il dialetto che parli più fluentemente e per ultima quella che parli meno fluentemente:*

Usa il formato: Lingua/Dialetto 1 - Lingua/dialetto 2 - ecc

Es. Italiano - Pavese / Italiano - Agrigentino, ecc

4. Per ognuna delle lingue/dialetti che hai elencato, specifica le seguenti informazioni*:
Se non parli più di una lingua/dialetto, puoi saltare le domande su lingue/dialetti addizionali.

Lingua/Dialetto 1: Dove l'hai imparata/o? (Puoi selezionare più opzioni) *

- Casa
- Scuola
- Comunità in cui vivo
- Altro:

Lingua/Dialetto 1: A che età sei stato esposto/a o hai sentito questa lingua per la prima volta? (Se dalla nascita, scrivi "0")*

Lingua/Dialetto 1: A che età hai iniziato ad usare questa lingua attivamente (ogni giorno, parlando e comunicando)?*

Lingua/Dialetto 1: Ci sono stati dei periodi della tua vita nei quali non hai usato questa lingua? Indicane la durata in mesi/anni*

Lingua/Dialetto 2: Dove l'hai imparata/o? (Puoi selezionare più opzioni)

- ☐ Casa
- ☐ Scuola
- ☐ Comunità in cui vivo
- ☐ Non ho una seconda lingua/dialetto
- ☐ Altro:

Lingua/Dialetto 2: A che età sei stato esposto/a o hai sentito questa lingua per la prima volta? (Se dalla nascita, scrivi “0”)

Lingua/Dialetto 2: A che età hai iniziato ad usare questa lingua attivamente (ogni giorno, parlando e comunicando)?

Lingua/Dialetto 2: Ci sono stati dei periodi della tua vita nei quali non hai usato questa lingua? Indicane la durata in mesi/anni.

Lingua/Dialetto 3: Dove l’hai imparata/o? (Puoi selezionare più opzioni)

- ☐ Casa
- ☐ Scuola
- ☐ Comunità in cui vivo
- ☐ Altro:

Lingua/Dialetto 3: A che età sei stato esposto/a o hai sentito questa lingua per la prima volta? (Se dalla nascita, scrivi “0”)

Lingua/Dialetto 3: A che età hai iniziato ad usare questa lingua attivamente (ogni giorno, parlando e comunicando)?

Lingua/Dialetto 3: Ci sono stati dei periodi della tua vita nei quali non hai usato questa lingua? Indicane la durata in mesi/anni.

Lingua/Dialetto 4: Dove l'hai imparata/o? (Puoi selezionare più opzioni)

- ☐ Casa
- ☐ Scuola
- ☐ Comunità in cui vivo
- ☐ Altro:

Lingua/Dialetto 4: A che età sei stato esposto/a o hai sentito questa lingua per la prima volta? (Se dalla nascita, scrivi "0")

Lingua/Dialetto 4: A che età hai iniziato ad usare questa lingua attivamente (ogni giorno, parlando e comunicando)?

Lingua/Dialetto 4: Ci sono stati dei periodi della tua vita nei quali non hai usato questa lingua? Indicane la durata in mesi/anni.

5. Qual è la tua competenza in dialetto?

- ○ Non lo capisco e non lo parlo
- ○ Lo capisco (anche se non benissimo) ma non lo parlo
- ○ Lo capisco e lo parlo (anche se non fluentemente)
- ○ Lo capisco e lo parlo abbastanza bene
- ○ Lo capisco e lo parlo benissimo

6. (Se parli dialetto) **Da chi ha imparato il dialetto?** (Puoi selezionare più opzioni)

	Sì	**No**
Da mia madre	○	○
Da mio padre	○	○
Dai miei nonni	○	○
Da zii e zie	○	○

Da fratelli e sorelle più grandi	○	○
Da cugini e cugine	○	○
Da compagni di giochi	○	○
Da compagni di scuola	○	○
Da compagni di lavoro	○	○

7. (Se parli dialetto) **Quale lingua ha imparato per prima tra l'italiano e il dialetto?**

- ○ L'italiano
- ○ Il dialetto
- ○ Contemporaneamente l'italiano e il dialetto

8. Indica quanto ti consideri competente, a livello generale, nelle seguenti lingue.

1 indica il minor grado assoluto di competenza, 5 il grado più alto di competenza

Italiano*

Nessuna competenza **Alta competenza**

Dialetto*

Nessuna competenza **Alta competenza**

Altra lingua (Qui, inserisci un'altra lingua **solo** se la parli quasi ogni giorno per lavoro/in famiglia/con amici, in modo attivo. **Specifica quale**:

Nessuna competenza **Alta competenza**

9. Indica il tuo grado di competenza linguistica per le seguenti lingue e nelle specifiche attività elencate, su una scala da 1 a 5*:

Italiano*

	1	2	3	4	5
Parlare	○	○	○	○	○
Capire	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

(Se parli dialetto) **Dialetto**

	1	2	3	4	5
Parlare	○	○	○	○	○
Capire	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

(Se parli un'altra lingua) **Altra lingua**

	1	2	3	4	5
Parlare	○	○	○	○	○
Capire	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

10. Nel tempo in cui svolgi le seguenti attività durante la tua giornata, quanto spesso usi l'Italiano?*

	Mai	Poche volte	A volte	La maggior parte del tempo	Sempre
Parlare	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

(Se parli dialetto) **Nel tempo in cui svolgi le seguenti attività durante la tua giornata, quanto spesso usi il dialetto**?

	Mai	**Poche volte**	**A volte**	**La maggior parte del tempo**	**Sempre**
Parlare	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

(Se parli un'altra lingua) **Nel tempo in cui svolgi le seguenti attività durante la tua giornata, quanto spesso usi l'altra lingua che hai specficato**?

	Mai	**Poche volte**	**A volte**	**La maggior parte del tempo**	**Sempre**
Parlare	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

11. Tra Italiano e dialetto, che lingua hai prevalentemente ascoltato/usato in questi periodi della tua vita, sia a casa che fuori casa?*

	Sempre Italiano	**Prevalentemente Italiano**	**Metà Italiano metà dialetto**	**Principalmente dialetto**	**Solo dialetto**
Infanzia (0-3 anni)	○	○	○	○	○
Età prescolare (3-5 anni)	○	○	○	○	○
Scuola primaria (6-13 anni)	○	○	○	○	○
Scuola secondaria (13-18 anni)	○	○	○	○	○

12. In una giornata, in che forma ti capita di sentire/vedere il dialetto?* (Puoi selezionare più opzioni)

- [ ] Non lo sento/vedo mai
- [ ] Parlandolo
- [ ] Sentendo altri che lo parlano
- [ ] In forma scritta (messaggi/insegne/pubblicità)
- [ ] Altro:

13. Quanto tempo passi generalmente in ognuno di questi contesti?* Specifica le percentuali approssimative, in modo tale che la loro somma dia 100%

Casa*

Scuola/Università* (Se non frequenti questo luogo, scrivi 0%)

Lavoro* (Se non lavori, scrivi 0%)

Altri contesti diversi da casa e lavoro*

14. Attualmente, qual è la percentuale di tempo approssimativa che passi ogni giorno parlando queste lingue/dialetti? Specifica le percentuali approssimative, in modo tale che la loro somma dia 100%*
Es.: 50% Italiano, 50% dialetto oppure 70% italiano, 30% dialetto oppure 40% dialetto, 40% italiano, 20% altra lingua

Indica "0%" se non parli mai quella lingua/dialetto durante la giornata

Italiano*

Dialetto*

Altra lingua (Se parli un'altra lingua, specifica quale)

15. Elenca la percentuale con cui usi a casa l'italiano e le altre lingue/dialetti che conosci. Indica "0%" se non parli mai quella lingua/dialetto durante la giornata*
(Ricorda che le percentuali devono arrivare a un totale di 100%

Italiano*

Dialetto* (Se usi un'altra lingua/dialetto, specifica quale)

Altra lingua/Dialetto (Se parli un'altra lingua, specifica quale)

16. Quanto spesso usi l'italiano e le altre tue lingue/dialetti a scuola/università? Indica "0%" se non parli mai quella lingua/dialetto durante la giornata.
Ricorda che le percentuali devono arrivare a un totale di 100%.

Se non frequenti questo luogo, puoi saltare la domanda

Italiano*

Dialetto*

Altra lingua/Dialetto* (Se parli un'altra lingua, specifica quale)

17. Elenca la percentuale con cui usi al lavoro l'italiano e le altre lingue/dialetti che conosci. Indica "0%" se non parli mai quella lingua/dialetto durante la giornata.
Ricorda che le percentuali devono arrivare a un totale di 100%

Se non lavori, puoi saltare la domanda

Italiano*

Dialetto*

Altra lingua/Dialetto* (Se parli un'altra lingua, specifica quale)

18. Elenca la percentuale con cui usi l'italiano e le altre lingue/dialetti che conosci in contesti che non siano casa/scuola/lavoro. Indica "0%" se non parli mai quella lingua/dialetto durante la giornata*.
(Ricorda che le percentuali devono arrivare a un totale di 100%)

Italiano*

Dialetto*

Altra lingua/Dialetto* (Se parli un'altra lingua, specifica quale)

19. Attualmente, tra Italiano e dialetto, che lingua usi prevalentemente in famiglia?*
Se non hai alcuni di questi parenti, segnalo nell'apposita colonna.

	Non ho questi parenti	**Sempre Italiano**	**Prevalentemente Italiano**	**Metà Italiano metà dialetto**	**Principalmente dialetto**	**Solo dialetto**
Con i genitori	○	○	○	○	○	○
Con il coniuge/compagn@	○	○	○	○	○	○
Con i figli	○	○	○	○	○	○
Con i fratelli/le sorelle	○	○	○	○	○	○

Con i nonni	○	○	○	○	○	○
Con altri parenti	○	○	○	○	○	○

20. Attualmente, tra Italiano e dialetto, che lingua usi prevalentemente con queste persone?*

	Sempre Italiano	Prevalentemente Italiano	Metà Italiano metà dialetto	Principalmente dialetto	Solo dialetto
Con amici	○	○	○	○	○
Con conoscenti	○	○	○	○	○
Con vicini di casa	○	○	○	○	○
Con estranei della propria regione	○	○	○	○	○
Con il medico di famiglia	○	○	○	○	○
Con i colleghi, fuori dal lavoro	○	○	○	○	○
Con compagni di scuola (fuori da scuola)	○	○	○	○	○
Con colleghi di università (fuori dall'università)	○	○	○	○	○
Con il parroco	○	○	○	○	○

21. Attualmente, tra Italiano e dialetto, che lingua usi prevalentemente in questi luoghi?*

	Sempre Italiano	Prevalentemente Italiano	Metà Italiano metà dialetto	Principalmente dialetto	Solo dialetto
Luogo di lavoro	○	○	○	○	○
Uffici del comune	○	○	○	○	○
Negozi della città/mercato	○	○	○	○	○
Bar o caffè	○	○	○	○	○
Scuola	○	○	○	○	○
Attività sportive	○	○	○	○	○
Chiesa/Luoghi di culto	○	○	○	○	○

Ospedale	○	○	○	○	○

22. Indica quale lingua usi per le seguenti attività, tra Italiano e dialetto:*

	Sempre Italiano	**Prevalentemente Italiano**	**Metà Italiano metà dialetto**	**Principalmente dialetto**	**Solo dialetto**
Leggere	○	○	○	○	○
Mandare email	○	○	○	○	○
Messaggiare	○	○	○	○	○
Social media (e.g. Facebook, Twitter etc.)	○	○	○	○	○
Scrivere appunti, lista della spesa, ecc.	○	○	○	○	○
Guardare TV/Ascoltare radio	○	○	○	○	○
Cercare su internet	○	○	○	○	○
Pregare	○	○	○	○	○
Pensare/Parlare con te stesso	○	○	○	○	○
Esprimere emozioni	○	○	○	○	○
Sognare	○	○	○	○	○
Contare/Fare calcoli	○	○	○	○	○

23. Indica quale lingua usi per i seguenti contesti/argomenti di conversazione, tra Italiano e dialetto:*

	Sempre Italiano	**Prevalentemente Italiano**	**Metà Italiano metà dialetto**	**Principalmente dialetto**	**Solo dialetto**
Salutare	○	○	○	○	○
Sgridare o minacciare	○	○	○	○	○
Esprimere rabbia	○	○	○	○	○
Esprimere gioia/felicità	○	○	○	○	○
Raccontare fatti della vita quotidiana	○	○	○	○	○

Raccontare pettegolezzi	○	○	○	○	○
Raccontare storie, fiabe	○	○	○	○	○
Fare dell'umorismo / Raccontare barzellette	○	○	○	○	○
Auguri o condoglianze	○	○	○	○	○
Imprecare	○	○	○	○	○
Scherzare	○	○	○	○	○
Parlare di questioni di famiglia	○	○	○	○	○
Parlare di questioni sentimentali /commoventi	○	○	○	○	○
Parlare di questioni private/personali	○	○	○	○	○
Parlare di lavoro/scuola/università	○	○	○	○	○
Parlare dei tuoi hobby	○	○	○	○	○
Parlare di sport	○	○	○	○	○
Parlare di temi politici e sociali	○	○	○	○	○
Parlare delle ultime notizie di attualità	○	○	○	○	○
Parlare di religione	○	○	○	○	○
Parlare di questioni culturali	○	○	○	○	○
Parlare di salute	○	○	○	○	○

24. (Se parli dialetto) **Quando parli dialetto, qual è il principale motivo per cui scegli di parlare il tuo dialetto?**

- ○ Mi viene naturale per comunicare nella vita di tutti i giorni
- ○ Mi sforzo per mantenerlo vivo e non perderlo
- ○ Lo uso solo in contesti ironici/per gioco
- ○ Lo uso perché con certe persone è l'unico modo per farmi capire
- ○ Perché per esprimere certi concetti mi risulta più facile dell'Italiano
- ○ Altro:

25. Se il suo interlocutore parla abitualmente in dialetto, tu in che lingua gli rispondi?*

- Solo in Italiano
- Prevalentemente in Italiano
- Metà in Italiano metà in dialetto
- Principalmente in dialetto
- Solo in dialetto

26. Su una scala da 1 (totalmente diverso) a 5 (molto simile) quanto consideri che il tuo dialetto sia simile all'italiano?*

Totalmente diverso **Molto simile**

27. Credi che una persona italiana che non conosce il tuo dialetto riuscirebbe a capirlo?*

28. (Se parli dialetto) **Usi il tuo dialetto per comunicare con persone italiane che non appartengono alla tua comunità dialettale?**

29. (Se parli dialetto) **Potendo scegliere di poter parlare con una persona che è ugualmente fluente in tutte le tue lingue, in che lingua sceglieresti di parlare?**

- Solo in Italiano
- Prevalentemente in Italiano
- Metà in Italiano metà in dialetto
- Principalmente in dialetto
- Solo in dialetto

Sezione linguistica 2

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1. Alcune persone passano da una lingua all'altra, tra quelle che conoscono, all'interno di un'unica conversazione (per esempio, mentre parlano in una lingua, usano anche frasi di un'altra lingua). Questo fenomeno viene definite **language-swicthing**. Un esempio può essere: "Stamattina mi sono svegliato, …..*frase in dialetto*…, poi ho incontrato Claudia").
Indica quanto spesso ti capita di usare simultaneamente le tue lingue (Italiano/Dialetto o Italiano/Altra lingua), facendo il cosiddetto language-switching.
Se non sai nessun'altra lingua/dialetto oltre l'italiano, clicca sul riquadro "0" qui sotto.

0

Se parli almeno un'altra lingua/dialetto oltre all'Italiano, clicca qui e specifica tra quali lingue fai language-switching (Es. Italiano/Dialetto, Italiano/Altra lingua, ecc.):

	Mai	Raramente	Qualche volta	Spesso	Sempre
Con amici e parenti					
Solo con amici					
Solo con parenti					
Con estranei che so che capiscono il mio dialetto					
Sui social media (e.g. Whatsapp/Facebook/Twitter)					

2. Indica quanto spesso ti capita di usare simultaneamente le tue lingue, facendo il cosiddetto language-switching, nei seguenti contesti.
Se non sai nessun'altra lingua oltre l'italiano, clicca sul riquadro "0" qui sotto.

0

Se parli almeno un'altra lingua/dialetto oltre all'Italiano, clicca qui e specifica tra quali lingue fai language-switching (Es. Italiano/Dialetto, Italiano/Altra lingua, ecc.):

	Mai	Raramente	Qualche volta	Spesso	Sempre
A casa					
A scuola/università (lascia questo spazio vuoto se non vai a scuola/università)					
Al lavoro					
In altri luoghi					

3. A volte capita di parlare in una lingua e, di tanto in tanto, inserire solo qualche parola in un'altra lingua (per esempio, "Ho cucinato …*.parola in dialetto*….per pranzo"). Questo fenomeno viene definito **Language-mixing**. **Indica quanto spesso ti capita di mischiare parole tra italiano/dialetto o italiano/altra lingua, facendo language mixing, in queste situazioni.**
Se non sai nessun'altra lingua/dialetto oltre l'italiano, clicca sul riquadro "0" qui sotto.

0

Se parli almeno un'altra lingua/dialetto oltre all'Italiano, clicca qui e specifica tra quali lingue fai language-mixing (Es. Italiano/Dialetto, Italiano/Altra lingua, ecc.):

	Mai	Raramente	Qualche volta	Spesso	Sempre
Con amici e parenti	○	○	○	○	○
Solo con amici	○	○	○	○	○
Solo con parenti	○	○	○	○	○
Con estranei che so che capiscono il mio dialetto	○	○	○	○	○
Sui social media (e.g. Whatsapp/Facebook/Twitter)	○	○	○	○	○

4. Indica quanto spesso ti capita di mischiare parole appartenenti alle tue lingue/dialetti , facendo il cosiddetto language-mixing, nei seguenti contesti.
Se non sai nessun'altra lingua/dialetto oltre l'italiano, clicca sul riquadro "0" qui sotto.

○ 0

○ Se parli almeno un'altra lingua/dialetto oltre all'Italiano, clicca qui e specifica tra quali lingue fai language-mixing (Es. Italiano/Dialetto, Italiano/Altra lingua, ecc.):

	Mai	Raramente	Qualche volta	Spesso	Sempre
A casa	○	○	○	○	○
A scuola/università (lascia questo spazio vuoto se non vai a scuola/università)	○	○	○	○	○
Al lavoro	○	○	○	○	○
In altri luoghi	○	○	○	○	○

5. (Se parli dialetto) **In generale, ti capita mai di non riuscire a spiegarti in italiano e di usare il dialetto?**

6. (Se parli dialetto) **In generale, ti capita mai di non riuscire a spiegarti in dialetto e di usare l'italiano?**

7. (Se parli dialetto) **Ci sono degli argomenti specifici in cui ti capita di mescolare le tue lingue (es., politica, sport, lavoro, esprimere emozioni, ecc)?**

- Sì
- No
- Non ho altre lingue oltre all'Italiano

Se hai risposto "Sì" specifica quali argomenti/situazioni e in quali lingue:

Sezione linguistica 3 (finale)

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1. (Se parli dialetto) **Ti piace parlare in dialetto? Indica quanto ti piace su una scala da 1 a 5, dove 1 è "per niente" e 5 "moltissimo"**

Per niente **Moltissimo**

2. A quale lingua ti ritieni maggiormente legato?*

- Italiano
- Dialetto
- Altra lingua (specifica quale):

3. Ti è mai capitato di sentirti a disagio o provare fastidio se il suo interlocutore ti si è rivolto nel tuo dialetto?*

4. (Se parli dialetto) **Ti è mai capitato di percepire disagio o fastidio da parte della persona con cui stavi parlando se le hai parlato nel tuo dialetto?**

5. Ti è mai capitato di percepire disagio nella persona con cui stavi parlando se lei ti si è rivolta nel tuo dialetto?*

6. Indica quanto sei d'accordo con le seguenti affermazioni su una scala da 1 a 5, dove 1 corrisponde a "per niente d'accordo" e 5 a "molto d'accordo"*:

Parlare sia italiano che dialetto rappresenta un grande vantaggio

Per niente d'accordo **Molto d'accordo**

Conoscere il dialetto, al giorno d'oggi, è inutile

Per niente d'accordo **Molto d'accordo**

Chi parla dialetto è giustamente associato ad un basso status culturale

Per niente d'accordo **Molto d'accordo**

Il dialetto sta scomparendo e non vale la pena rivitalizzarlo

Per niente d'accordo **Molto d'accordo**

L'uso del dialetto deve essere promosso perché rappresenta parte della nostra identità

Per niente d'accordo **Molto d'accordo**

7. (Se parli dialetto) **Mi sento più "me stesso" quando parlo**:

- Italiano
- Dialetto
- Entrambi nella stessa misura

8. (Se parli dialetto) **Indica le tue sensazioni nei seguenti contesti:**

	Ne vado fiero - sento di esprimere al massimo la mia identità culturale	**Sono mio agio - per me è la normalità**	**È indifferente**	**Mi sento a disagio e provo sensazioni negative**
Parli il tuo dialetto con una persona che sa (anche) il tuo dialetto				
Parli Italiano con una persona che sa (anche) il tuo dialetto				

Parli il tuo dialetto con una persona che sa solo il tuo dialetto	○	○	○	○
Parli il tuo dialetto in presenza di una persona che capisce ma non parla il tuo dialetto	○	○	○	

9. Secondo te, come è percepita generalmente una persona che parla il tuo dialetto?*

10. Rispondi alle seguenti domande, utilizzando una scala da 1 a 5, dove 1 rappresenta il valore minimo (per niente), 5 il valore massimo (moltissimo) *

10.1 Quanto ti senti parte della popolazione italiana?

Per niente **Moltissimo**

10.2 Quanto sei orgoglioso di essere italiano?

Per niente **Moltissimo**

10.3 Ritieni che essere italiano sia un aspetto centrale della tua identità?

Per niente **Moltissimo**

10.4 Quanto ti senti parte della tua comunità dialettale (es. pavese, milanese, agrigentino, ecc)?

Per niente **Moltissimo**

10.5 Quanto sei orgoglioso di essere parte della tua comunità dialettale?

Per niente **Moltissimo**

10.6 Ritieni che essere un italiano del nord o del sud (pavese/milanese/agrigentino/palermitano, ecc) sia un aspetto centrale della tua identità?

Per niente **Moltissimo**

TRANSLATION INTO ENGLISH

-

SOCIOLINGUISTIC QUESTIONNAIRE

In this questionnaire, we will ask some questions about your linguistic background (which languages can you speak and how do you use them). Data will be anonymized and gathered in compliance with Privacy. You will need to answer questions with * compulsory to go ahead with the questionnaire. The other questions without * can be left blank. Thank you for your time!

Sociodemographic section

1. Gender: ☐ Male ☐ Female ☐ Not binary

2. Education: ☐ No formal education ☐ Primary school (sixth grade) ☐ Secondary school ☐Professional school diploma ☐ High school diploma ☐ Bachelor's degree ☐ Master degree ☐ Post graduate degree

3. Current profession (Job/Study, full-time/part-time, year of study):

_____

4. Handedness: ☐ right-handed ☐ left-handed

5. Date of birth (Day/Month/Year): _____

6. Do you have hearing problems? Yes No

   If **yes**, do you wear a hearing aid? Yes No

7. Do you have vision problems? Yes No

   If **yes**, do you wear a vision aid? Yes No

8. Do you have any known neurological impairments? (e.g., epilepsy etc) Yes No

   If **yes**, please indicate: _____

9. Do you follow a psychoactive treatment?

10. Please indicate the highest level of education and occupation for each parent:
    For Level of education, please choose between: *No formal education/ Primary school (sixth grade)/ Secondary school / Professional school diploma / High school diploma / Bachelor's degree / Master degree/ Post graduate degree*

	Mother	Father
Level of education		
Profession		

Mother tongue		
Second language		
Other language/dialects		

11. What is the first language of your mother?

11.1 Which other languages can she speak?

12. What is the first language of your father?

12.1 What other language can he speak?

13. Were you born in Italy? Yes No

If **no**, where were you born?

When did you move to Italy?

14. In which city do you currently leave?

15. Have you ever lived in a place where Italian is not the dominant communicating language?

Yes No

If **yes**, please specify where and how long have you been there:

		From	**To**
If **yes**, where and for how long?	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
		Year	**Year**

Linguistic session 1

1. Do you speak an Italian dialect, besides Italian? It doesn't matter if you can speak it very fluently or not: even if you just know some sentences or words, you should answer yes

   Yes No

   If you can speak any dialect, please specify which dialect (from which city/village): _____

2. (If you speak dialect) Between Italian and dialect, which language do you speak more easily?

   ☐ Italian ☐ Dialect

3. List all the language and dialects you can speak and understand (including Italian), ***sorted by fluency*** (put first the language/dialect you can speak more fluently, last the one you speak less fluently):

Language/Dialect	Where did you learn it?	At what age have you been first exposed to it? (If l from birth, write age "0")	At what age did you start using it every day/nearly every day in active context)?	Were there any periods in your life when you did not use this language? Indicate duration in months/years.
1. _____	☐Home ☐School ☐Community ☐Other:			
2. _____	☐Home ☐School ☐Community ☐Other:			
3. _____	☐Home ☐School ☐Community ☐Other:			
4. _____	☐Home ☐School ☐Community ☐Other:			
5. _____	☐Home ☐School ☐Community ☐Other:			

4. What is your proficiency level in dialect?
   ☐ I can understand it and I can speak it ☐ I can understand it and I can speak it (even if not that fluently) ☐ I can understand it (even if not perfectly), but I can't speak it ☐ I can't neither understand nor speak it

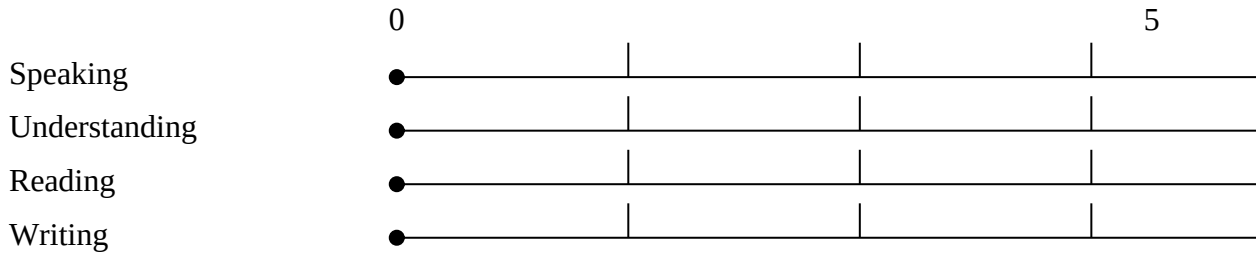
5. (If you speak dialect) Who did you learn dialect (in an active or passive way) from?
From my mother: Yes no
From my father: Yes no
From my grandparents: Yes no
From uncles and aunts: Yes no
From older brothers and sisters: Yes no
From cousins: Yes no
From playmates: Yes no
From schoolmates: Yes no
From workmates: Yes no
Other (please, specify): _____

6. (If you speak dialect) Which language did you learn first between Italian and dialect?
☐ Italian ☐ dialect ☐ Italian and dialect at the same time ☐ other language

7. Rate your proficiency level on a scale of 0-10 for the following activities conducted in each of your languages.

Italian

0 = No competence 5 = High competence



In the time you perform the following activities during your day, how often do you use Italian?

	Never	Few times	Sometimes	Most of the time	Always
Speaking	☐	☐	☐	☐	☐
Understanding	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Writing	☐	☐	☐	☐	☐

(If you speak dialect)

Dialect

0 = No competence 5 = High competence

Understanding

Reading

Writing

In the time you perform the following activities during your day, how often do you use dialect?

	Never	Few times	Sometimes	Most of the time	Always
Speaking	☐	☐	☐	☐	☐
Understanding	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Writing	☐	☐	☐	☐	☐

Other language
(_____)

0 = No competence 5 = High competence

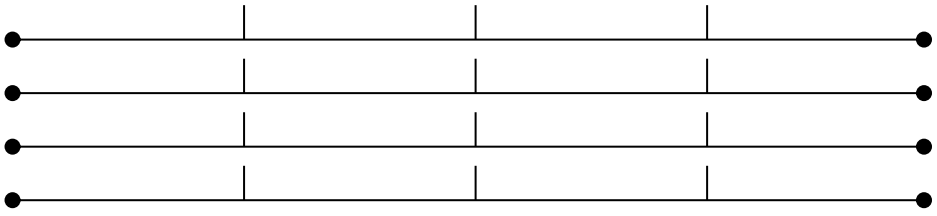
0 5

Speaking

Understanding

Reading

Writing



In the time you perform the following activities during your day, how often do you use the other language?

	Never	Few times	Sometimes	Most of the time	Always
Speaking	☐	☐	☐	☐	☐
Understanding	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Writing	☐	☐	☐	☐	☐

8. What language did you predominantly listen to/use in these periods of your life, both at home and outside home?

	Always Italian	Predominantly Italian	Half Italian half dialect	Mainly dialect	Dialect only
Infancy (0-3 years)	☐	☐	☐	☐	☐
Pre-school age (3-5 years)	☐	☐	☐	☐	☐
Primary school	☐	☐	☐	☐	☐

(6-13 years) Secondary school (13-18 years)	☐	☐	☐	☐	☐

9. In a day, in what form do you hear/see dialect? (You can select more than one option)
☐ I never hear/see it ☐ I speak it ☐ I hear others speak it ☐ I see it in a written form (messages, signs, advertisements)

10. How much time do you spend in each of the following situations, in general? Note that your answers should add up to 100%.

	Home	School	Work	Other places than home, school and work
List percentage here →				

11. List the percent use of your native language and subsequently acquired language(s) **at home**. Put 0% if you do not use that particular language (note that your answers should add up to 100%).
Native language/dialect: (specify)_____
Second language/dialect: (specify)_____
Third language/dialect: (specify)_____
Fourth language/dialect: (specify)_____

	Native language/Dialect	Second language/Dialect	Third language/Dialect	Fourth language/Dialect
List percentage here				

12. How often do you use your native language and subsequently acquired language(s) **at school/university**? Put 0% if you do not use that particular language (note that your answers should add up to 100%). Skip the question if you are not at school/university.

	Native language/Dialect	Second language/Dialect	Third language/Dialect	Fourth language/Dialect	Fifth language/Dialect
List percentage here					

13. List the percent use of your native language and subsequently acquired language(s) **at work**. Put 0% if you do not use that particular language (note that your answers should add up to 100%).

	Native language/Dialect	Second language/Dialect	Third language/Dialect	Fourth language/Dialect	Fifth language/Dialect
List percentile here					

14. List the percent use of your native language and subsequently acquired language(s) in **situations other than home, school, and work**. Put 0% when you do not use that particular language (note that your answers should add up to 100%).

	Native language/Dialect	Second language/Dialect	Third language/Dialect	Fourth language/Dialect	Fifth language/Dialect
List percentage here					

15. Currently, what language do you mainly use with these people? (Leave the space empty if you don't have any of these relatives)

	Always Italian	Predominantly Italian	Half Italian half dialect	Predominantly dialect	Dialect only
With parents	☐	☐	☐	☐	☐
With partner	☐	☐	☐	☐	☐
With your children	☐	☐	☐	☐	☐
With siblings	☐	☐	☐	☐	☐
With grandparents	☐	☐	☐	☐	☐
With other relatives	☐	☐	☐	☐	☐
With your friends	☐	☐	☐	☐	☐
With acquaintances	☐	☐	☐	☐	☐
With neighbors	☐	☐	☐	☐	☐
With strangers from your region	☐	☐	☐	☐	☐
With the family doctor	☐	☐	☐	☐	☐

With colleagues, outside of work	☐	☐	☐	☐	☐
With classmates (outside University/School)	☐	☐	☐	☐	☐
With the parish priest	☐	☐	☐	☐	☐

16. What language do you mainly use in these places?

	Always Italian	Predominantly Italian	Half Italian half dialect	Predominantly dialect	Dialect only
Place of work	☐	☐	☐	☐	☐
Municipality offices	☐	☐	☐	☐	☐
City shops/market	☐	☐	☐	☐	☐
Bar or café	☐	☐	☐	☐	☐
School	☐	☐	☐	☐	☐
Sports venues	☐	☐	☐	☐	☐
Church/Places of Worship	☐	☐	☐	☐	☐
Hospital	☐	☐	☐	☐	☐

17. Specify which language you use for the following activities:

	Always Italian	Predominantly Italian	Half Italian half dialect	Predominantly dialect	Dialect only
Reading	☐	☐	☐	☐	☐
Emailing	☐	☐	☐	☐	☐
Messaging	☐	☐	☐	☐	☐
Using social media (e.g. Facebook, Twitter etc.)	☐	☐	☐	☐	☐
Writing notes, shopping list, etc	☐	☐	☐	☐	☐
Watching TV/listening to radio	☐	☐	☐	☐	☐
Searching the Internet	☐	☐	☐	☐	☐
Praying	☐	☐	☐	☐	☐
Thinking / Talking to yourself	☐	☐	☐	☐	☐

Expressing emotions	☐	☐	☐	☐	☐
Dreaming	☐	☐	☐	☐	☐
Counting/Calculating	☐	☐	☐	☐	☐

18. Specify which language you use for the following situations:

	Always Italian	Predominantly Italian	Half Italian half dialect	Predominantly dialect	Dialect only
Greetings	☐	☐	☐	☐	☐
Screaming or threatening	☐	☐	☐	☐	☐
Expressing anger	☐	☐	☐	☐	☐
Expressing joy/happiness	☐	☐	☐	☐	☐
Telling facts of everyday life	☐	☐	☐	☐	☐
Telling gossip	☐	☐	☐	☐	☐
Making humour / Telling Jokes	☐	☐	☐	☐	☐
Sending wishes or condolences	☐	☐	☐	☐	☐
Swearing	☐	☐	☐	☐	☐
Joking	☐	☐	☐	☐	☐
Talking about family matters	☐	☐	☐	☐	☐
Talking about sentimental/emotional issues	☐	☐	☐	☐	☐
Talking about private/personal matters	☐	☐	☐	☐	☐
Talking about work/school/university	☐	☐	☐	☐	☐
Talking about your hobbies	☐	☐	☐	☐	☐
Talking about sport	☐	☐	☐	☐	☐
Talking about politics social issues	☐	☐	☐	☐	☐
Talking about the latest news	☐	☐	☐	☐	☐
Talking about religion	☐	☐	☐	☐	☐

Talking about cultural issues	☐	☐	☐	☐	☐
Talking about health	☐	☐	☐	☐	☐

19. (If you speak dialect) When you speak dialect, what is the main reason you choose to speak your dialect?
☐ It comes naturally to me to communicate in everyday life
☐I use it to keep it alive and not to lose it
☐ I use it only in ironic contexts, for fun
☐ I use it because with certain people it is the only way to make myself understood
☐ Because to express certain concepts I find it easier than Italian

20. If your interlocutor habitually speaks in dialect, in which language do you answer him/her?
☐ Italian ☐ Dialect ☐ I mix Italian and dialect ☐ Other (specify) _____

21. On a scale of 1 (totally different) to 5 (very similar), how similar do you consider your dialect to Italian? 1 2 3 4 5

22. Do you think an Italian person who does not know your dialect would be able to understand it?
☐ Yes ☐ Somewhat ☐ Not at all

23. (If you speak dialect) Do you use your dialect to communicate with Italian people who do not belong to your dialect community?
☐ Yes ☐ Only in a reduced form (few sentences or words) ☐ No

24. (If you speak dialect) If you could choose to speak with a person who is equally fluent in all your languages, in which language would you choose to speak?
☐ Italian ☐ Dialect ☐ Other language (specify which)

Linguistic section 2 – Language switching

1. Some people switch from one language to another, among those they know, within a single conversation (e.g. while speaking in one language, they also use **sentences** from another language). This phenomenon is referred to as '**language-switching**'. A brief example: "*This morning I woke up, (…..sentence in dialect…),then I met Claudia*").
Indicate how often you use your languages simultaneously, practicing the so-called language-switching. If you do not know any language other than Italian, answer with '0' in the fields below.
☐ 0
Specify among which languages you do language switching:_____

	Never	Rarely	Sometimes	Often	Always
With friends and family	☐	☐	☐	☐	☐
Only with friends	☐	☐	☐	☐	☐
Only with family	☐	☐	☐	☐	☐
With strangers who I know understand my dialect	☐	☐	☐	☐	☐
On social media (e.g. Whatsapp, Facebook, Twitter)	☐	☐	☐	☐	☐

2. Indicate how often you use your languages simultaneously, so-called **language-switching**, in the following **contexts**. If you do not know any language other than Italian, answer with '0' in the fields below.

☐ 0

Specify among which languages you do language switching:_____

	Never	Rarely	Sometimes	Often	Always
At home	☐	☐	☐	☐	☐
At school/university (Leave this space empty if you are not attending school/university)	☐	☐	☐	☐	☐
At work	☐	☐	☐	☐	☐
In other places	☐	☐	☐	☐	☐

3. Sometimes people are speaking in a language and, from time to time, they say just some **isolated words** in another language/dialect (for example, " *I cooked (….word in dialect….) for lunch*"). This phenomenon is called "**language-mixing**".

Indicate how often you mix words of your different languages, practicing the so-called language-mixing. If you do not know any language other than Italian, answer with '0' in the fields below.

☐ 0

Specify among which languages you do language mixing:_____

	Never	Rarely	Sometimes	Often	Always
With friends and family	☐	☐	☐	☐	☐
Only with friends	☐	☐	☐	☐	☐

Only with family	☐	☐	☐	☐	☐
With strangers who I know understand my dialect	☐	☐	☐	☐	☐
On social media (e.g. Whatsapp, Facebook, Twitter)	☐	☐	☐	☐	☐

4. Indicate how often you mix words from your languages, so-called **language-mixing**, in the following **contexts**. If you do not know any language other than Italian, answer with '0' in the fields below.

☐ 0

Specify among which languages you do language mixing

:_____

	Never	Rarely	Sometimes	Often	Always
At home	☐	☐	☐	☐	☐
At school/university (Leave this space empty if you are not attending school/university)	☐	☐	☐	☐	☐
At work	☐	☐	☐	☐	☐
In other places	☐	☐	☐	☐	☐

5. (If you speak dialect) Do you ever find yourself unable to explain yourself in Italian and use dialect?

☐ Sometimes ☐ Often ☐Never

6. (If you speak dialect) Do you ever find yourself unable to explain yourself in dialect and use Italian?

☐ Sometimes ☐Often ☐ Never

7. (If you speak dialect) Are there specific topics where you mix the two languages (e.g., politics, sports, work, expressing emotions, etc.)? Yes No

If yes, please specify which ones: _____

Linguistic session– Language attitudes

1. (If you speak dialect) Do you like to speak in dialect? ☐ Yes ☐ Yes, but only on certain occasions ☐ No

2. (If you speak dialect) Which language do you feel most connected to? ☐ Dialect ☐ Italian ☐ Other language

3.Have you ever felt uncomfortable or annoyed if your interlocutor addressed you in dialect? ☐ Sometimes ☐ Often ☐ Never

4. (If you speak dialect) Have you ever felt discomfort or annoyance from the person you were talking to if you spoke to them in dialect? ☐ Sometimes ☐ Often ☐ Never

5. Have you ever felt discomfort in the person you were talking to if they addressed you in dialect? ☐ Sometimes ☐Often ☐Never

6. Indicate how much you agree with the following statements:

	I don't agree at all	I quite agree	I strongly agree
Speaking both Italian and dialect is a great advantage	☐	☐	☐
Knowing dialect nowadays is useless	☐	☐	☐
I associate dialect speakers with a low cultural status	☐	☐	☐
Dialect is disappearing and not worth revitalising	☐	☐	☐
The use of dialect must be promoted because it represents part of our identity	☐	☐	☐

7. (If you speak dialect) I feel more 'myself' when I speak: ☐ Italian ☐ Dialect ☐ Both

8. (If you speak dialect) Indicate your feelings in the following contexts:

	I am proud of it, I feel I express my cultural identity to the fullest	I am at ease, for me it is normality	It is irrelevant	I feel uncomfortable and have negative feelings
You speak dialect with a person who knows (also) dialect	☐	☐	☐	☐
You speak Italian with a person who knows (also) dialect	☐	☐	☐	☐

You speak dialect with a person who only knows dialect	☐	☐	☐	☐
You speak dialect in the presence of a person who understands, but does not speak your dialect	☐	☐	☐	☐

9. In your opinion, how is a person who speaks dialect generally perceived? ☐ Poorly educated/negatively ☐ Neutrally ☐ Positively

10. Choose at least three adjectives to describe pavese/agrigent dialect:
☐ Closed ☐ Cold ☐ Fastidious ☐Pleasant ☐ Sympathetic ☐Typical ☐ Elegant ☐Rude ☐Vulgar ☐ Crude ☐Solar ☐ Twisted ☐Amusing

11. Answer the following questions, using a scale of 1 to 7, where 1 represents the lowest value ("not at all"), 7 the highest value ("very much")

11.1 How much do you feel part of the pavese/agrigent population? 1 2 3 4 5 6 7

11.2 How proud are you of being Sicilian/Lombard? 1 2 3 4 5 6 7

11.3 Is being an Italian from the north/south (Lombardy/Sicily) central to your identity? 1 2 3 4 5 6 7

11.4 How much do you feel part of the Italian population? 1 2 3 4 5 6 7

11.6 How proud are you of being Italian? 1 2 3 4 5 6 7

11.7 Is being Italian a central aspect of your identity? 1 2 3 4 5 6 7

Appendix B – Sociolinguistic questionnaire for bilingual participants

Questionario Sociodemografico

Il seguente questionario raccoglierà informazioni sul tuo background linguistico (quali lingue usi e come). Le informazioni personali verranno trattate nel **rispetto della privacy** e la tua **identità** rimarrà **anonima**. Le domande contrassegnate con asterisco saranno obbligatorie per continuare, quindi assicurati di dare una risposta. Altre invece saranno facolative. Grazie in anticipo per il tuo tempo!

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1. Genere*

- Femmina
- Maschio
- Non binario

2. Livello di istruzione*

3. Professione attuale*

- Lavoratore / tempo pieno
- Lavoratore / part-time
- Disoccupat@
- Pensionat@
- Studente (specifica anno di studi e facoltà)

4. Sei destro o mancino?*

5. La tua data di nascita*

6. Hai problemi d'udito?*

- Sì
- No

Se sì, porti un apparecchio acustico/audioprotesi?

- Sì
- No

Con questi sussidi, riesci a sentire bene?

- Sì
- No

7. Hai mai avuto una lesione alla testa?*

- Sì
- No

Se sì, specifica che tipo di problema hai avuto:

8. Hai problemi di vista?*

Se sì, indossi occhiali o lenti a contatto?

- Sì
- No

- Con questi sussidi, la tua visione si corregge?

- Sì
- No

9. Hai qualche deficit neurologico riconosciuto? (e.g., epilessia, ecc)*

Se sì, specifica:

10. Stai seguendo una cura psicoattiva (assumendo psicofarmaci o altri medicinali)?*

- Sì
- No

Se sì, specifica che tipo di farmaco assumi:

11. Per favore, indica le seguenti informazioni sui tuoi genitori:*

	Nessun titolo	Licenza elementare	Licenza media	Qualifica di scuola professionale	Diploma di scuola media superiore	Laurea	Titolo post-laurea
Madre							
Padre							

12. Qual è la professione attuale di tua madre?*

13. Qual è la professione attuale di tuo padre?*

14. Qual è/quali sono (se ne ha più di una) la/e lingua/e madre /prima lingua (o dialetto) di tua madre?*

15. Qual è/quali sono (se ne ha più di una) la/e lingua/e madre/prima lingua (o dialetto) di tuo padre?*

16. Specifica quali altre lingue/dialetti parla tua madre*. (Se non ne parla altre/i, scrivi "0")

17. Specifica quali altre lingue/dialetti parla tuo padre*.(Se non ne parla altre/i, scrivi "0")

18. Sei nato in Italia?*

- Sì
- No

Se **non** sei nato in Italia, specifica dove sei nato:

Se **non** sei nato in Italia, specifica a che età ti sei trasferito in Italia:

19. In quale città vivi attualmente?

20. Hai mai vissuto in un luogo in cui l'Italiano non è la principale lingua per comunicare?*

- Sì
- No

21. Se hai vissuto in un luogo in cui l'Italiano **non** è la lingua principale, indica dove e per quanto tempo:

Sezione Linguistica 1

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1. Sei bilingue Italiano-Spagnolo?*

- Sì
- No

2. Oltre all'Italiano e allo spagnolo, parli un dialetto italiano?* Non importa il tuo grado di competenza, che sia alta o bassa, anche se sai solo qualche frase, vale come parlare il dialetto

- Sì
- No

Se sì, specifica quale (es. pavese/agrigentino/milanese, ecc):

3. Tra Italiano e Spagnolo quale lingua, in generale, parli più facilmente?*

- Italiano
- Spagnolo
- Entrambi nella stessa misura

4. Elenca tutte le lingue e i dialetti che parli e capisci, compreso l'Italiano e lo Spagnolo. Elencali mettendo per prima la lingua/il dialetto che parli più fluentemente e per ultima quella che parli meno fluentemente:*

Usa il formato: Lingua/Dialetto 1 - Lingua/dialetto 2 - ecc

Es. Italiano - Spagnolo - Inglese - Pavese, ecc

5. Per ognuna delle lingue/dialetti che hai elencato, specifica le seguenti informazioni*: Se non parli più di una lingua/dialetto, puoi saltare le domande su lingue/dialetti addizionali.

Italiano: Dove l'hai imparata/o?* (Puoi selezionare più opzioni)

- Casa
- Scuola
- Comunità in cui vivo
- Altro:

Italiano: A che età sei stato esposto/a o hai sentito questa lingua per la prima volta?* (Se dalla nascita, scrivi "0")

Italiano: A che età hai iniziato ad usare questa lingua attivamente (ogni giorno, parlando e comunicando)?*

Italiano: Ci sono stati dei periodi della tua vita nei quali non hai usato questa lingua? Indicane la durata in mesi/anni*

Spagnolo: Dove l'hai imparata/o?*

- ☐ Casa
- ☐ Scuola
- ☐ Comunità in cui vivo
- ☐ Altro:

Spagnolo: A che età sei stato esposto/a o hai sentito questa lingua per la prima volta?*
(Se dalla nascita, scrivi "0")

Spagnolo: A che età hai iniziato ad usare questa lingua attivamente (ogni giorno, parlando e comunicando)?*

Spagnolo: Ci sono stati dei periodi della tua vita nei quali non hai usato questa lingua? Indicane la durata in mesi/anni.*

Lingua/Dialetto 3: Dove l'hai imparata/o?

- ☐ Casa
- ☐ Scuola
- ☐ Comunità in cui vivo
- ☐ Altro:

Lingua/Dialetto 3: A che età sei stato esposto/a o hai sentito questa lingua per la prima volta? (Se dalla nascita, scrivi “0”)

Lingua/Dialetto 3: A che età hai iniziato ad usare questa lingua attivamente (ogni giorno, parlando e comunicando)?

Lingua/Dialetto 3: Ci sono stati dei periodi della tua vita nei quali non hai usato questa lingua? Indicane la durata in mesi/anni.

Lingua/Dialetto 4: Dove l’hai imparata/o?

- ☐ Casa
- ☐ Scuola
- ☐ Comunità in cui vivo
- ☐ Altro:

Lingua/Dialetto 4: A che età sei stato esposto/a o hai sentito questa lingua per la prima volta? (Se dalla nascita, scrivi “0”)

Lingua/Dialetto 4: A che età hai iniziato ad usare questa lingua attivamente (ogni giorno, parlando e comunicando)?

Lingua/Dialetto 4: Ci sono stati dei periodi della tua vita nei quali non hai usato questa lingua? Indicane la durata in mesi/anni.

6. Qual è la tua competenza in Spagnolo?

- ○ Non lo capisco e non lo parlo
- ○ Lo capisco e lo parlo (anche se non fluentemente)

- Lo capisco (anche se non benissimo) ma non lo parlo
- Lo capisco e lo parlo
- Lo capisco e lo parlo benissimo

6.1 Qual è la tua competenza in Italiano?

- Non lo capisco e non lo parlo
- Lo capisco e lo parlo (anche se non fluentemente)
- Lo capisco (anche se non benissimo) ma non lo parlo
- Lo capisco e lo parlo
- Lo capisco e lo parlo benissimo

7. Da chi ha imparato lo Spagnolo?* (Puoi selezionare più opzioni)

	Sì	**No**
Da mia madre		
Da mio padre		
Dai miei nonni		
Da zii e zie		
Da fratelli e sorelle più grandi		
Da cugini e cugine		
Da compagni di giochi		
Da compagni di scuola		
Da compagni di lavoro		

7.1 Da chi ha imparato l'Italiano?* (Puoi selezionare più opzioni)

	Sì	**No**
Da mia madre		
Da mio padre		
Dai miei nonni		

Da zii e zie	○	○
Da fratelli e sorelle più grandi	○	○
Da cugini e cugine	○	○
Da compagni di giochi	○	○
Da compagni di scuola	○	○
Da compagni di lavoro	○	○

8. Quale lingua ha imparato per prima tra l'italiano e lo Spagnolo?*

- ○ L'italiano
- ○ Lo Spagnolo
- ○ Contemporaneamente l'italiano e Lo Spagnolo

9. Indica quanto ti consideri competente, a livello generale, nelle seguenti lingue.

1 indica il minor grado assoluto di competenza, 5 il grado più alto di competenza

Italiano*

Nessuna competenza **Alta competenza**

Spagnolo*

Nessuna competenza **Alta competenza**

Altra lingua/dialetto (Qui, inserisci un'altra lingua/dialetto **solo** se la parli quasi ogni giorno per lavoro/in famiglia/con amici, in modo attivo. **Specifica quale**:

Nessuna competenza **Alta competenza**

10. Indica il tuo grado di competenza linguistica per le seguenti lingue e nelle specifiche attività elencate, su una scala da 1 a 5*:

Italiano*

	1	2	3	4	5
Parlare	○	○	○	○	○
Capire	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

Spagnolo*

	1	2	3	4	5
Parlare	○	○	○	○	○
Capire	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

(Se parli un'altra lingua) **Altra lingua**

	1	2	3	4	5
Parlare	○	○	○	○	○
Capire	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

11. Nel tempo in cui svolgi le seguenti attività durante la tua giornata, quanto spesso usi l'Italiano?*

	Mai	Poche volte	A volte	La maggior parte del tempo	Sempre
Parlare	○	○	○	○	○
Leggere	○	○	○	○	○

Scrivere	○	○	○	○	○

Nel tempo in cui svolgi le seguenti attività durante la tua giornata, quanto spesso usi lo Spagnolo*?

	Mai	**Poche volte**	**A volte**	**La maggior parte del tempo**	**Sempre**
Parlare	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

(Se parli un'altra lingua) **Nel tempo in cui svolgi le seguenti attività durante la tua giornata, quanto spesso usi l'altra lingua che hai specficato**?

	Mai	**Poche volte**	**A volte**	**La maggior parte del tempo**	**Sempre**
Parlare	○	○	○	○	○
Leggere	○	○	○	○	○
Scrivere	○	○	○	○	○

12. Tra Italiano e Spagnolo, che lingua hai prevalentemente ascoltato/usato in questi periodi della tua vita, sia a casa che fuori casa?*

	Sempre Italiano	**Prevalentemente Italiano**	**Metà Italiano metà Spagnolo**	**Principalmente Spagnolo**	**Solo Spagnolo**
Infanzia (0-3 anni)	○	○	○	○	○
Età prescolare (3-5 anni)	○	○	○	○	○
Scuola primaria (6-13 anni)	○	○	○	○	○
Scuola secondaria (13-18 anni)	○	○	○	○	○

13. In una giornata, in che forma ti capita di sentire/vedere lo Spagnolo?* (Puoi selezionare più opzioni)

- [ ] Non lo sento/vedo mai
- [ ] Parlandolo
- [ ] Sentendo altri che lo parlano
- [ ] In forma scritta (messaggi/insegne/pubblicità)
- [ ] Altro:

13.1 In una giornata, in che forma ti capita di sentire/vedere l'Italiano?* (Puoi selezionare più opzioni)

- [ ] Non lo sento/vedo mai
- [ ] Parlandolo
- [ ] Sentendo altri che lo parlano
- [ ] In forma scritta (messaggi/insegne/pubblicità)
- [ ] Other (please specify)

14. Quanto tempo passi generalmente in ognuno di questi contesti?* Specifica le percentuali approssimative, in modo tale che la loro somma dia 100%

Casa*

Scuola/Università* (Se non frequenti questo luogo, scrivi 0%)

Lavoro* (Se non lavori, scrivi 0%)

Altri contesti diversi da casa e lavoro*

15. Attualmente, qual è la percentuale di tempo approssimativa che passi ogni giorno parlando queste lingue/dialetti? Specifica le percentuali approssimative, in modo tale che la loro somma dia 100%*

Es.: 50% Italiano, 50% dialetto oppure 70% italiano, 30% dialetto oppure 40% dialetto, 40% italiano, 20% altra lingua

Indica "0%" se non parli mai quella lingua/dialetto durante la giornata

Italiano*

Spagnolo*

Altra lingua/dialetto* (Se usi un'altra lingua, specifica quale)

16. Elenca la percentuale con cui usi a casa l'italiano e le altre lingue/dialetti che conosci. Indica "0%" se non parli mai quella lingua/dialetto durante la giornata*
Ricorda che le percentuali devono arrivare a un totale di 100%

Italiano*

Spagnolo*

Altra lingua/Dialetto* (Se parli usi un'altra lingua, specifica quale)

17. Quanto spesso usi l'italiano e le altre tue lingue/dialetti a scuola/università? Indica "0%" se non parli mai quella lingua/dialetto durante la giornata.
Ricorda che le percentuali devono arrivare a un totale di 100%.

Se non frequenti questo luogo, puoi saltare la domanda

Italiano*

Spagnolo*

Altra lingua/Dialetto* (Se usi un'altra lingua, specifica quale)

18. Elenca la percentuale con cui usi al lavoro l'italiano e le altre lingue/dialetti che conosci. Indica "0%" se non parli mai quella lingua/dialetto durante la giornata.
Ricorda che le percentuali devono arrivare a un totale di 100%

Se non lavori, puoi saltare la domanda

Italiano*

Spagnolo*

Altra lingua/Dialetto* (Se usi un'altra lingua, specifica quale)

19. Elenca la percentuale con cui usi l'italiano e le altre lingue/dialetti che conosci in contesti che non siano casa/scuola/lavoro. Indica "0%" se non parli mai quella lingua/dialetto durante la giornata*.
Ricorda che le percentuali devono arrivare a un totale di 100%

Italiano*

Spagnolo*

Altra lingua/Dialetto* (Se usi un'altra lingua, specifica quale)

20. Attualmente, che lingua usi prevalentemente in famiglia?*
Se non hai alcuni di questi parenti, segnalo nell'apposita colonna.

	Non ho questi parenti	Sempre Italiano	Prevalentemente Italiano	Metà Italiano metà Spagnolo	Principalmente Spagnolo	Solo Spagnolo
Con i genitori	○	○	○	○	○	○
Con il coniuge/compagn@	○	○	○	○	○	○
Con i figli	○	○	○	○	○	○
Con i fratelli/le sorelle	○	○	○	○	○	○
Con i nonni	○	○	○	○	○	○
Con altri parenti	○	○	○	○	○	○

21. Attualmente, che lingua usi prevalentemente con queste persone?*

	Sempre Italiano	Prevalentemente Italiano	Metà Italiano metà Spagnolo	Principalmente Spagnolo	Solo Spagnolo
Con amici	○	○	○	○	○
Con conoscenti	○	○	○	○	○
Con vicini di casa	○	○	○	○	○
Con estranei della propria regione	○	○	○	○	○
Con il medico di famiglia	○	○	○	○	○
Con i colleghi, fuori dal lavoro	○	○	○	○	○
Con compagni di scuola (fuori da scuola)	○	○	○	○	○
Con colleghi di università (fuori dall'università)	○	○	○	○	○

Con il parroco	○	○	○	○	○

22. Attualmente, che lingua usi prevalentemente in questi luoghi?*

	Sempre Italiano	**Prevalentemente Italiano**	**Metà Italiano metà Spagnolo**	**Principalmente Spagnolo**	**Solo Spagnolo**
Luogo di lavoro	○	○	○	○	○
Uffici del comune	○	○	○	○	○
Negozi della città/mercato	○	○	○	○	○
Bar o caffè	○	○	○	○	○
Scuola	○	○	○	○	○
Attività sportive	○	○	○	○	○
Chiesa/Luoghi di culto	○	○	○	○	○
Ospedale	○	○	○	○	○

23. Indica quale lingua usi per le seguenti attività:*

	Sempre Italiano	**Prevalentemente Italiano**	**Metà Italiano metà Spagnolo**	**Principalmente Spagnolo**	**Solo Spagnolo**
Leggere	○	○	○	○	○
Mandare email	○	○	○	○	○
Messaggiare	○	○	○	○	○
Social media (e.g. Facebook, Twitter etc.)	○	○	○	○	○
Scrivere appunti, lista della spesa, ecc.	○	○	○	○	○
Guardare TV/Ascoltare radio	○	○	○	○	○
Cercare su internet	○	○	○	○	○
Pregare	○	○	○	○	○

Pensare/Parlare con te stesso	○	○	○	○	○
Esprimere emozioni	○	○	○	○	○
Sognare	○	○	○	○	○
Contare/Fare calcoli	○	○	○	○	○

24. Indica quale lingua usi per i seguenti contesti/argomenti di conversazione:*

	Sempre Italiano	**Prevalentemente Italiano**	**Metà Italiano metà Spagnolo**	**Principalmente Spagnolo**	**Solo Spagnolo**
Salutare	○	○	○	○	○
Sgridare o minacciare	○	○	○	○	○
Esprimere rabbia	○	○	○	○	○
Esprimere gioia/felicità	○	○	○	○	○
Raccontare fatti della vita quotidiana	○	○	○	○	○
Raccontare pettegolezzi	○	○	○	○	○
Raccontare storie, fiabe	○	○	○	○	○
Fare dell’umorismo / Raccontare barzellette	○	○	○	○	○
Auguri o condoglianze	○	○	○	○	○
Imprecare	○	○	○	○	○
Scherzare	○	○	○	○	○
Parlare di questioni di famiglia	○	○	○	○	○
Parlare di questioni sentimentali /commoventi	○	○	○	○	○
Parlare di questioni private/personali	○	○	○	○	○
Parlare di lavoro/scuola/università	○	○	○	○	○

Parlare dei tuoi hobby	○	○	○	○	○
Parlare di sport	○	○	○	○	○
Parlare di temi politici e sociali	○	○	○	○	○
Parlare delle ultime notizie di attualità	○	○	○	○	○
Parlare di religione	○	○	○	○	○
Parlare di questioni culturali	○	○	○	○	○
Parlare di salute	○	○	○	○	○

25. Quando parli Spagnolo, qual è il principale motivo per cui scegli di parlare Spagnolo?*

- ○ Mi viene naturale per comunicare nella vita di tutti i giorni
- ○ Mi sforzo per mantenerlo vivo e non perderlo
- ○ Lo uso solo in contesti ironici/per gioco
- ○ Lo uso perché con certe persone è l'unico modo per farmi capire
- ○ Perché per esprimere certi concetti mi risulta più facile dell'Italiano
- ○ Altro:

25.1 Quando parli l'Italiano, qual è il principale motivo per cui scegli di parlare Italiano?*

- ○ Mi viene naturale per comunicare nella vita di tutti i giorni
- ○ Mi sforzo per mantenerlo vivo e non perderlo
- ○ Lo uso solo in contesti ironici/per gioco
- ○ Lo uso perché con certe persone è l'unico modo per farmi capire
- ○ Perché per esprimere certi concetti mi risulta più facile dello Spagnolo
- ○ Altro:

26. Se il suo interlocutore parla abitualmente in Spagnolo, ma capisce anche l'Italiano, tu in che lingua gli rispondi?*

- ○ Solo in Spagnolo
- ○ Prevalentemente in Spagnolo

- Metà in Italiano metà in Spagnolo
- Principalmente in Italiano
- Solo in Italiano

27.Potendo scegliere di poter parlare con una persona che è ugualmente fluente in Italiano e Spagnolo, in che lingua sceglieresti di parlare?*

- Solo in Spagnolo
- Prevalentemente in Spagnolo
- Metà in Italiano metà in Spagnolo
- Principalmente in Italiano
- Solo in Italiano

Sezione linguistica 2

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1. Alcune persone passano da una lingua all'altra, tra quelle che conoscono, all'interno di un'unica conversazione (per esempio, mentre parlano in una lingua, usano anche frasi di un'altra lingua). Questo fenomeno viene definite **language-swicthing**.
Un esempio può essere: "Stamattina mi sono svegliato, …..*frase in Spagnolo* …, poi ho incontrato Claudia").

Specifica qui sotto le lingue coinvolte nel **Language switching***

Indica quanto spesso ti capita di usare simultaneamente le tue lingue (Italiano/Spagnolo o Italiano/Altra lingua o dialetto), facendo il cosiddetto language-switching.*

	Mai	**Raramente**	**Qualche volta**	**Spesso**	**Sempre**
Con amici e parenti	○	○	○	○	○
Solo con amici	○	○	○	○	○
Solo con parenti	○	○	○	○	○
Con estranei che so che capiscono lo Spagnolo	○	○	○	○	○

Sui social media (e.g. Whatsapp/Facebook/Twitter)	○	○	○	○	○

2. Indica quanto spesso ti capita di usare simultaneamente le tue lingue, facendo il cosiddetto language-switching, nei seguenti contesti.*

	Mai	**Raramente**	**Qualche volta**	**Spesso**	**Sempre**
A casa	○	○	○	○	○
A scuola/università (lascia questo spazio vuoto se non vai a scuola/università)	○	○	○	○	○
Al lavoro	○	○	○	○	○
In altri luoghi	○	○	○	○	○

3. A volte capita di parlare in una lingua e, di tanto in tanto, inserire solo qualche parola in un'altra lingua (per esempio, "Ho cucinato ….*parola in Spagnolo/Dialetto*….per pranzo"). Questo fenomeno viene definito **Language-mixing**.

Specifica qui sotto le lingue coinvolte nel **Language mixing***

Indica quanto spesso ti capita di mischiare parole tra italiano/dialetto o italiano/altra lingua, facendo language mixing, in queste situazioni*.

	Mai	**Raramente**	**Qualche volta**	**Spesso**	**Sempre**
Con amici e parenti	○	○	○	○	○
Solo con amici	○	○	○	○	○
Solo con parenti	○	○	○	○	○
Con estranei che so che capiscono lo Spagnolo	○	○	○	○	○
Sui social media (e.g. Whatsapp/Facebook/Twitter)	○	○	○	○	○

4. Indica quanto spesso ti capita di mischiare parole appartenenti alle tue lingue/dialetti , facendo il cosiddetto language-mixing, nei seguenti contesti.*

	Mai	Raramente	Qualche volta	Spesso	Sempre
A casa	○	○	○	○	○
A scuola/università (lascia questo spazio vuoto se non vai a scuola/università)	○	○	○	○	○
Al lavoro	○	○	○	○	○
In altri luoghi	○	○	○	○	○

5.In generale, ti capita mai di non riuscire a spiegarti in italiano e di usare lo Spagnolo?*

6.In generale, ti capita mai di non riuscire a spiegarti in Spagnolo e di usare l'italiano?*

7. Ci sono degli argomenti specifici in cui ti capita di mescolare le tue lingue (es., politica, sport, lavoro, esprimere emozioni, ecc)?*

○ Sì

○ No

Se hai risposto "Sì" specifica quali argomenti/situazioni e in quali lingue:

Sezione linguistica 3 (finale)

1.Ti piace parlare in Spagnolo?* Indicalo su una scala da 1 a 5, dove 1 indica "per niente" e 5 "moltissimo".

Per niente **Moltissimo**

2. A quale lingua ti ritieni maggiormente legato?*

- Italiano
- Spagnolo
- Altra lingua (specifica quale):

3. Ti è mai capitato di sentirti a disagio o provare fastidio se il suo interlocutore ti si è rivolto in Spagnolo?*

4.Ti è mai capitato di percepire disagio o fastidio da parte della persona con cui stavi parlando se le hai parlato in Spagnolo?*

5. Ti è mai capitato di percepire disagio nella persona con cui stavi parlando se lei ti si è rivolta in Spagnolo?*

6. Indica quanto sei d'accordo con le seguenti affermazioni su una scala da 1 a 5, dove 1 corrisponde a "per niente d'accordo" e 5 a "molto d'accordo"*:

Parlare sia italiano che Spagnolo rappresenta un grande vantaggio

Per niente d'accordo **Molto d'accordo**

Il fatto di essere bilingue non è vantaggioso

Per niente d'accordo **Molto d'accordo**

Avere sia Italiano che Spagnolo come lingue madri può creare confusione e causare difficoltà

Per niente d'accordo **Molto d'accordo**

7. Mi sento più "me stesso" quando parlo:

- Italiano
- Spagnolo
- Entrambi nella stessa misura

8. Rispondi alle seguenti domande, utilizzando una scala da 1 a 5, dove 1 rappresenta il valore minimo (per niente), 5 il valore massimo (moltissimo) *

9.1 Quanto ti senti parte della popolazione italiana?

Per niente **Moltissimo**

9.2 Quanto sei orgoglioso di essere italiano?

Per niente **Moltissimo**

9.3 Ritieni che essere italiano sia un aspetto centrale della tua identità?

Per niente **Moltissimo**

9.4 Quanto ti senti parte della popolazione spagnola/ispanica?

Per niente **Moltissimo**

9.5 Quanto sei orgoglioso di essere parte della comunità spagnola/ispanica?

Per niente **Moltissimo**

9.6 Ritieni che avere origini spagnole/ispaniche sia un aspetto centrale della tua identità?

Per niente **Pochissimo**

TRANSLATION INTO ENGLISH
-
SOCIODEMOGRAPHIC QUESTIONNAIRE

In this questionnaire, we will ask some questions about your linguistic background (which languages can you speak and how do you use them). Data will be anonymized and gathered in compliance with Privacy. You will need to answer questions with * compulsory to go ahead with the questionnaire. The other questions without * can be left blank. Thank you for your time!

Sociodemographic section

1. Gender: ☐ Male ☐ Female ☐ Not binary

2. Education: ☐ No formal education ☐ Primary school (sixth grade) ☐ Secondary school ☐Professional school diploma ☐ High school diploma ☐ Bachelor's degree ☐ Master degree ☐ Post graduate degree

2. Current profession (Job/Study, full-time/part-time, year of study):

_____

3. Handedness: ☐ right-handed ☐ left-handed

4. Date of birth (Day/Month/Year): _____

5. Do you have hearing problems? Yes No

   If **yes**, do you wear a hearing aid? Yes No

6. Do you have vision problems? Yes No

   If **yes**, do you wear a vision aid? Yes No

7. Do you have any known neurological impairments? (e.g., epilepsy etc) Yes No

   If **yes**, please indicate: _____

   Do you follow a psychoactive treatment?

8. Please indicate the highest level of education and occupation for each parent:
   For Level of education, please choose between: *No formal education/ Primary school (sixth grade)/ Secondary school / Professional school diploma / High school diploma / Bachelor degree / Master degree/ Post graduate degree*

	Mother	Father
Level of education		
Profession		
Mother tongue		
Second language		
Other language/dialects		

9. What is the first language of your mother?

9.1 Which other languages can she speak?

10. What is the first language of your father?

11.1 What other language can he speak?

12. Were you born in Italy? Yes No

If **no**, where were you born?

When did you move to Italy?

13. Have you ever lived in a place where Italian is not the dominant communicating language?

Yes No

If **yes**, please specify where and how long have you been there:

			From	**To**
If **yes**, where and for how long?	1.	_____	_____	_____
	2.	_____	_____	_____
	3.	_____	_____	_____
			Year	**Year**

Linguistic session

1. Are you an Italian-Spanish bilingual? Yes No

2. Do you speak an Italian dialect, besides Italian? It doesn't matter if you can speak it very fluently or not: even if you just know some sentences or words, you should answer yes

Yes No

If you can speak any dialect, please specify which dialect (from which city/village):

_____

3. (If you are an Italian-Spanish bilingual) Between Italian and Spanish, which language do you speak more easily?

☐ Italian ☐ Spanish ☐ Both in the same way

4. List all the language and dialects you can speak and understand (including Italian), ***sorted by fluency*** (put first the language/dialect you can speak more fluently, last the one you speak less fluently):

Language/Dialect	Where did you learn it?	At what age have you been first exposed to it? (If l from birth, write age "0")	At what age did you start using it every day/nearly every day in active context)?	Were there any periods in your life when you did not use this language? Indicate duration in months/years.
1. _____	☐Home ☐School ☐Community ☐Other:			
2. _____	☐Home ☐School ☐Community ☐Other:			
3. _____	☐Home ☐School ☐Community ☐Other:			
4. _____	☐Home ☐School ☐Community ☐Other:			
5. _____	☐Home ☐School ☐Community ☐Other:			

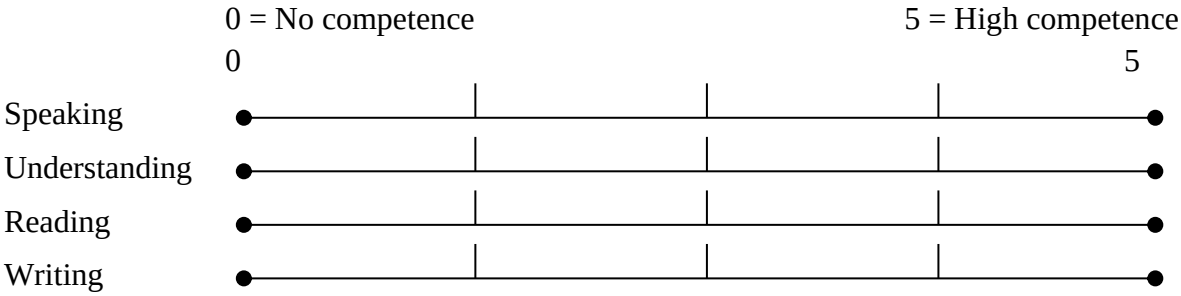
5. What is your proficiency level in Spanish?
☐ I can understand it and I can speak it ☐ I can understand it and I can speak it (even if not that fluently) ☐ I can understand it (even if not perfectly), but I can't speak it ☐ I can't neither understand nor speak it

6. (If you are an Italian-Spanish bilingual) Who did you learn Spanish (in an active or passive way) from?
From my mother: Yes no
From my father: Yes no
From my grandparents: Yes no
From uncles and aunts: Yes no
From older brothers and sisters: Yes no
From cousins: Yes no
From playmates: Yes no
From schoolmates: Yes no
From workmates: Yes no
Other (please, specify): _____

7. (If you are an Italian-Spanish bilingual) Which language did you learn first between Italian and Spanish? ☐ Italian ☐ Spanish ☐ Italian and Spanish at the same time ☐ Other language

8. Rate your proficiency level on a scale of 0-10 for the following activities conducted in each of your languages.

Italian

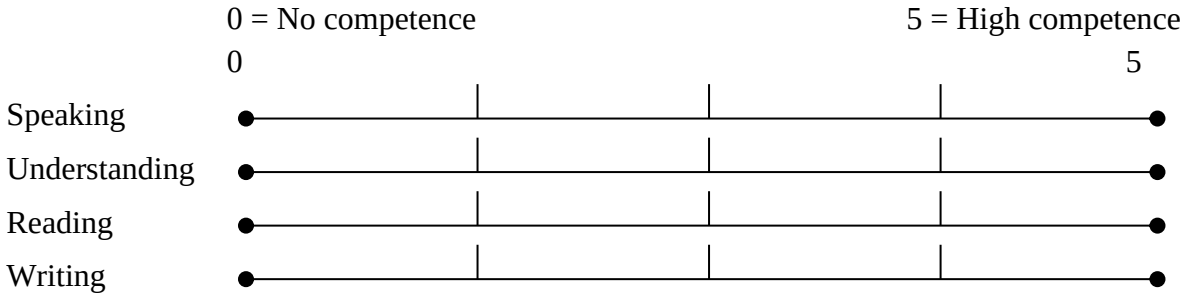


In the time you perform the following activities during your day, how often do you use Italian?

	Never	Few times	Sometimes	Most of the time	Always
Speaking	☐	☐	☐	☐	☐
Understanding	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Writing	☐	☐	☐	☐	☐

(If you are an Italian-Spanish bilingual)

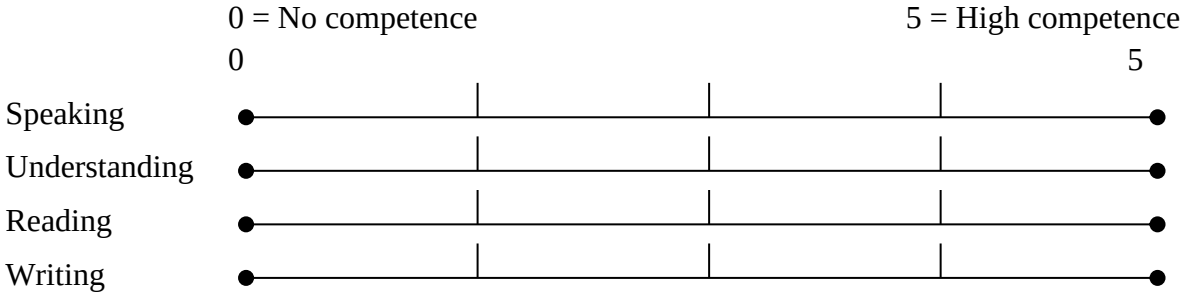
Spanish



In the time you perform the following activities during your day, how often do you use Spanish?

	Never	Few times	Sometimes	Most of the time	Always
Speaking	☐	☐	☐	☐	☐
Understanding	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Writing	☐	☐	☐	☐	☐

Other language/Dialect
(_____)



In the time you perform the following activities during your day, how often do you use the other language?

	Never	Few times	Sometimes	Most of the time	Always
Speaking	☐	☐	☐	☐	☐
Understanding	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Writing	☐	☐	☐	☐	☐

9. What language did you predominantly listen to/use in these periods of your life, both at home and outside home?

	Always Italian	Predominantly Italian	Half Italian half Spanish	Mainly Spanish	Spanish only
Infancy (0-3 years)	☐	☐	☐	☐	☐
Pre-school age (3-5 years)	☐	☐	☐	☐	☐
Primary school (6-13 years)	☐	☐	☐	☐	☐
Secondary school (13-18 years)	☐	☐	☐	☐	☐

10. In a day, in what form do you hear/see Spanish? (You can select more than one option) ☐ I never hear/see it ☐ I speak it ☐ I hear others speak it ☐ I see it in a written form (messages, signs, advertisements)

11. How much time do you spend in each of the following situations, in general? Note that your answers should add up to 100%.

	Home	School	Work	Other places than home, school and work
List percentage here →				

12. List the percent use of your native language and subsequently acquired language(s) **at home**. Put 0% if you do not use that particular language (note that your answers should add up to 100%).
Native language/dialect: (specify)_____
Second language/dialect: (specify)_____
Third language/dialect: (specify)_____
Fourth language/dialect: (specify)_____

	Native language/Dialect	Second language/Dialect	Third language/Dialect	Fourth language/Dialect
List percentage here				

13. How often do you use your native language and subsequently acquired language(s) **at school/university**? Put 0% if you do not use that particular language (note that your answers should add up to 100%). Skip the question if you are not at school/university.

	Native language/Dialect	Second language/Dialect	Third language/Dialect	Fourth language/Dialect	Fifth language/Dialect
List percentage here					

14. List the percent use of your native language and subsequently acquired language(s) **at work**. Put 0% if you do not use that particular language (note that your answers should add up to 100%).

	Native language/Dialect	Second language/Dialect	Third language/Dialect	Fourth language/Dialect	Fifth language/Dialect
List percentage here					

15. List the percent use of your native language and subsequently acquired language(s) in **situations other than home, school, and work**. Put 0% when you do not use that particular language (note that your answers should add up to 100%).

	Native language/Dialect	Second language/Dialect	Third language/Dialect	Fourth language/Dialect	Fifth language/Dialect
List percentage here					

16. Currently, what language do you mainly use with these people? (Leave the space empty if you don't have any of these relatives)

	Always Italian	Predominantly Italian	Half Italian half Spanish	Predominantly Spanish	Spanish only
With parents	☐	☐	☐	☐	☐
With partner	☐	☐	☐	☐	☐
With your children	☐	☐	☐	☐	☐
With siblings	☐	☐	☐	☐	☐
With grandparents	☐	☐	☐	☐	☐
With other relatives	☐	☐	☐	☐	☐
With your friends	☐	☐	☐	☐	☐
With acquaintances	☐	☐	☐	☐	☐
With neighbors	☐	☐	☐	☐	☐
With strangers from your region	☐	☐	☐	☐	☐
With the family doctor	☐	☐	☐	☐	☐
With colleagues, outside of work	☐	☐	☐	☐	☐
With classmates (outside University/School)	☐	☐	☐	☐	☐
With the parish priest	☐	☐	☐	☐	☐

17. What language do you mainly use in these places?

	Always Italian	Predominantly Italian	Half Italian half Spanish	Predominantly Spanish	Spanish only

Place of work	☐	☐	☐	☐	☐
Municipality offices	☐	☐	☐	☐	☐
City shops/market	☐	☐	☐	☐	☐
Bar or café	☐	☐	☐	☐	☐
School	☐	☐	☐	☐	☐
Sports venues	☐	☐	☐	☐	☐
Church/Places of Worship	☐	☐	☐	☐	☐
Hospital	☐	☐	☐	☐	☐

18. Specify which language you use for the following activities:

	Always Italian	Predominantly Italian	Half Italian half Spanish	Predominantly Spanish	Spanish only
Reading	☐	☐	☐	☐	☐
Emailing	☐	☐	☐	☐	☐
Messaging	☐	☐	☐	☐	☐
Using social media (e.g. Facebook, Twitter etc.)	☐	☐	☐	☐	☐
Writing notes, shopping list, etc	☐	☐	☐	☐	☐
Watching TV/listening to radio	☐	☐	☐	☐	☐
Searching the Internet	☐	☐	☐	☐	☐
Praying	☐	☐	☐	☐	☐
Thinking / Talking to yourself	☐	☐	☐	☐	☐
Expressing emotions	☐	☐	☐	☐	☐
Dreaming	☐	☐	☐	☐	☐
Counting/Calculating	☐	☐	☐	☐	☐

19. Specify which language you use for the following situations:

	Always Italian	Predominantly Italian	Half Italian half Spanish	Predominantly Spanish	Spanish only
Greetings	☐	☐	☐	☐	☐

Screaming or threatening	☐	☐	☐	☐	☐
Expressing anger	☐	☐	☐	☐	☐
Expressing joy/happiness	☐	☐	☐	☐	☐
Telling facts of everyday life	☐	☐	☐	☐	☐
Telling gossip	☐	☐	☐	☐	☐
Making humour / Telling Jokes	☐	☐	☐	☐	☐
Sending wishes or condolences	☐	☐	☐	☐	☐
Swearing	☐	☐	☐	☐	☐
Joking	☐	☐	☐	☐	☐
Talking about family matters	☐	☐	☐	☐	☐
Talking about sentimental/emotional issues	☐	☐	☐	☐	☐
Talking about private/personal matters	☐	☐	☐	☐	☐
Talking about work/school/university	☐	☐	☐	☐	☐
Talking about your hobbies	☐	☐	☐	☐	☐
Talking about sport	☐	☐	☐	☐	☐
Talking about politics social issues	☐	☐	☐	☐	☐
Talking about the latest news	☐	☐	☐	☐	☐
Talking about religion	☐	☐	☐	☐	☐
Talking about cultural issues	☐	☐	☐	☐	☐
Talking about health	☐	☐	☐	☐	☐

20. (If you are an Italian-Spanish bilingual) When you speak Spanish, what is the main reason you choose to speak Spanish?

☐ It comes naturally to me to communicate in everyday life
☐I use it to keep it alive and not to lose it
☐ I use it only in ironic contexts, for fun
☐ I use it because with certain people it is the only way to make myself understood
☐ Because to express certain concepts I find it easier than Italian

21. (If you are an Italian-Spanish bilingual) If your interlocutor habitually speaks Spanish, in which language do you answer him/her?
☐ Italian ☐ Spanish ☐ I mix Italian and Spanish ☐ Other (specify) _____

22. (If you are an Italian-Spanish bilingual) If you could choose to speak with a person who is equally fluent in all your languages, in which language would you choose to speak?
☐ Italian ☐ Spanish ☐ Other language (specify which)

Linguistic section– Language switching

1. Some people switch from one language to another, among those they know, within a single conversation (e.g. while speaking in one language, they also use **sentences** from another language). This phenomenon is referred to as '**language-switching**'. A brief example: "*This morning I woke up, (…..sentence in Spanish…),then I met Claudia*").
Indicate how often you use your languages simultaneously, practicing the so-called language-switching. If you do not know any language other than Italian, answer with '0' in the fields below.
☐ 0
Specify among which languages you do language switching:_____

	Never	Rarely	Sometimes	Often	Always
With friends and family	☐	☐	☐	☐	☐
Only with friends	☐	☐	☐	☐	☐
Only with family	☐	☐	☐	☐	☐
With strangers who I know understand Spanish	☐	☐	☐	☐	☐
On social media (e.g. Whatsapp, Facebook, Twitter)	☐	☐	☐	☐	☐

2. Indicate how often you use your languages simultaneously, so-called **language-switching**, in the
following **contexts**. If you do not know any language other than Italian, answer with '0' in the fields below.

☐ 0

Specify among which languages you do language switching:_____

	Never	Rarely	Sometimes	Often	Always

At home	☐	☐	☐	☐	☐
At school/university (Leave this space empty if you are not attending school/university)	☐	☐	☐	☐	☐
At work	☐	☐	☐	☐	☐
In other places	☐	☐	☐	☐	☐

3. Sometimes people are speaking in a language and, from time to time, they say just some **isolated words** in another language/dialect (for example, " *I cooked (….word in Spanish….) for lunch*"). This phenomenon is called "**language-mixing**".
Indicate how often you mix words of your different languages, practicing the so-called language-mixing. If you do not know any language other than Italian, answer with '0' in the fields below.

☐ 0

Specify among which languages you do language mixing:_____

	Never	Rarely	Sometimes	Often	Always
With friends and family	☐	☐	☐	☐	☐
Only with friends	☐	☐	☐	☐	☐
Only with family	☐	☐	☐	☐	☐
With strangers who I know understand Spanish	☐	☐	☐	☐	☐
On social media (e.g. Whatsapp, Facebook, Twitter)	☐	☐	☐	☐	☐

4. Indicate how often you mix words from your languages, so-called **language-mixing**, in the following **contexts**. If you do not know any language other than Italian, answer with '0' in the fields below.
☐ 0

Specify among which languages you do language mixing:_____

	Never	Rarely	Sometimes	Often	Always

At home	☐	☐	☐	☐	☐
At school/university (Leave this space empty if you are not attending school/university)	☐	☐	☐	☐	☐
At work	☐	☐	☐	☐	☐
In other places	☐	☐	☐	☐	☐

5. (If you are an Italian-Spanish bilingual) Do you ever find yourself unable to explain yourself in Italian and use Spanish?
☐ Sometimes ☐ Often ☐Never

6. (If you are an Italian-Spanish bilingual) Do you ever find yourself unable to explain yourself in Spanish and use Italian?
☐ Sometimes ☐Often ☐ Never

7. (If you are an Italian-Spanish bilingual) Are there specific topics where you mix the two languages (e.g., politics, sports, work, expressing emotions, etc.)? Yes No
If yes, please specify which ones: _____

Linguistic session– Language attitudes

1. (If you are an Italian-Spanish bilingual) Do you like to speak Spanish? ☐ Yes ☐ Yes, but only on certain occasions ☐ No

2. (If you are an Italian-Spanish bilingual) Which language do you feel most connected to? ☐ Spanish ☐ Italian ☐ Other language

3.Have you ever felt uncomfortable or annoyed if your interlocutor addressed you in Spanish?
☐ Sometimes ☐ Often ☐ Never

4. (If you are an Italian-Spanish bilingual) Have you ever felt discomfort or annoyance from the person you were talking to if you spoke to them in Spanish? ☐ Sometimes ☐ Often ☐ Never

5. Have you ever felt discomfort in the person you were talking to if they addressed you in Spanish? ☐ Sometimes ☐Often ☐Never

6. Indicate how much you agree with the following statements:

	I don’t agree at all	I quite agree	I strongly agree
Speaking both Italian and Spanish is a great advantage	☐	☐	☐
The fact of having two mother tongues is not that important	☐	☐	☐
Having both Italian and Spanish as mother thongues can be confusing and cause difficulties	☐	☐	☐

7. (If you are an Italian-Spanish bilingual) I feel more 'myself' when I speak: ☐ Italian ☐ Spanish ☐ Both

8. Answer the following questions, using a scale of 1 to 7, where 1 represents the lowest value ("not at all"), 7 the highest value ("very much")

8.1 How much do you feel part of the Spanish/Hispanic population? 1 2 3 4 5

8.2 How proud are you of being Spanish/Hispanic? 1 2 3 4 5

8.3 Is being Spanish/Hispanic central to your identity? 1 2 3 4 5

8.4 How much do you feel part of the Italian population? 1 2 3 4 5

8.6 How proud are you of being Italian? 1 2 3 4 5

8.7 Is being Italian a central aspect of your identity? 1 2 3 4 5

Appendix C – Supporting information from Chapter 3

S1 Table. Fixed and random effects from the GLME of Accuracy, with the monolingual group as the baseline. Accuracy rates are set as the dependent variable, language groups (i.e., "monolingual", "bilingual", "Agrigentino", and "Pavese") are set as fixed factors, while animacy, register, gender, and age are set as control factors.

Effect	Estimate	SE	z	p	by-participant SD	by-item SD
Intercept	1.636388	0.228756	7.15343	8.463602	1.9459	0.5822
Comparison between monolingual and Agrigentino groups	-1.18852	0.342797	-3.46712*	0.000526		
Comparison between monolingual and Pavese groups	0.724389	0.38912	1.861606	0.062659		
Comparison between monolingual and bilingual groups	0.324106	0.344428	0.941	0.346705		
Animacy	-0.1721	0.102849	-1.67329	0.09427		
Register	-0.21219	0.102904	-2.06203*	0.039205		
Gender	-0.20616	0.212744	-0.96907	0.332511		
Age	-0.70609	0.23108	-3.05561*	0.002246		

S2 Table. Fixed and random effects from the second GLME of Accuracy, with the Italian-Pavese bidialectal group set as the baseline. Accuracy rates are set as the dependent variable, language groups (i.e., “monolingual”, “bilingual”, “Agrigentino”, “Pavese”) are set as fixed factors, while animacy, register, gender, and age were set as control factors.

Effect	Estimate	SE	z	p	by-participant SD	by-item SD
Intercept	1.636381	0.228752	7.153502	8.459132	1.9459	0.5821
Comparison between Pavese and monolingual groups	0.140137	0.382405	0.366463	0.71402		
Comparison between Pavese and Agrigentino groups	-1.18853	0.342773	-3.46739	0.000526*		
Comparison between Pavese and bilingual group	0.324044	0.344425	0.940825	0.346794		
Animacy	-0.17212	0.102846	-1.6736	0.09421		
Register	-0.2122	0.102902	-2.06217	0.039191*		
Gender	-0.20613	0.21274	-0.96891	0.33259		
Age	-0.70602	0.23107	-3.05544	0.002247*		

S3 Table. VIF for the first GLME of Accuracy (S1 Table), with the monolingual group as the baseline.

Factor	GVIF	Df	GVIF^(1/(2*Df))
Group	1.441456	3	1.062837536
Animacy	1.000054	1	1.000026796
Register	1.000065	1	1.00003262
Gender	1.056288	1	1.027758777
Age	1.399619	1	1.183055012

S4 Table. VIF for the first GLME of Accuracy (S2 Table), with the Italian-Pavese bidialectal group set as the baseline.

Factor	GVIF	Df	GVIF^(1/(2*Df))
Group	1.44141	3	1.062831885
Animacy	1.000054	1	1.000026801
Register	1.000065	1	1.000032662
Gender	1.056281	1	1.027755472
Age	1.399575	1	1.183036283

S5 Table. Fixed and random effects from the LME of log-transformed RTs, with the monolingual group as the baseline. Log-transformed RTs are set as the dependent variable, language groups (i.e., “monolingual”, “bilingual”, “Agrigentino”, “Pavese”) and “Judgement” are set as fixed factors. Animacy, register, gender, and age are set as control factors.

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.17022	0.018932	167.4537	1.104342	0.17394	0.03158
Comparison between monolingual and Agrigentino groups	0.054767	0.030264	1.809666	0.073268		
Comparison between monolingual and Pavese groups	-0.07092	0.033487	-2.11772*	0.036623		
Comparison between monolingual and bilingual groups	-0.02693	0.030185	-0.89227	0.374345		
Judgement	0.053879	0.005734	9.397239*	< 0.000		
Animacy	0.000162	0.006459	0.025051	0.980149		
Register	-0.00039	0.006463	-0.06014	0.952368		
Gender	0.027323	0.01864	1.46577	0.145787		
Age	0.076381	0.020261	3.76992*	0.000273		
Judgement * Comparison between monolingual and Agrigentino groups	-0.01951	0.008653	-2.25437*	0.024225		
Judgement * Comparison between monolingual and Pavese groups	-0.00535	0.010848	-0.49279	0.622191		
Judgement * Comparison between monolingual and bilingual groups	-0.0105	0.009469	-1.10897	0.267506		

S6 Table. Fixed and random effects from the first LME of log-transformed RTs, with the Italian-Agrigentino bidialectal group set as the baseline. Log-transformed RTs are set as the dependent variable, language groups (i.e., "monolingual", "bilingual", "Pavese", "Agrigentino") and "Judgement" are set as fixed factors. Animacy, register, gender, and age are set as control factors.

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.169806	0.018933	167.4251	1.131487	0.17394	0.03158
Comparison between Agrigentino and monolingual groups in RTs	0.042721	0.033343	1.281236	0.203		
Comparison between Agrigentino and Pavese groups in RTs	-0.07086	0.033485	-2.11619*	0.036757		
Comparison between Agrigentino and bilingual groups in RTs	-0.02683	0.030183	-0.88877	0.376215		
Judgement	0.053714	0.005716	9.397239*	< 0.000		
Animacy	0.000162	0.006459	0.025051	0.980149		
Register	-0.00039	0.006463	-0.06014	0.952368		
Gender	0.027323	0.01864	1.46577	0.145787		
Age	0.07642	0.020271	3.76992*	0.000273		
Judgement * Comparison between Agrigentino and monolingual groups	0.035246	0.009932	3.548694*	0.000391		
Judgement * Comparison between Agrigentino and Pavese groups	-0.00533	0.010815	-0.49279	0.622191		
Judgement * Comparison between	-0.01047	0.00944	-1.10897	0.267506		

Agrigentino and bilingual groups

S7 Table. VIF for the first LME of log-transformed RTs (S5 Table), with the monolingual group as the baseline.

Factor	GVIF	Df	GVIF^(1/(2*Df))
Group	1.427898	3	1.061164902
Judgement	1.075887	1	1.037249714
Animacy	1.001349	1	1.000674323
Register	1.002767	1	1.001382758
Gender	1.054148	1	1.026717018
Age	1.382452	1	1.175777187
Group x Judgement	1.071595	3	1.011591389

S8 Table. VIF for the first LME of log-transformed RTs (S6 Table), with the Italian-Agrigentino bidialectal group as the baseline.

Factor	GVIF	Df	GVIF^(1/(2*Df))
Group	1.427898	3	1.061164902
Judgement	1.075887	1	1.037249714
Animacy	1.001349	1	1.000674323
Register	1.002767	1	1.001382758
Gender	1.054148	1	1.026717018
Age	1.382452	1	1.175777187
Group x Judgement	1.071595	3	1.011591389

S9 Table. Fixed and random effects from the second GLME of Accuracy, with the Italian-Pavese bidialectal group as the baseline. Accuracy rates are set as the dependent variable. Language group (i.e., "Agrigentino", "Pavese", "bilingual"), "% of use of Italian", "% of use of the L2", and "% of switching" are set as fixed factors in the model and their interactions are also reported. Animacy, register, gender, and age are set as control factors.

Effect	Estimate	SE	z	p	By-participant SD	By-item SD
Intercept	1.830894	0.449259	4.075368	0.000045	2.0262	0.5809
Comparison between bilingual and Agrigentino groups	-1.02866	0.524128	-1.96261	0.049692*		
Comparison between bilingual and Pavese groups	0.281209	0.584696	0.48095	0.630552		
% of language switching	0.033485	0.322411	0.103857	0.917282		
% Italian language use	0.276591	0.322234	0.858355	0.390696		
% L2 language use	-0.64167	0.474529	-1.35223	0.176303		
Animacy	-0.15334	0.105937	-1.44751	0.147754		
Register	-0.2398	0.10606	-2.26101	0.023759*		
Gender	-0.37387	0.299119	-1.24989	0.21134		
Age	-0.69412	0.263821	-2.63101	0.008513*		
% of switching - Comparison between bilingual and Agrigentino groups	0.028767	0.434299	0.066237	0.947189		
% of switching - Comparison between bilingual and Pavese groups	0.433908	0.486839	0.891276	0.372781		
% of use of Italian - Comparison between bilingual and Agrigentino groups	-0.24568	0.409015	-0.60067	0.548058		
% of use of Italian - Comparison	-0.32754	0.482162	-0.67931	0.496943		

between bilingual and Pavese groups				
% of use of L2 - Comparison between bilingual and Agrigentino groups	-0.7593	0.649724	-1.16865	0.242545
% of use of L2 - Comparison between bilingual and Pavese groups	-0.25666	0.734922	-0.34924	0.726913

S10 Table. Fixed and random effects from the second LME of RTs, with the bilingual group as the baseline. Log-transformed RTs are set as the dependent variable. Language group (i.e., "Agrigentino", "Pavese", "bilingual"), "Judgement", "% of use of Italian", "% of use of the L2", and "% of switching" are set as fixed factors in the model and their interactions with RTs are also reported. Animacy, register, gender, and age are set as control factors.

Effect	Estimate	SE	t	p	By-participant SD	By-item SD
Intercept	3.1778239	0.03784051	83.97942	2.203706	0.1775	0.0323
Comparison between bilingual and Pavese groups in RTs	-0.135994	0.04955025	-2.74457*	0.007774		
Comparison between bilingual and Agrigentino groups in RTs	0.0693015	0.04489181	1.543744	0.127362		
Judgement	0.0426497	0.00653476	6.526599	7.855467		
% of language switching	-0.031112	0.02740176	-1.1354	0.26027		
% Italian language use	-0.014504	0.02689215	-0.53934	0.591441		
% L2 language use	-0.092019	0.04048825	-2.27273*	0.026263		
Animacy	-0.000352	0.00694745	-0.05071	0.959828		
Register	0.0014101	0.00695588	0.202717	0.840462		
Gender	0.0148799	0.02562078	0.580775	0.563345		
Age	0.0721191	0.02245913	3.211127*	0.002028		
Judgement * Comparison between bilingual and Pavese groups in RTs	0.0073624	0.00991194	0.742776	0.457678		
Judgement * Comparison between bilingual and Agrigentino groups in RTs	-0.008549	0.00835691	-1.02297	0.306402		
% of switching - Comparison between bilingual and Pavese groups in RTs	0.0955539	0.04098093	2.331667*	0.022743		
% of switching - Comparison between bilingual and Agrigentino groups in RTs	0.0236268	0.03682924	0.641523	0.523377		

% of use of Italian - Comparison between bilingual and Pavese groups in RTs	0.0221724	0.03934398	0.563552	0.574945
% of use of Italian - Comparison between bilingual and Agrigentino groups in RTs	-0.054767	0.03488127	-1.57009	0.1211
% of use of L2 - Comparison between bilingual and Pavese groups in RTs	-0.095244	0.0621837	-1.53166	0.130326
% of use of L2 - Comparison between bilingual and Agrigentino groups in RTs	0.0121473	0.05594454	0.217131	0.828767

S11 Table. Fixed and random effects from the second LME of RTs, with the Italian-Agrigentino bidialectal group as the baseline. Log-transformed RTs are set as the dependent variable. Language group (i.e., "Pavese", "bilingual", "Agrigentino"), "Judgement", "% of use of Italian", "% of use of the L2", and "% of switching" are set as fixed factors in the model and their interactions with RTs are also reported. Animacy, register, gender, and age are set as control factors.

Effect	Estimate	SE	t	p	By-participant SD	By-item SD
Intercept	3.177824	0.037841	83.97942	2.203701	0.1775	0.0323
Comparison between Agrigentino and Pavese groups in RTs	-0.13599	0.04955	-2.74457*	0.007774		
Comparison between bilingual and Agrigentino groups in RTs	0.066693	0.066288	1.006112	0.317993		
Judgement	0.04265	0.006535	6.526599	7.855467		
% of language switching	-0.03111	0.027402	-1.1354	0.26027		
% Italian language use	-0.0145	0.026892	-0.53934	0.591441		
% L2 language use	-0.09202	0.040488	-2.27273*	0.026263		
Animacy	-0.00035	0.006947	-0.05071	0.959828		
Register	0.00141	0.006956	0.202717	0.840462		
Gender	0.01488	0.025621	0.580775	0.563345		
Age	0.072119	0.022459	3.211127*	0.002028		
Judgement * Comparison between Agrigentino and Pavese groups in RTs	0.007362	0.009912	0.742776	0.457678		
Judgement * Comparison between bilingual and Agrigentino groups in RTs	0.001187	0.00893	0.132866	0.894308		

% of switching - Comparison between Agrigentino and Pavese groups in RTs	0.095554	0.040981	2.331667*	0.022743
% of switching - Comparison between bilingual and Agrigentino groups in RTs	-0.11918	0.041492	-2.87239*	0.005457
% of use of Italian - Comparison between Agrigentino and Pavese groups in RTs	0.022172	0.039344	0.563552	0.574945
% of use of Italian - Comparison between bilingual and Agrigentino groups in RTs	0.032594	0.038082	0.85589	0.395095
% of use of L2 - Comparison between Agrigentino and Pavese groups in RTs	-0.09524	0.062184	-1.53166	0.130326
% of use of L2 - Comparison between bilingual and Agrigentino groups in RTs	0.083097	0.054365	1.528498	0.13111

Appendix D – Supporting information from Chapter 4

Table 1. Fixed and random effects from the GLME of accuracy, with the bilingual group as the baseline level. Accuracy rates are set as the dependent variable, Register (i.e., "Low register", "High register") and language groups (i.e., "Monolingual", "Bilingual", "Agrigentino", "Pavese") are set as fixed factors, while animacy, register, gender, age, and education are set as control factors (* = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001).

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	0.772047	0.55132	1.40036	0.161405	1.8773	0.5848
Register	-0.23114	0.104547	-2.21092	0.027042*	0.1147	
Comparison between Bilingual and Monolingual groups	0.168404	0.37909	0.444232	0.656875		
Comparison between Bilingual and Agrigentino groups	-1.15882	0.340481	-3.40348	0.000665***		
Comparison between Bilingual and Pavese groups	0.78523	0.388527	2.021045	0.043275*		
Animacy	-0.17317	0.103463	-1.67375	0.09418		
Gender	-0.26297	0.208698	-1.26003	0.20766		
Age	-0.51075	0.255213	-2.00125	0.045365*		
Comparison between Primary school and "Other" levels of education	1.623975	1.739883	0.933381	0.350623		

Comparison between Primary school and Postgraduate degree	0.933353	0.759057	1.229621	0.218839
Comparison between Primary school and Degree	0.944007	0.621691	1.51845	0.128901
Comparison between Primary school and High school diploma	0.957784	0.608352	1.574391	0.115397
Comparison between Primary school and Professional school diploma	0.26602	1.077568	0.246871	0.805008
Comparison between Primary school and Secondary school diploma	-0.61409	1.075356	-0.57106	0.56796
Register x Comparison between Bilingual and Monolingual groups	0.069801	0.084752	0.823596	0.410169
Register x Comparison between Bilingual and Agrigentino groups	-0.02733	0.078106	-0.34988	0.726431

Register x Comparison between Bilingual and Pavese groups	-0.00961	0.088661	-0.10835	0.913722

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Table 2. Fixed and random effects from the GLME of accuracy without value 3 of AJs. Accuracy rates are set as the dependent variable, Register (i.e., "Low register", "High register") and language groups (i.e., "Monolingual", "Bilingual", "Agrigentino", "Pavese") are set as fixed factors, while animacy, register, gender, age, and education are set as control factors (* = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001).

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	1.257195	0.609119	2.063957	0.039022	2.0813	0.6348
Register	-0.33772	0.11821	-2.85696	0.004277	0.1841	
Comparison between Monolingual and Agrigentino groups	-1.33976	0.383945	-3.48946	0.000484***		
Comparison between Monolingual and Pavese groups	1.092009	0.452611	2.412691	0.015835*		
Comparison between Monolingual and Bilingual groups	0.061776	0.427549	0.144488	0.885115		
Animacy	-0.11809	0.114937	-1.02746	0.304206		
Gender	-0.44032	0.231765	-1.89984	0.057454		
Age	-0.65201	0.283262	-2.3018	0.021347*		
Comparison between Primary school and "Other" levels of education	1.606457	1.913412	0.839577	0.401146		
Comparison between Primary school and Postgraduate degree	1.021803	0.837777	1.219659	0.222594		
Comparison between Primary school and Degree	1.17395	0.68705	1.708683	0.08751		
Comparison between Primary school and High school diploma	1.332712	0.671237	1.985457	0.047094*		

Comparison between Primary school and Professional school diploma	0.088308	1.164069	0.075861	0.939529
Comparison between Primary school and Secondary school diploma	-0.33658	1.167406	-0.28831	0.773106
Register x Comparison between Monolingual and Agrigentino groups	0.037116	0.09509	0.390322	0.696298
Register x Comparison between Monolingual and Pavese groups	-0.12218	0.118239	-1.03335	0.301439
Register x Comparison between Monolingual and Bilingual groups	0.057346	0.102534	0.559291	0.575963

Table 3. Fixed and random effects from the LME of log-transformed RTs, with the bilingual group as the baseline level. Log-transformed RTs are set as the dependent variable, Register (i.e., "Low register", "High register") and language groups (i.e., "Monolingual", "Bilingual", "Agrigentino", "Pavese") are set as fixed factors, while animacy, register, gender, age, and education are set as control factors (* = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001).

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.237526	0.04871	66.46497	2.122967	0.17100	0.03395
Register	0.002823	0.006772	0.4169	0.679165		
Comparison between Bilingual and Monolingual groups	0.014273	0.033473	0.426396	0.670774		
Comparison between Bilingual and Agrigentino groups	0.045669	0.030569	1.493952	0.138468		
Comparison between Bilingual and Pavese groups	-0.08324	0.033662	-2.47283	0.015164*		
Animacy	0.0024	0.006771	0.35445	0.725019		
Gender	0.039456	0.018758	2.103461	0.038041*		
Age	0.067993	0.022927	2.965606	0.003812**		
Comparison between Primary school and "Other" levels of education	-0.03965	0.156253	-0.25375	0.800234		
Comparison between Primary school and Postgraduate degree	-0.20949	0.067524	-3.10244	0.002522**		
Comparison between Primary school and Degree	-0.05506	0.055501	-0.99209	0.323649		
Comparison between Primary	-0.08686	0.054564	-1.59189	0.114702		

school and High school diploma				
Comparison between Primary school and Professional school diploma	0.089412	0.096887	0.922852	0.358402
Comparison between Primary school and Secondary school diploma	0.254252	0.098551	2.579914	0.011397*
Register x Comparison between Bilingual and Monolingual groups	-0.00441	0.00715	-0.61701	0.537261
Register x Comparison between Bilingual and Agrigentino groups	-0.01765	0.00708	-2.49366	0.012683*
Register x Comparison between Bilingual and Pavese groups	0.003449	0.007235	0.476648	0.633638

Table 4. Fixed and random effects from the LME of log-transformed RTs, with the Italian-Pavese group as the baseline level. Log-transformed RTs are set as the dependent variable, Register (i.e., "Low register", "High register") and language groups (i.e., "Monolingual", "Bilingual", "Agrigentino", "Pavese") are set as fixed factors, while animacy, register, gender, age, and education are set as control factors (* = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001).

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.237526	0.04871	66.46497	2.122975	0.17100	0.03395
Register	0.002823	0.006772	0.4169	0.679165		
Comparison between Pavese and Bilingual groups	0.023299	0.033966	0.685955	0.494396		
Comparison between Pavese and Monolingual groups	0.014273	0.033473	0.426396	0.670774		
Comparison between Pavese and Agrigentino groups	0.045669	0.030569	1.493952	0.138468		
Animacy	0.0024	0.006771	0.35445	0.725019		
Gender	0.039456	0.018758	2.103461	0.038041*		
Age	0.067993	0.022927	2.965606	0.003812**		
Comparison between Primary school and "Other" levels of education	-0.03965	0.156253	-0.25375	0.800234		
Comparison between Primary school and Postgraduate degree	-0.20949	0.067524	-3.10244	0.002522**		
Comparison between Primary school and Degree	-0.05506	0.055501	-0.99209	0.323649		
Comparison between Primary school and High school diploma	-0.08686	0.054564	-1.59189	0.114702		
Comparison between Primary school and Professional school diploma	0.089412	0.096887	0.922852	0.358402		

Comparison between Primary school and Secondary school diploma	0.254252	0.098551	2.579914	0.011397*
Register x Comparison between Pavese and Bilingual groups	0.018617	0.007139	2.607849	0.009144**
Register x Comparison between Pavese and Monolingual groups	-0.00441	0.00715	-0.61701	0.537261
Register x Comparison between Pavese and Agrigentino groups	-0.01765	0.00708	-2.49366	0.012683*

Table 5. Fixed and random effects from the LME of log-transformed RTs without values 3 of AJs. Log-transformed RTs are set as the dependent variable, Register (i.e., “Low register”, “High register”) and language groups (i.e., “Monolingual”, “Bilingual”, “Agrigentino”, “Pavese”) are set as fixed factors, while animacy, register, gender, age, and education are set as control factors (* = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001).

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.224842	0.0484	66.62866	3.624436	0.16895	0.03763
Register	0.000041	0.007325	-0.00562	0.995544		
Comparison between Monolingual and Agrigentino groups	0.045535	0.030329	1.501361	0.136553		
Comparison between Monolingual and Pavese groups	-0.07747	0.033419	-2.31805	0.022572*		
Comparison between Monolingual and Bilingual groups	0.019933	0.033658	0.592215	0.55511		
Animacy	-0.00091	0.007324	-0.12461	0.901508		
Gender	0.037384	0.018599	2.009999	0.047252*		
Age	0.066809	0.022685	2.945032	0.004055**		
Comparison between Primary school and “Other” levels of education	-0.04943	0.154497	-0.31993	0.749727		
Comparison between Primary school and Postgraduate degree	-0.19907	0.066914	-2.97497	0.003714**		
Comparison between Primary school and Degree	-0.05687	0.054977	-1.03438	0.303583		
Comparison between Primary school and High school diploma	-0.09316	0.054039	-1.72395	0.087972		
Comparison between Primary	0.094639	0.096113	0.984662	0.327277		

school and Professional school diploma				
Primary school: Secondary school diploma	0.252904	0.09774	2.587505	0.011171*
Register x Comparison between Monolingual and Agrigentino groups	-0.01663	0.007395	-2.24919	0.024559*
Register x Comparison between Monolingual and Pavese groups	0.006385	0.007482	0.853405	0.39349
Register x Comparison between Monolingual and Bilingual groups	0.015541	0.007396	2.101151	0.035695*

Table 6. Fixed and random effects from the second LME of log-transformed RTs. Log-transformed RTs are set as the dependent variable, Register (i.e., "Low register", "High register") and language group (i.e., "bilingual", "Agrigentino", "Pavese") are set as fixed effects in the model. Additional fixed factors are proficiency in Italian, language dominance, pattern of language use in low- vs high-register, percentage of daily use of Italian, percentage of daily use of the second language, and percentage of language switching. The interactions between register and the additional control factors are also reported. Animacy, register, gender, age, and education are set as control factors.

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.195704	0.076725	41.65139	8.774672	0.17277	0.03299
Register	-0.00381	0.015808	-0.24111	0.809534		
Comparison between Bilingual and Pavese groups	-0.11197	0.044957	-2.49069	0.015491*		
Comparison between Bilingual and Agrigentino groups	0.047024	0.045193	1.040516	0.302204		
Proficiency in Italian	-0.03235	0.023393	-1.38278	0.17178		
% of daily use Italian	-0.05272	0.029092	-1.81206	0.074899		
% of daily use L2	-0.02268	0.046555	-0.48712	0.627918		
Patterns of use - High register	-0.04277	0.040295	-1.06137	0.292706		
Patterns of use - Low register	0.031609	0.045225	0.698935	0.487247		
Dominance in Italian	0.071044	0.070666	1.005339	0.318707		
Dominance in Italian and L2 equally	-0.07117	0.100167	-0.71051	0.480101		
Dominance in L2	0.092281	0.118828	0.776597	0.4404		
% of switching	-0.04247	0.024919	-1.70449	0.093381		
Animacy	0.00105	0.007039	0.149176	0.882227		
Gender	0.036024	0.024721	1.457202	0.150191		
Age	0.048221	0.026204	1.840189	0.070609		
Comparison between Primary school and "Other" levels of education	-0.1003	0.164167	-0.61096	0.5435		
Comparison between Primary school and Postgraduate degree	-0.1907	0.074733	-2.55173	0.013244*		

Comparison between Primary school and Degree	-0.05297	0.061524	-0.8609	0.392667
Comparison between Primary school and High school diploma	-0.08609	0.058513	-1.4713	0.146357
Comparison between Primary school and Professional school diploma	-0.03254	0.108098	-0.30104	0.764407
Comparison between Primary school and Secondary school diploma	0.270421	0.102686	2.633462	0.010693*
Register x Comparison between Bilingual and Pavese groups	0.009122	0.010011	0.911214	0.362255
Register x Comparison between Bilingual and Agrigentino groups	-0.0137	0.009748	-1.40533	0.160026
Interaction between Register and Proficiency in Italian	0.003013	0.004846	0.621759	0.534147
Interaction between Register and Dominance in Italian	0.008817	0.01644	0.536314	0.591781
Interaction between Register and Dominance in Italian and L2 equally	0.009722	0.023125	0.420408	0.674217
Interaction between Register and Dominance in L2	0.002252	0.026504	0.084961	0.932298
Interaction between Register and % of daily use Italian	0.00467	0.006732	0.693759	0.487886
Interaction between Register and % of daily use L2	0.007033	0.010716	0.656361	0.511641
Interaction between Register and Patterns of use in High register contexts	0.006823	0.008889	0.76755	0.442814

Interaction between Register and Patterns of use in Low register contexts	-0.00826	0.009188	-0.89932	0.368551
Interaction between Register and % of Switching	0.010208	0.00554	1.842473	0.065503*

Table 7. Fixed and random effects from the second LME of log-transformed RTs without values 3 of AJs. Log-transformed RTs are set as the dependent variable, Register (i.e., “Low register”, “High register”) and language group (i.e., “bilingual”, “Agrigentino”, “Pavese”) are set as fixed effects in the model. Additional fixed factors are proficiency in Italian, language dominance, pattern of language use in low- vs high-register, percentage of daily use of Italian, percentage of daily use of the second language, and percentage of language switching. The interactions between register and the additional control factors are also reported. Animacy, register, gender, age, and education are set as control factors.

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.187647	0.07835	40.68469	9.032650	0.1751	0.03635
Register	-0.01112	0.016525	-0.67317	0.501066		
Comparison between Bilingual and Pavese groups	-0.11225	0.04564	-2.45935	0.016811*		
Comparison between Bilingual and Agrigentino groups	0.049235	0.04592	1.072201	0.287889		
Proficiency in Italian	-0.02718	0.023612	-1.15121	0.254192		
% of daily use Italian	-0.04405	0.029093	-1.51418	0.135197		
% of daily use L2	-0.02931	0.047649	-0.61506	0.540819		
Patterns of use - High register	-0.03635	0.040936	-0.88807	0.378027		
Patterns of use - Low register	0.027175	0.046008	0.590651	0.556945		
Dominance in Italian	0.069015	0.071762	0.961722	0.340031		
Dominance in Italian and L2 equally	-0.05713	0.101741	-0.56151	0.576533		
Dominance in L2	0.103381	0.120824	0.855633	0.395573		
% of switching	-0.04226	0.025441	-1.66093	0.101936		
Animacy	-0.00131	0.007572	-0.17279	0.863771		
Gender	0.034196	0.025138	1.360323	0.178766		

Age	0.049813	0.026559	1.875569	0.06555
Comparison between Primary school and “Other” levels of education	-0.11485	0.166414	-0.69014	0.492775
Comparison between Primary school and Postgraduate degree	-0.18515	0.075924	-2.43869	0.0177*
Comparison between Primary school and Degree	-0.0568	0.062496	-0.90892	0.367011
Comparison between Primary school and High school diploma	-0.09259	0.059403	-1.55868	0.124319
Comparison between Primary school and Professional school diploma	-0.01821	0.109734	-0.16592	0.868778
Comparison between Primary school and Secondary school diploma	0.272565	0.104361	2.611762	0.011341*
Register x Comparison between Bilingual and Pavese groups	0.010051	0.010273	0.978397	0.327964
Register x Comparison between Bilingual and Agrigentino groups	-0.01347	0.010096	-1.33427	0.182225
Interaction between Register	0.005042	0.004981	1.012128	0.311566

and Proficiency in Italian				
Interaction between Register and Dominance in Italian	0.006701	0.006924	0.967918	0.33317
Interaction between Register and Dominance in Italian and L2 equally	0.002634	0.011343	0.232208	0.816394
Interaction between Register and Dominance in L2	0.00622	0.009175	0.677916	0.497882
Interaction between Register and % of daily use Italian	-0.00326	0.009681	-0.33726	0.73595
Interaction between Register and % of daily use L2	0.015843	0.017019	0.930905	0.351984
Interaction between Register and Patterns of use in High register contexts	0.018736	0.023827	0.786324	0.431745
Interaction between Register and Patterns of use in Low register contexts	0.007638	0.028014	0.272665	0.785131
Interaction between Register and % of Switching	0.011832	0.005692	2.078768	0.037731*