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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. 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 more 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: 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. One of the key factors shaping these mental models is the formality associated with the situational context in which communicative acts take place. If a context is formal, it is likely to be associated with a more formal speech variety, where speakers are careful about pronunciation, word choice, and sentence structure (Richards et al. 1997). In contrast, informal contexts often involve a more relaxed approach to language, with less focus on form and a greater likelihood of deviating from the linguistic norm. 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 using 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.

While research on the impact of linguistic register on language processing remains limited, initial findings suggest that people are sensitive to register variation during both production and comprehension, with significant consequences on processing outcomes. Following van Dijk's approach (2005, 2008), the integration of register information in specific mental models during processing implies that register knowledge holds a position within the broader linguistic repertoire of speakers/signers,

as happens for other linguistic domains such as morphology and syntax (Pinker 1984, Audring 2019, Ünal & Papafragou 2020). However, while appreciating that register knowledge may operate as a distinct domain within our linguistic knowledge, we should also consider its potential interaction with other domains. Indeed, while acknowledging the autonomy of the different levels of linguistic analysis, such as syntax and morphology, prior theoretical frameworks also recognize their interplay (Newmeyer 2017). Concerning syntax, Adger (2018) highlighted that its interaction with other domains, such as morphology and semantics, is crucial to elucidate linguistic phenomena that would otherwise remain unclear. Even accounts that do not recognize the independence of morphology from other linguistic modules (Esher & O'Neill 2022) aligned with weak autonomy theses, which support the interplay among different linguistic domains. Along these lines, we aim to explore the role of register in the context of this interplay. Specifically, our study investigates whether register interacts with other linguistic domains during language processing, and if so, in which manner. To address this question, we will focus on the potential interplay between linguistic register variation and the processing of morphosyntactic anomalies.

In particular, we will explore a specific type of morphosyntactic error, namely Subject-Verb agreement mismatches. These mismatches amount to morphosyntactic errors where the verb agrees not with its subject, but with a distracting element, such as a noun phrase (NP), that lies between the subject and the verb and has different number features from the subject of the sentence. Previous literature defined this phenomenon as an "agreement attraction error", affirming its occurrence in both language production and comprehension (see Hammerly et al. 2019 for a review). In both cases, the number, animacy, and length of the disrupting NP (Bock & Miller 1991) and its linear proximity to the verb (Vigliocco & Nicol 1998) were found to play a role in the processing of Subject-Verb agreement, together with the morphological richness of the language (Vigliocco et al. 1995, Foote & Bock 2012). Several studies delved into the computation of Subject-Verb agreement mismatches across different languages and populations due to the complex nature of such morphosyntactic phenomenon in terms of processing (Bock & Eberhard 1993, Pearlmutter et al. 1999, Wagers et al. 2009). Indeed, processing difficulties have been observed not only for Subject-Verb agreement mismatches but also in computing correct Subject-Verb agreement (Franck et al. 2015, Laurinavichyute & von der Malsburg 2019, Santesteban et al. 2020).

Our study examines 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 the best of our knowledge, no previous study has investigated the prevalence of Subject-Verb agreement attraction errors across formal and informal registers. Nonetheless, the predominant focus on the linguistic norms that characterize formal speech (Heylighen & Dewaele 1999), alongside the occasional deviation from prescriptive rules, which are more typical of colloquial and informal speech (Pinker 2014), suggests that the occurrence of grammatical phenomena that diverge from the norm is possibly more expected across informal linguistic registers.

The frequent examination of Subject-Verb agreement attraction errors in research on bilingual language processing (Lago & Felser 2018, Reifegerste et al. 2023 *inter alia*) highlights its relevance for the second aim of our research: to explore the potential relationship between register knowledge and linguistic background during sentence comprehension. Indeed, previous literature suggested that bilingual individuals engaged in linguistic activity that demands inhibition and switching between two or more languages may become trained in interference suppression (Costa et al. 2008, Verreyt et al. 2019, Siu & Ho 2022). This training could have significant implications for processing linguistic stimuli where such cognitive abilities are essential (Leivada et al. 2021a). Subject-Verb agreement mismatches are one type of such stimuli (Veenstra et al. 2018) precisely because they require suppressing the influence of a distracting noun phrase to accurately compute agreement between the subject and verb. Introducing register variation as an additional variable alongside linguistic background could offer further insights into the comparison between monolingual and bilingual language processing. Indeed, 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. 2021b *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) focused on English-Hebrew and Russian-Hebrew bilinguals and analysed the use of formal and informal register in the heritage languages of the participants (i.e., Russian and English). English-Hebrew bilinguals were found to use formal and informal written registers in a similar way to the English monolingual control group. Russian-Hebrew bilinguals showed different patterns in differentiating between formal and informal registers compared to the Russian monolingual control group, diverging from it in features such as sentence length, nominalization, and use of coordinating conjunctions. Heritage bilinguals were also the population investigated by Bunk (2021), who focused on the patterns of register variation in German among bilingual heritage speakers of Turkish. Bilinguals were found to exhibit an emphasized marking of formal linguistic register at a lexical level compared to monolinguals. This was ascribed to the societal language pressure which might cause heritage speakers to linguistically accentuate their ability to speak the societal language in formal registers. These results suggest that bilinguals can differ in their sensitivity to linguistic register variation for different reasons, such as the type of received linguistic input, and the sociolinguistic values ascribed to their languages. Varying degrees of sensitivity to register variation could further influence the processing patterns of linguistic structures already identified as especially susceptible in bilingual populations, such as Subject-Verb agreement mismatches (Foote 2010, Sagarra & Rodriguez 2022). Altogether, adopting a comparative perspective that encompasses various linguistic groups could elucidate how register variation influences the identification of morphosyntactic anomalies among individuals with diverse language backgrounds. Appreciating

variation in bilingualism is especially important, given that bilingualism is not a monolithic concept and variation can exist even within the same bilingual communities. Hence, the second aim of this study is to understand whether linguistic trajectory (i.e., being monolingual or bilingual) affects how register variation is processed, leading to potentially different outcomes in how agreement mismatches are identified in high- vs. low-register. To achieve this aim, we compare monolingual and bilingual populations that use different standard and non-standard languages. More concretely, we test speakers of two Italian bidialectal communities, namely Italian-Pavese and Italian-Agrigentino bidialectals. To the best of our knowledge, no study has focused on Subject-Verb agreement mismatches with plural NP distractors in Pavese and Agrigentino.

To summarize, the research questions (RQs) we seek to address are the following: (RQI) Does register modulate the ability to detect morphosyntactic errors? (RQII) Does register variation play the same role in detecting such errors in monolingual and bilingual populations of majority and minority languages?

Given the exploratory nature of this work, outlining precise predictions is complex. About RQI, following van Dijk's notion of context models (2005, 2008), we hypothesize that the association between high register and formal contexts might lead our participants to assume that high-register stimuli are correct, with consequent higher acceptance rates of Subject-Verb agreement mismatches in this condition. Alternatively, sensitivity to morphosyntactic errors might be heightened in high-register stimuli, where less variation from the grammatical norm is permitted (Heylighen & Dewaele 1999). Differently from high-register stimuli, low-register sentences might be perceived as more likely to feature errors due to the implicit association of low register to informal contexts. In this scenario, listeners will be more prompted to detect grammatical anomalies in low-register sentences. About RQII, we expect some variation between monolingual and bilingual participants in processing morphosyntactic anomalies presented in low- vs. high-register, following the literature reviewed above. Moreover, we expect more similar processing patterns between low- vs. high-register for functionally monolingual speakers, who use their language across all communicative contexts, compared to the bilingual groups. Conversely, our bilingual participants may exhibit greater variation due to their distinct linguistic practices across different registers, also reflecting the specific dynamics of prestige that define their sociolinguistic dimension.

2. Materials and methods

2.1 Participants

Our sample consists of 108 neurotypical adult speakers who were split into 4 language groups: Italian functionally monolingual speakers (n = 27), Italian-Spanish bilinguals (n = 27), Italian-Pavese bidialectals (n = 26), and Italian-Agrigentino bidialectals (n = 28). This final number of participants was determined by practical reasons, such as the lack of a proper linguistic profile for inclusion in one of the language groups. Nevertheless, the sample size for each group aligns with previous research on minority language speakers (Kirk et al. 2014, Poarch et al. 2019, Leivada 2020). 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 – Pavese dialect), and one from the south (i.e., Agrigento – Agrigentino dialect). Pavese and Agrigentino are two Italian dialects that show important differences in structural and sociolinguistic terms. Pavese belongs to the northern Italian dialects group, while Agrigentino is part of the central-southern Italian dialects group, and it belongs to the subgroup of the extreme southern dialects. Both languages are independent linguistic systems from Italian, the majority or societal language in these communities. The use of the term "dialect" only refers to their sociolinguistic subordination to the societal language, which is standard Italian (Coseriu 1980). Indeed, while standard Italian is normally used across all communicative contexts, dialects are generally ascribed to informal settings (Vietti & Dal Negro 2012). In this paper, we employ the term "dialect" just for clarity, to differentiate between bilingual participants who speak standard and non-standard languages, without denying the status of Pavese and Agrigentino as languages or the bilingual nature of the Pavese and Agrigentino communities. Importantly, the patterns of language use vary in each bidialectal community. In the southern regions of Italy, non-standard languages have higher vitality compared to most of the northern regions (ISTAT 2012), and standard Italian and the dialect overlap across different communicative domains without being mutually exclusive, as in the case of Agrigento. Conversely, in the bidialectal communities of the north of Italy (excluding Veneto and Friuli Venezia Giulia regions), given the less frequent use of local, non-standard varieties, the boundaries between the two languages tend to be more defined, and Italian and the dialect exhibit less interchangeability across diverse situational settings, as in the case of Pavia (Trumper 1977, Berruto 2018). These regional differences in language practices stem from historical reasons. After Italy's unification in the 19th century, industrialization and urbanization drove national education policies to the promotion of a unified standard language (the forthcoming "standard Italian"). This shift was especially pronounced in north-western regions, where non-standard languages became increasingly stigmatized as markers of backwardness and poverty. In contrast, the South, where a pre-unification economy persisted despite its formal integration into the Italian kingdom, remained a distinct cultural and linguistic landscape, leading to a higher vitality of local non-standard languages.

Both bilingual and bidialectal participants reported high levels of proficiency in their respective languages[1]. 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

[1] Proficiency levels in Italian for bilingual participants were statistically compared through a Linear Model (all material can be found here). No significant differences were found across different language groups.

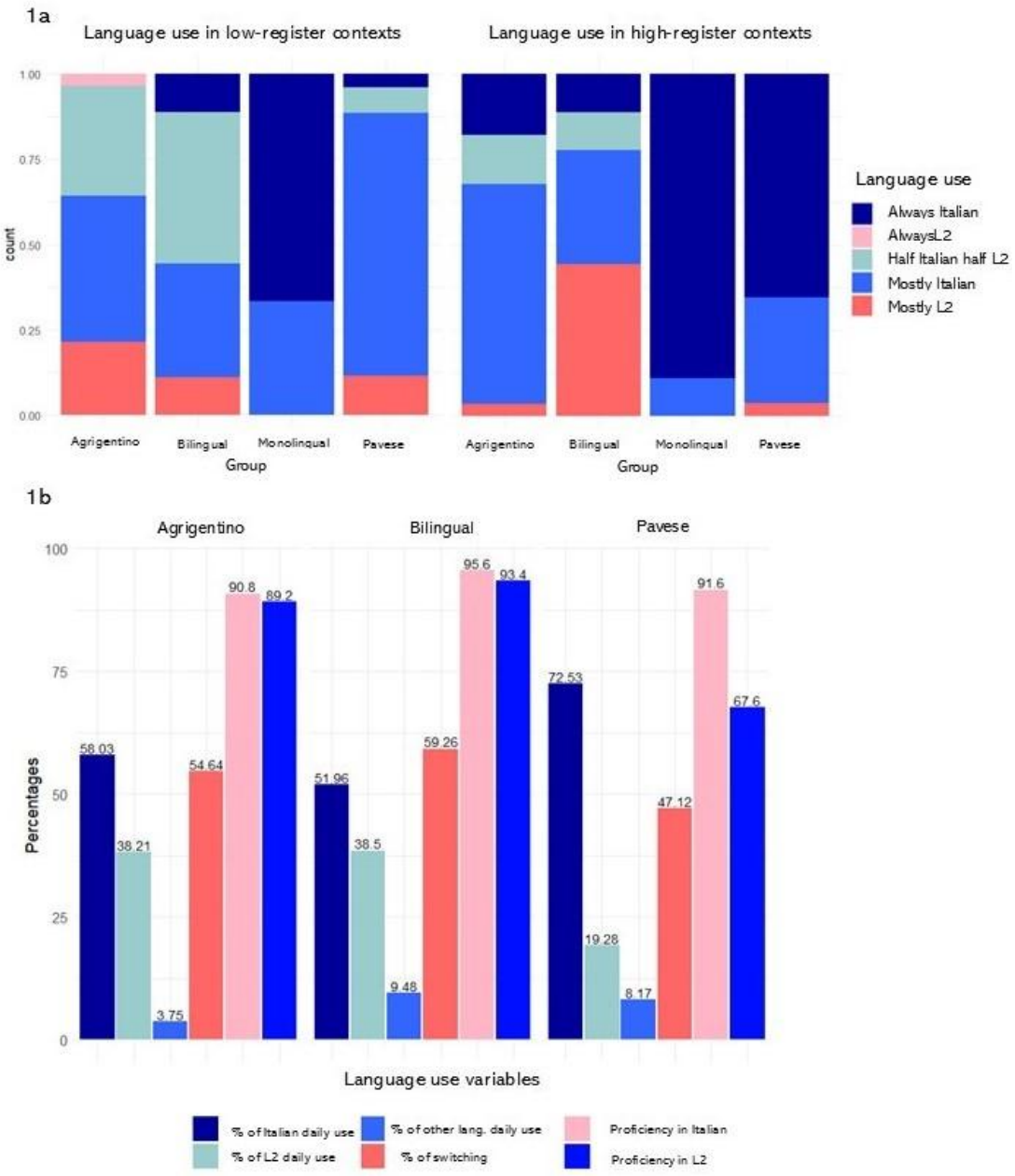
measures gathered using a granular sociolinguistic background questionnaire based on the LSBQ (Anderson et al. 2018), which also included questions about sociodemographic information, language use, and language attitudes. Participants' classification in different language groups was based on information collected from this same questionnaire. Regarding our use of the term "monolingual", a clarification is due. Although the participants included in our monolingual group reported having 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 "functionally monolingual speakers" 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 this URL.

Table 1. Participant demographics.

	Functionally 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	Secondary 7	Primary 1	Secondary 11
	Tertiary 22	Tertiary 20	Secondary 13 Tertiary 12	Tertiary 17

Figure 1. Panel 1a: Patterns of language use for each language group. Panel 1b: Linguistic variables for Italian-Spanish bilinguals (i.e., "bilingual") and Italian-Agrigentino and Italian-Pavese bidialectals (i.e., "Agrigentino" and "Pavese" respectively). Italian language use, second language (L2) use, which corresponds to Spanish, Agrigentino, and Pavese, other language use, language switching, and self-rated proficiency are reported in percentages.



2.2 Task

The task collected data on (i) AJs on a 5-point Likert scale and (ii) 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. The experiment was

conducted in Italian. Spanish, Pavese, and Agrigentino, which are the additional languages of our bilingual and bidialectal groups, behave similarly to Italian (example 1) in the tested domain, as they inflect the verb to agree with the subject in terms of person and number. The only difference concerns Pavese (1d), which also presents a subject clitic pronoun preceding the verb as an additional marker for Subject-Verb agreement (Manzini & Savoia 2007, Poletto & Tortora 2016).

Italian

(1)a. Italian
La macchina delle ragazze è/[*sono] nel parcheggio.
the car.NOUN.SG of.the girls.NOUN.PL be.3SG/[*be.3PL] in.the carpark
'The car of the girls is/[*are] in the car park.'

b. Spanish
El coche de las chicas está/[*están] en el aparcamiento.
the car.NOUN.SG of the girls.NOUN.PL be.3SG/[*be.3PL] in the carpark
'The car of the girls is/[*are] in the car park.'

c. Agrigentino
A machina di li picciotte è/[*sunnu] nu parcheggiu.
the car.NOUN.SG of the girls.NOUN.PL be.3SG/[*be.3PL] in the carpark
'The car of the girls is/[*are] in the carpark.'

d. Pavese
La machina di fiöl l'è/[*i'èn] int'al parcheg.
the car.NOUN.SG of.the girls.NOUN.PL CL.be.3SG/[*be.3PL] in.the carpark
'The car of the girls is/[*are] in the car park.'

The test items were divided into 2 conditions: half of the test items (n = 20) were presented in a low linguistic register (examples 2a and 3a), while the other half (n = 20) were presented in a higher linguistic register (examples 2b and 3b). The stimuli were designed starting from high-register Italian sentences (examples 2b and 3b) that featured a specific structure: a singular subject, a plural NP distractor, and a verb with incorrect plural agreement. Low-register stimuli were subsequently created to mirror the high-register versions in both semantic content (examples 2 and 3) and syntactic structure. However, the lexical elements were replaced with idiomatic and figurative language to convey the same meaning. In Italian, register variation depends on various linguistic features that belong to different linguistic domains, among which the lexicon holds a primary position. However, syntactic and pragmatic choices can also convey register variation. Some examples concern the major use of passive constructions in more formal registers (Vietri 2014) or the use of the third-person singular and feminine pronoun "lei" instead of the common second-person singular pronoun "tu", which indicates a respectful and/or distant relationship with the interlocutor. In our experiment, we decided to focus on the lexical domain and use lexical choices pertaining to idiomatic and figurative language to manipulate register variation. This allowed us to keep the syntactic structure of our stimuli constant. Previous literature has noted that several idiomatic and figurative phrases are more frequently encountered in informal discourse (Vietri 2014). To establish that the idiomatic and figurative expressions we selected were associated with informal register, thus ensuring a clear distinction between high- and low-register stimuli, we

ran a separate test on a sample of 26 neurotypical adult speakers of Italian, who were not included in the final sample. The separate sample was balanced for age, gender, and region of origin in Italy. Participants were asked to identify the low- and high-register alternatives from the sentence pairs presented, which corresponded to the experimental items used in the AJ task, as no sentence pairs required revision based on the results. This approach ensured that low-register sentences, which included idiomatic and figurative expressions, were universally perceived as such by Italian speakers across the north and the south of the Italian peninsula. For each condition (low vs. high register), 10 items include animate NP distractors (2a and 2b), while the other 10 items present inanimate NP distractors (3a and 3b).

(2) a. Italian
*Lo spettacolo dei ballerini professionisti lasciano
the show.NOUN.SG of.the dancers.NOUN.PL professional leave.3PL
il pubblico a bocca aperta
the audience open-mouthed
'The show of the professional dancers leave the audience mesmerized.'
b. Italian
*L'esibizione dei danzatori professionisti
the performance.NOUN.SG of.the dancers.NOUN.PL professional
stupiscono gli spettatori
impress.3PL the audience
'The performance of the professional dancers impress the audience.'

(3) a. Italian
*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'
b. Italian
*L'alloggio per le vacanze estive
the accommodation.NOUN.SG for the holidays.NOUN.PL summer
prevedono un costo elevato
involve a cost high
'The accommodation for summer holidays involve a high cost.'

Some of the grammatical fillers (n = 40) have the same syntactic structure as the test items but with target Subject-Verb agreement. The rest of the grammatical fillers (n = 20) present a different structure from the test items and involve sentences with correct auxiliary choices for the verbs. The ungrammatical fillers (n = 20) are sentences with wrong auxiliary choices for the verbs. For fillers involving (un)grammatical auxiliary choices, we used 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). 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 merged in a single list) were presented in a completely randomized order. Table 2 summarizes the design of our experimental stimuli.

Table 2. Design of the experimental stimuli.

Register	Test items		Fillers		
	Ungrammatical		Grammatical		Ungrammatical
	Subject-Verb agreement		Subject-Verb agreement	Auxiliary selection	Auxiliary selection
	Animate NP	Inanimate NP			
Low	10	10	20	20	20
High	10	10	20		

Participants listened to the prompts one by one and were instructed to express a judgement about their acceptability as soon as they could. They were not given the choice to skip a sentence or replay it. They were aware that the next sentence would appear only after they had responded to the previous one. 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.

2.3 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 Universitat 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), which contained additional questions on language use in specific contexts and on linguistic attitudes toward the spoken languages (Lupinu et al. 2007). In the second part, participants completed an auditory timed AJ task in standard Italian[2]. 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. In this session, participants listened to three sentences that were not part of the experimental stimuli and were then asked to rate them on the same 5-point Likert scale used in the AJ tasks. The entire

[2] Bidialectal participants also completed the AJ task in their other language (i.e., Agrigentino and Pavese). For these groups, the AJ task in the non-standard language was always administered after the Italian AJ task, with a break between the two tasks. This task order was intentionally maintained to minimize the risk of missing data for the Italian task due to participants potentially quitting during the break. Losing data in Italian would have prevented us from making a reliable comparison between the bidialectal participants and the other language groups.

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 this URL.

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. We also removed participants whose mean accuracy level for grammatical fillers containing correct Subject-Verb agreement was lower than 75% in both high and low register (6 in total). Data analyses were then conducted on 8026 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[3], 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[4] 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). We classified value 3 of the 5-point Likert scale as an inaccurate judgement because it represents a "neither correct nor incorrect" response to a linguistic stimulus containing an agreement mismatch, which is objectively a grammatical anomaly. However, to address any potential influence resulting from our classification of value 3 as "inaccurate", all the

[3] To ensure that our high- and low-register stimuli were comparable in terms of difficulty and discrimination, we conducted an item analysis following the Item Response Theory (IRT), which did not reveal any significant difference in such measures between low- and high-register test items. We also analysed fillers with correct Subject-Verb agreement to explore the underlying reasons why stimuli were rejected. The results showed that low-register stimuli were rejected for the presence of agreement mismatches rather than other factors such as idiomaticity. These additional analyses are available at: https://osf.io/gwdq3/?view_only=87ac63203f674b8c92cde29e5b40e3c7.

[4] Unlike treatment contrasts, which compare the means of different variable levels to a preset baseline condition, sum contrasts coding tests whether a condition's mean differs from the grand mean (GM). In the two- or more-group case, GM shows whether the different level means are the same (i.e., null hypothesis). Consequently, sum contrasts coding makes main effects more interpretable by representing how each level deviates from the overall mean and not from a predefined reference level, which can heavily influence coefficients in treatment contrasts. This practice is ideal when no single level is theoretically meaningful as a baseline, as in our case for the between-group comparison, and becomes useful for more easily interpreting complex interactions typical of mixed-effects models (see this URL; this URL)

models for accuracy were also reran excluding such value from the dataset. This step was taken to ensure that the primary results of the models remained unaffected by our classification of judgements. In the first model, accuracy was set as the dependent variable. As fixed effects, we included the register of the stimuli (sum contrast, 2 levels = "low register", "high register"), the language group of the participants[5] (sum contrast, 4 levels = "functionally monolinguals", "bilinguals", "Agrigentino", "Pavese"), their interaction, and the animacy of the NP distractors (sum contrast, two levels = "animate", "inanimate"). The control factors of the model were 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"), language group (sum contrast, 3 levels = "bilinguals", "Agrigentino", "Pavese") and the animacy of the NP distractors (sum contrast, two levels = "animate", "inanimate"), 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[6] 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 these additional fixed factors were also analysed. 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

[5] We ran alternative models to analyse both Accuracy and RTs, operationalizing bilingualism through continuous proficiency measures for both Italian and the participants' second language. These measures replaced the language group as fixed factors. These additional models (see Tables 8, 9, 10, and 11 of the Appendix), showed no main effect of L1 or L2 proficiency, and no interactions of proficiency with register. This lack of effects shows that the differences found in the main models are due to the unique sociolinguistic characteristics of each language group rather than proficiency per se.

[6] The label "L2" is consistently used throughout the paper to represent Spanish, Agrigentino, and Pavese, which constitute the additional languages spoken by our participants. We opted for this label for the sake of clarity, aiming to distinguish it from the shared language of the bilingual and bidialectal groups (i.e., Italian), denoted as "L1", without implying any specific relationship between L1 and L2 in terms of age of acquisition or dominance.

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 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 any fixed effect with a t-statistic value not included between -2 and 2 to be significant.

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 of the second model for accuracy. We kept the same control factors as the basic model, namely age, gender, and education. Again, the final model included both participants and items as random intercepts.

4. Results

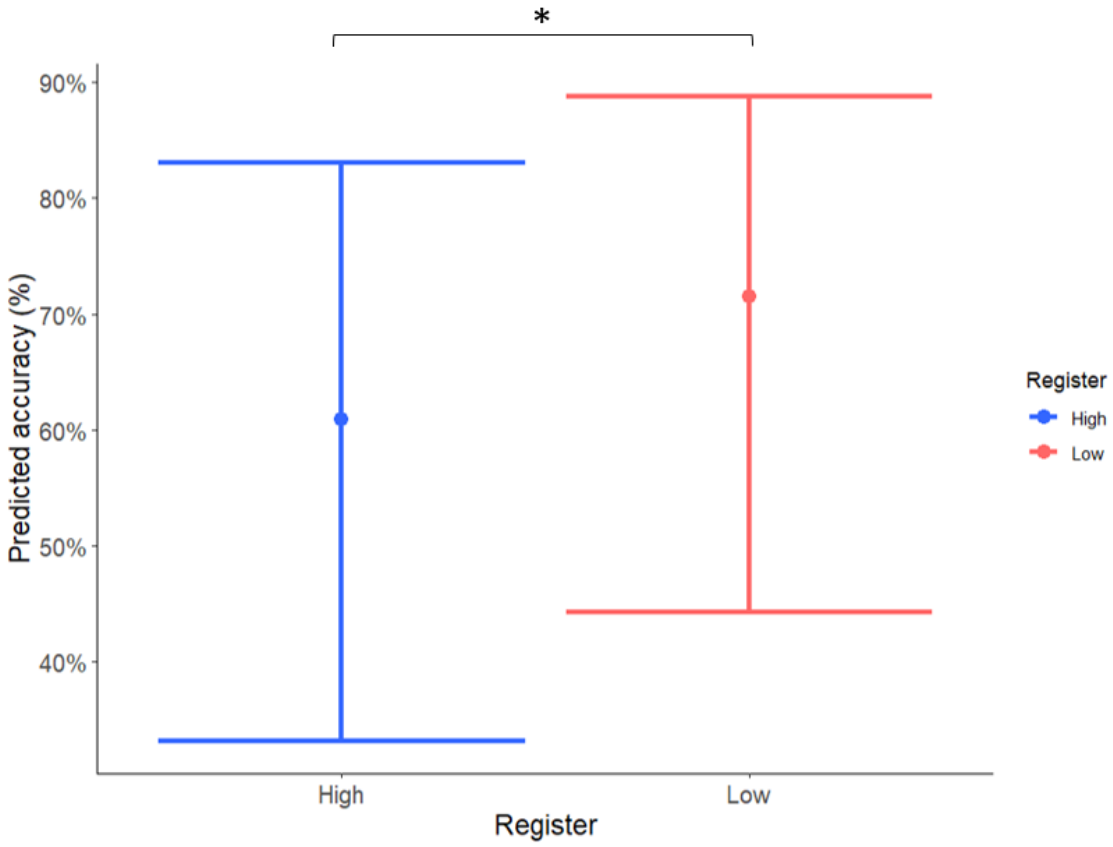
4.1 Results for accuracy

We find a main effect of register ($t = -2.264$; $p = 0.02$) for the whole sample that involves all 4 language groups (Table 3). As Figure 2 shows, Subject-Verb agreement mismatches are detected more frequently in low-register stimuli as opposed to high-register stimuli.

Table 3. 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 value	p	by-participant SD	by-item SD
Intercept	0.6635535	0.57031794	1.16348	0.2446348	1.87661	0.59325
Register	-0.239223	0.10562512	-2.26483	0.0235231*	0.06458	
Comparison between Monolingual and Agrigentino groups	-1.130792	0.3468714	-3.25997	0.0011142**		
Comparison between Monolingual and Pavese groups	0.4982129	0.41354497	1.204737	0.2283048		
Comparison between Monolingual and Bilingual groups	0.332077	0.39150801	0.8482	0.3963267		
Animacy	-0.177333	0.10504229	-1.6882	0.0913724		
Gender	-0.236281	0.21169597	-1.11613	0.2643655		
Age	-0.463974	0.26723189	-1.73622	0.0825244		
Comparison between Primary school and “Other” levels of education	1.9640438	1.74644798	1.124593	0.2607614		
Comparison between Primary school and Postgraduate degree	0.9838273	0.76580068	1.284704	0.1988957		
Comparison between Primary school and Degree	0.9440549	0.6569258	1.43708	0.1506953		
Comparison between Primary school and High school diploma	1.0630888	0.63150834	1.683412	0.0922953		
Comparison between Primary school and Professional school diploma	-0.771784	1.29160294	-0.59754	0.5501474		
Comparison between Primary school and Secondary school diploma	-0.34877	1.07981364	-0.32299	0.7467019		
Register x Comparison between Pavese and Bilingual groups	-0.015546	0.07717202	-0.20145	0.840349		
Register x Comparison between Pavese and Monolingual groups	0.0125086	0.08967409	0.13949	0.889063		
Register x Comparison between Pavese and Agrigentino groups	-0.07126	0.08284128	-0.8602	0.3896771		

Figure 2. Accuracy rates for low- vs. high-register stimuli across all language groups. The y-axis reports the mean of accuracy levels in percentages. The error bars represent standard errors. * = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001

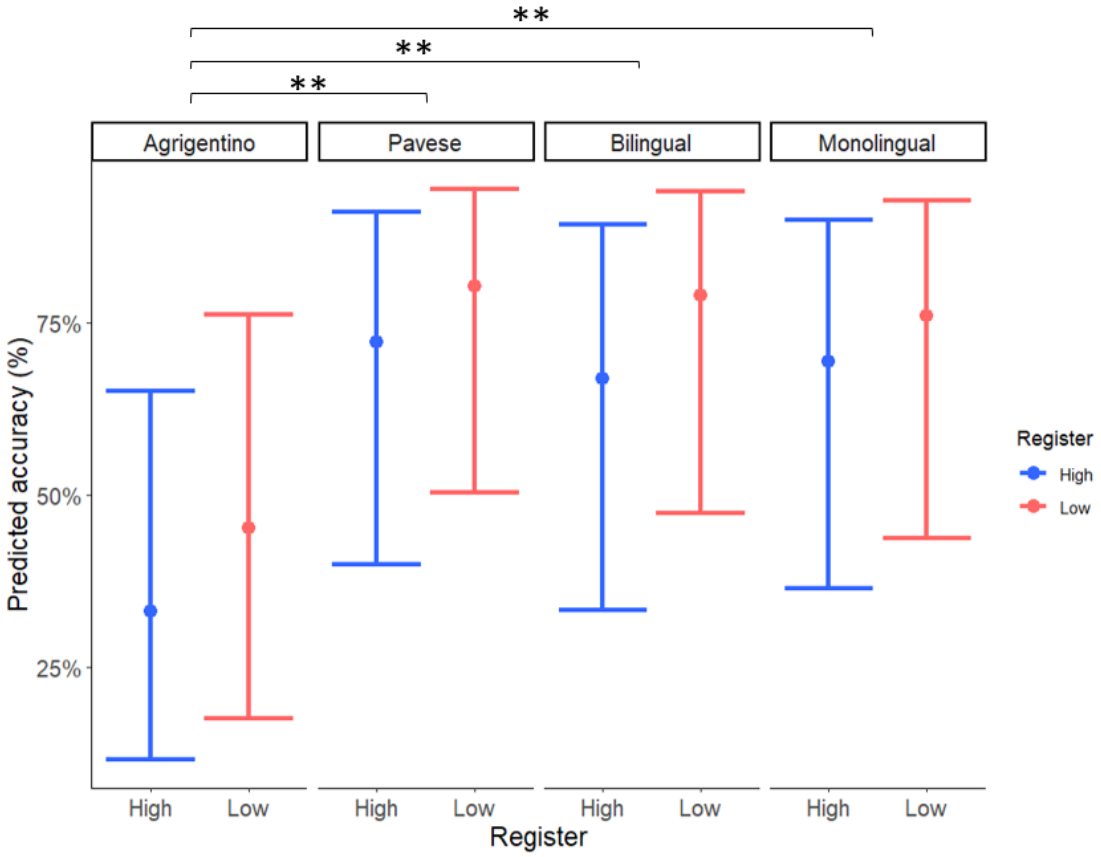


A significant effect is also observed for the comparison between Italian-Agrigentino, Italian-Spanish bilingual participants, and functionally monolinguals in their accuracy rates. To further explore between-group comparisons, we ran further analyses in which we set the bilingual group as the baseline (Table S1, Appendix). We find that Italian-Agrigentino bidialectals are less accurate than both the monolingual group and the Italian-Pavese bidialectal group. About Italian-Spanish bilinguals, they had higher accuracy rates compared to the Italian-Agrigentino group. Regarding register variation, it is noteworthy that bilingual participants, and especially Italian-Agrigentino 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 functionally monolingual speakers (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.

To ensure that the model predictions are not influenced by the controlled factors of the model (i.e., age, gender, level of education), we calculated the collinearity coefficient between each fixed factor (VIF), which revealed no correlation

between any of them (register = 1.01; group = 2.11; animacy = 1.00; gender = 1.09; age = 1.491; education = 2.47; register:group = 1.08).

Figure 3. Accuracy rates for low- vs. high-register stimuli per language group. The y-axis reports the mean of accuracy levels in percentages. The error bars represent standard errors. * = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001



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 S2, Appendix). 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 4 shows statistically significant interactions concerning sociodemographic variables

such as age (t = 3.00; p = 0.003), education, and the interactions between register and different language groups.

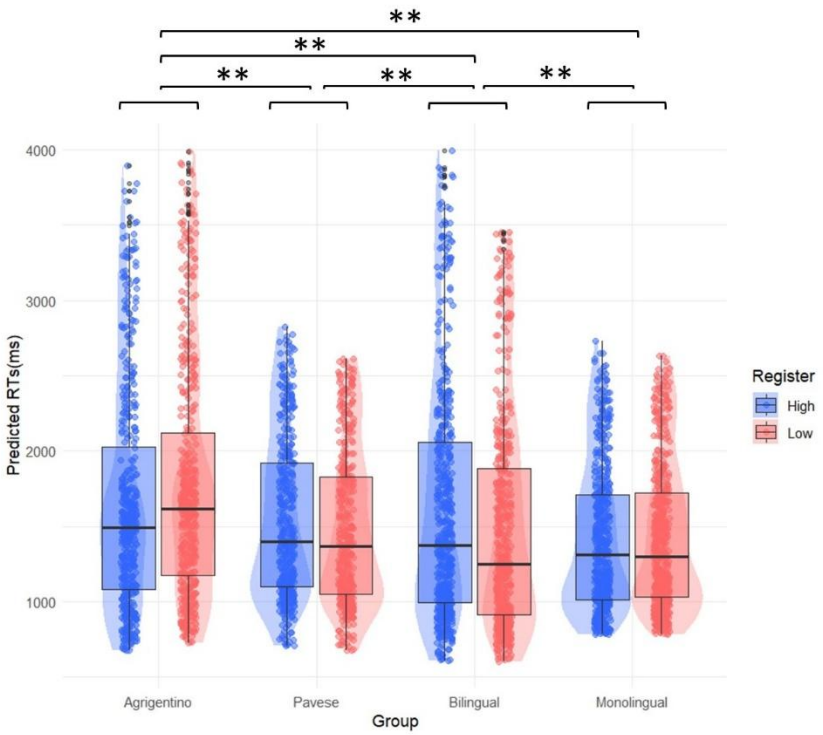
Table 4. Fixed and random effects from the LME of log-transformed RTs. Log-transformed RTs are set as the dependent variable, register and language group are set as fixed factors, while animacy, register, gender, age, and education are set as control factors (* = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001).

Effect	Estimate	SE	t	p	by-participant SD	by-item SD
Intercept	3.2436429	0.0491359	66.0137	2.659703	0.16514	0.03454
Register	0.0029745	0.00695005	0.427979	0.671141		
Comparison between Monolingual and Agrigentino groups	0.0370255	0.03020458	1.225823	0.223464		
Comparison between Monolingual and Pavese groups	-0.049456	0.03498562	-1.4136	0.16093		
Comparison between Monolingual and Bilingual groups	0.0141283	0.03395836	0.416048	0.678366		
Animacy	0.0028741	0.00694071	0.414088	0.681207		
Gender	0.0330593	0.01851026	1.786	0.077468		
Age	0.0704614	0.02343285	3.00695	0.003421*		
Comparison between Primary school and “Other” levels of education	-0.089175	0.15234244	-0.58536	0.559774		
Comparison between Primary school and Postgraduate degree	-0.217982	0.06629867	-3.28787	0.001442**		
Comparison between Primary school and Degree	-0.043567	0.0572344	-0.76121	0.448527		
Comparison between Primary school and High school diploma	-0.086155	0.05522372	-1.56012	0.122248		
Comparison between Primary school and Professional school diploma	0.2242941	0.11512776	1.948219	0.054508		
Comparison between Primary school and Secondary school diploma	0.2173162	0.0962179	2.258584	0.026324*		
Register x Comparison between Monolingual and Agrigentino groups	-0.021011	0.00730454	-2.87645	0.004044**		
Register x Comparison between Monolingual and Pavese groups	0.0058846	0.00780894	0.753578	0.451149		

Register x Comparison between Monolingual and Bilingual groups	0.0196735	0.00736753	2.670291	0.00761**

The main effect of age suggests that older participants are slower than younger participants in providing an answer. With respect to levels of education, respondents holding a postgraduate degree show faster RTs compared to participants with a primary school qualification (t = -3.28; p = 0.001), who in turn are slightly faster compared to participants holding a secondary school diploma (t = 2.25; p = 0.02). 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 = 1.95; animacy = 1.00; gender = 1.09; age = 1.90; education = 2.48; 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 S3 and Table S4, Appendix).

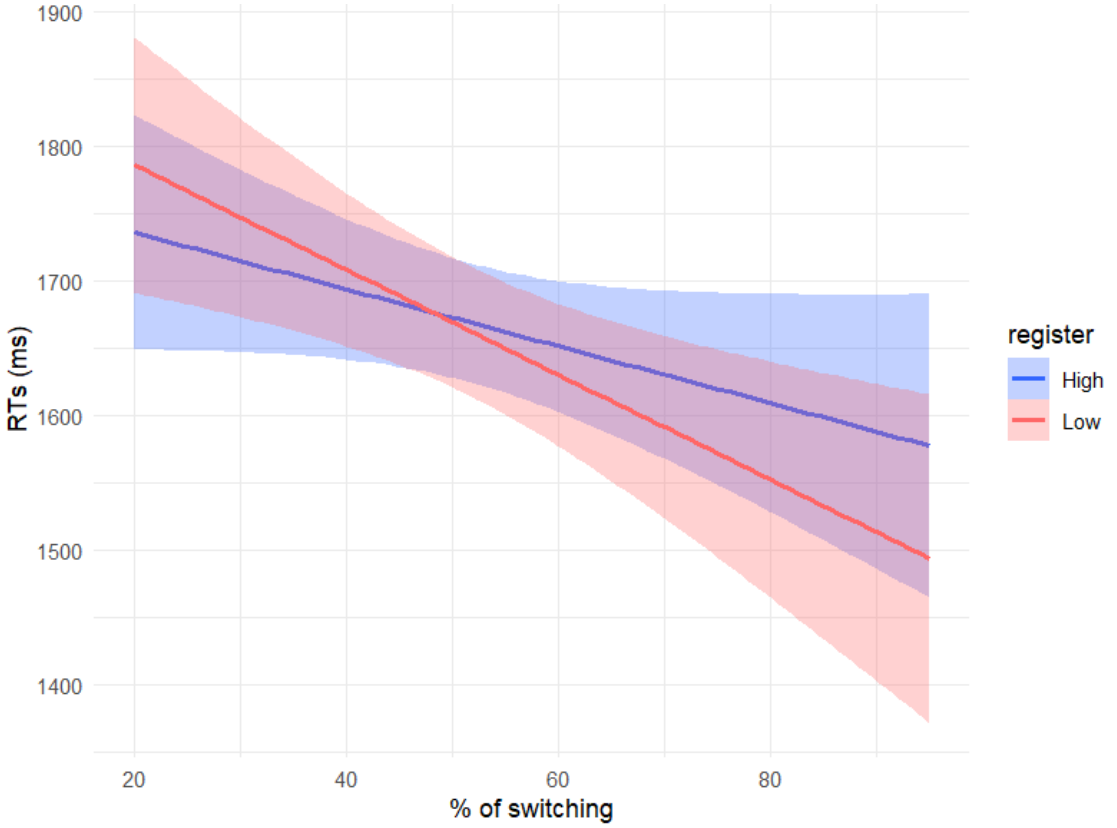
Figure 4. RTs in milliseconds for low- vs. high-register stimuli split per language group. * = p < .05, ** = p < .01, *** = p < .001, **** = p < .0001. The violin shapes represent data density, while the box plots represent standard deviations



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 S5, Appendix).

In the additional analysis of RTs, we seek to determine the effect of different variables related to language practices and use (Table S6, Appendix). Besides the significant effect of education, which was also found in the basic model of RTs, the effect of the percentage of switching is statistically significant. Higher percentages of switching are associated with reduced RTs for bilinguals and bidialectals. As Figure 5 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 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 a combined effect of language group on RTs, with Italian-Pavese bidialectals being faster than Italian-Agrigentino bidialectals ($t = -2.059$; $p = 0.03$) in providing an answer. Furthermore, while Italian-Agrigentino bidialectals judge high-register stimuli faster than low-register stimuli, the opposite tendency is found in the Italian-Pavese bidialectal group.

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 (Table S7, Appendix).

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, RQI 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 assumptions 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 in addition to other domains of language. Put differently, this finding entails that register could function as a separate domain in language processing, suggesting that the processing of morphology and syntax can be influenced by other linguistic modules (cf. Radford's 1988, 2004 *Autonomous Syntax Principle*, according to which syntactic rules are initially accessed independently from other modules during language processing). 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 linguistic register in core morphosyntactic processing, providing evidence against strong modularity hypotheses. These findings are in line with previous research that underscored the impact of extra-grammatical features, such as context (Grodner et al. 2005), on the processing of (morpho)syntax. In our study, the contrast between low and high register of the stimuli might have triggered different communicative contexts in our participants' minds, with varied consequences on processing outcomes.

Our 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 more prompted to identify 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, which 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 increased 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. Importantly, this second interpretation of the results, which emphasizes the frequency and familiarity of low register, is closely intertwined with our first interpretation, which is more rooted in the social dimension of register variation. The two are not mutually exclusive. The same nature of low register as the less marked variety aligns with the idea that participants might anticipate greater deviations from grammatical norms: greater familiarity with low register could lead to reduced attention to prescriptive linguistic rules. The concepts of frequency and familiarity in linguistic input align with usage-based approaches to language, which view grammar as a dynamic system shaped by use and relying on domain-general cognitive processes (Diesse et al. 2019). According to the Entrenchment-and-Conventionalization Model (EC-Model, Schmid et al. 2020), linguistic activity functions as a driving force: the more conventionalized and entrenched a linguistic structure is, the more likely it is to be used. From this perspective, greater experience with a specific register may lead to less costs to process the specific register features of this variety, leading to more accurate judgements for morphosyntax. This usage-based framework extends beyond a strictly within-language level and encompasses the co-occurrence patterns of different languages, explaining specific language-choice patterns in bilingual environments (Gaskins et al. 2022).

Indeed, our hypothesis regarding our participants' familiarity levels with a specific register and the resulting impact on processing can offer insights into findings relevant to RQII, which concerns the comparison between monolingual and bilingual speakers of minority and majority languages in the processing of morphological errors across different registers. Besides considering familiarity with a particular linguistic register, it is crucial to account for the familiarity of using that register within one or both languages in the case of bilinguals. In this regard, through our comparative perspective, we observed different tendencies across language groups. The monolingual group is the one presenting more similar accuracy rates and RTs between low- and high-register stimuli. Regarding accuracy, both the bilingual and the bidialectal groups tend to better spot agreement mismatches in low-register stimuli,

with a more pronounced distinction between low- and high-register stimuli compared to functionally monolingual speakers. This distinction becomes particularly evident when comparing accuracy rates for low- and high-register stimuli between Italian-Agrigentino bidialectals and functionally monolingual speakers. With respect to RTs, similarly to what we found for accuracy, while the monolingual group shows more comparable response latencies for both low- and high-register stimuli compared to bilinguals and bidialectals, 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 Italian-Spanish 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 present minor differences compared to the bilingual groups, leading to more 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. This might result in varying levels of familiarity with employing a specific register within one of their languages. Additionally, the tendency to use a language in specific communicative settings can implicitly influence the perceived prestige associated with that language, depending on its typical formal vs. informal context of use. 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. From this perspective, the accuracy trends in functionally monolingual speakers and Italian-Agrigentino bilinguals may have connected but distinct roots: while the former group may be more driven by the implicit association of high register with formal contexts, the latter group could be more influenced by the

prestige dynamics inherent in minority language bilingualism. 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 expect (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. Previous literature focused on bilingual heritage speakers (Kostina & Siegal 2021, Bunk 2021) supports the pivotal role of linguistic prestige in modulating register choices and processing. Indeed, both heritage and non-standard language bilingualism share the presence of a societal language whose sociolinguistic supremacy affects the language dynamics of the bilingual community. Our results align with previous findings and suggest that these dynamics of linguistic prestige can potentially extend to a differentiated usage and processing of registers in both the societal and minority languages.

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 switching and RTs. Higher percentages of language switching are associated with faster RTs, with a more pronounced difference in low-register sentences (Figure 5). The overall faster performance associated with higher switching percentages may stem from the enhanced language processing mechanisms in bilinguals and bidialectals who are used to frequently juggling different linguistic systems (Costa et al. 2008, Verreyt et al. 2019, Siu & Ho, 2022). This

interpretation should be corroborated by a positive relation between higher percentages of language switching and better accuracy rates, which is missing in our current data. This could be explained by the fact that both the Italian-Pavese and the Italian-Spanish bilingual groups are performing almost at ceiling in detecting attraction errors. This does not imply that bilingual experience variables such as switching do not affect language processing. Rather, it suggests that the task might not have enough sensitivity to capture such effects (Leivada et al., 2021b). Regarding the more pronounced difference in RTs for low-register sentences, 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. 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.

In summary, our results highlight the significance of investigating register variation through a psycholinguistic perspective. This approach allows for a nuanced exploration of language processing, encompassing both grammatical and extra-grammatical factors. A major challenge in this endeavor lies in creating experimental designs that faithfully replicate authentic communicative settings while rigorously controlling for specific linguistic features. Our study tried to meet this challenge by focusing on the sentence level and ensuring homogeneity of semantic and morphosyntactic features across low- and high-register stimuli. However, real-time communication extends beyond sentence boundaries and encompasses broader conversational contexts (Cosentino et al. 2013). As a potential limitation of our study, we acknowledge the absence of preceding context in our experimental stimuli. A preceding context may have hindered the anticipation of (in)formal modes for the processing of our experimental items, potentially increasing the contrast between high- and low-register sentences. Future replications of this study could address this limitation by adding contextual information before the stimuli, enabling the observation of potential variation in the main effect of register identified in the current experiment.

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 to include not only features related to situational and social aspects of language use but also its

cognitive dimensions and its impact on language processing (Keller 2021). This could translate into deepening the conceptualization of mental models that connect language practices to context, following van Dijk's (2005, 2008) perspective. Furthermore, future research could consider the development of ecologically valid methodologies for the processing of linguistic register variation. One potential approach is the use of vignettes to create realistic scenarios that mimic formal and informal communicative contexts, allowing participants to engage in a more immersive and ecological task (Goetze 2023).

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). Although this practice might present challenges, especially for bilingual communities speaking non-standard languages due to their internal variation in terms of language use and attitudes, it can help address unresolved issues in bilingualism and language processing research. Moreover, applying psycholinguistic methods to non-standard language bilingualism has the potential to recognize the distinct linguistic status of non-standard varieties, such as those spoken in the Italian Peninsula. 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. Indeed, finding truly monolingual individuals has become increasingly challenging, particularly in Italy, where non-standard languages coexist with foreign standard languages, but also in other sociolinguistic contexts. 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 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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