Foreign Language Effect on the Judgment of Bullshit: Interplay of Language, Emotions and Meaning

This manuscript is a preprint and has not been peer-reviewed.

Last updated December 5th, 2024

Lea Gorišek[1], Dušica Filipović Đurđević[1, 2], Kaja Damnjanović[1, 3]

[1]Laboratory for Experimental Psychology, Department of Psychology, Faculty of Philosophy, University of Belgrade,

[2]Laboratory for Experimental Psychology, Faculty of Philosophy, University of Novi Sad

[3]Institute of Philosophy, Faculty of Philosophy, University of Belgrade

Lea Gorišek
https://orcid.org/0009-0009-8433-8431
E-mail: leag98@gmail.com

Dušica Filipović Đurđević
https://orcid.org/0000-0001-5044-5428
E-mail: dusica.djurdjevic@f.bg.ac.rs

Kaja Damnjanović
https://orcid.org/0000-0002-9254-1263
E-mail: kdamnjan@f.bg.ac.rs

Address for correspondence: Lea Gorišek, Laboratory for Experimental Psychology, Faculty of Philosophy, Čika Ljubina 18-20, 11000 Belgrade, Serbia, e-mail: leag98@gmail.com

Data availability statement: All experimental materials, trial-level data and analysis code are available at this link: [https://osf.io/vxbwe/?view_only=8fcee645baa04edaa365fce0f3072dde].

Acknowledgements

The authors thank Ana Đorđević, Sabina Halupka-Rešetar and Sanja Ignjatović for their assistance with participant recruitment, as well as all the participants who took the time to complete the experiment. The authors are also grateful to Danka Purić and Iris Žeželj for their feedback on the research design. Furthermore, the authors thank Marko Ilijić and Katarina Mladenović for their contributions to ensuring the accuracy of the English translation of statements during material preparation. Finally, thanks should also go to Sandra Ilić for her guidance on software-related aspects in the preparation of the experiment.

Portions of this work were presented at the 23rd meeting of the European Society for Cognitive Psychology (ESCOP) in Porto, PT (Sept. 2023), and during the Katarina Marić Fund Awards Ceremony at the Empirical Studies in Psychology Conference.

This work is a part of Lea Gorišek's MA thesis entitled "Foreign Language Effect on the Judgment of Bullshit" at the University of Belgrade, co-supervised by Dr. Dušica Filipović Đurđević and Dr. Kaja Damnjanović.

Funding: This research was funded by the Ministry of Education, Science, and Technological Development of the Republic of Serbia (info:eu-repo/grantAgreement/MESTD/inst-2020/200163/RS//).

Disclosure of conflict of interests: The authors have no known conflict of interest to disclose.

Ethics approval statement: This research was approved by the Institutional Review Board of the Department of Psychology, Faculty of Philosophy, University of Belgrade (board approval number: #2022-65). All participants gave informed consent before participating per the Declaration of Helsinki.

Foreign Language Effect on the Judgment of Bullshit: Interplay of Language, Emotions and Meaning

Abstract

Foreign language effect (FLE) refers to the observed differences in responding to judgment and decision-making problems presented in native (L1) or foreign language (L2). The present research aimed to investigate whether L2 use could impact the judgment of bullshit, and, provided that the impact is observed, if the mechanisms behind the FLE could rely on emotionality. Bullshit is a form of meaningless material that is grammatically and syntactically correct, and has been studied in empirical psychology. We conducted two studies with participants differing in L2 proficiency. The participants were instructed to evaluate the profoundness of positive, negative, and neutral bullshit and mundane statements in their L1 and L2. The results suggest that people are more prone to accept the profundity of emotionally charged bullshit, whereas L2 use mostly impacts the judgment of less proficient speakers – it could diminish their ability to detect neutral nonsense and refute the profundity of negative mundane statements. This implies the dependence of FLE on valence, meaning, and their interaction. We discuss findings within Dual Process accounts of reasoning, noting that both emotional involvement and using a L2 lead to quick, intuitive processing. Therefore, to sound profound, use emotional words or a foreign language!

Keywords: Foreign Language Effect, Bullshit, Emotional Processing, Meaning, Dual Process Theory

Introduction

In today's globalized world, most people speak and actively use more than one language daily. In Europe, for example, over half of the population (54%) can speak a foreign language well enough to converse (Corporate authors, 2012). This implies that many people process information, judge and make decisions in a language they are not fully proficient in. Because decisions, both minor and significant, play a crucial role in shaping our lives and those of others around us, understanding how people reason in non-native languages can yield a variety of practical insights and implications.

In this research, we investigate for the first time whether foreign-language presentation affects the profundity rating of nonsensical (bullshit) statements compared to everyday (mundane) statements and whether this process is modulated by emotional valence.

Foreign Language Effect

Previous empirical studies in the domain of the psychology of rationality that investigated whether using a foreign language could influence cognitive processes and reasoning outcomes introduced the concept of Foreign Language Effect (FLE). FLE pertains to the dependence of judgment and decision-making (JDM), as well as overall reasoning during the problem-solving process on the nativeness of a language in which the problem is presented (native - L1 vs. foreign - L2; Hayakawa et al., 2016). The FLE was first recorded by Keysar et al. (2012), as participants were no longer affected by the options' framing when the Asian disease problem was presented in a foreign language. Studies show that the FLE occurs in bilinguals who had acquired the L2 in a classroom learning context, and not in early childhood (Keysar et al., 2012; Costa et al., 2014). These results were replicated using different native and foreign languages, such as English, Japanese, French, etc. (Keysar et al., 2012; Costa et al., 2014). In addition to the context of language acquisition, studies indicate that foreign language proficiency also plays a role in FLE on JDM, as findings show that this effect is absent in bilinguals who are entirely or to a greater extent proficient in L2 (Čavar & Tytus, 2018; Brouwer, 2019). Dylman and Champoux-Larsson (2020) also argued about the boundaries of the FLE, because they did not record a FLE in cases of greater linguistic similarity between L1 and L2 languages, higher L2 proficiency and when the tested L2 had higher cultural influence on the participant's community (usually through media).

Due to the growing body of research regarding the FLE (e.g. Costa et al, 2014; Geipel et al., 2015; Oganian, et al., 2016; Hayakawa & Keysar, 2018; Circi et al., 2021), several explanatory hypotheses have been formulated. One of the proposed explanations of the mechanisms underlying the FLE stemmed from the framework of the Dual Process Theory, which suggests that two processes are activated during reasoning: Type 1, intuitive, automatic, and affective, and Type 2, conscious, slow, and deliberative (Circi et al., 2021; Evans & Stanovich, 2013). The native language is processed automatically, whereas the foreign language requires a greater degree of effort, which may activate deliberate, conscious, and more rational (Type 2) cognitive processes (Costa et al., 2014; Keysar et al., 2012). That is, presenting the problem in a foreign language, as it is a less familiar context, *disrupts cognitive fluency*, and raises attention levels. This could make the processing more cautious and activate more rational Type 2 processes, leading to more analytical solutions (Costa et al., 2014; Keysar et al., 2012). On the other hand, from the perspective of the *cognitive load hypothesis*, the use of a foreign language could make the JDM tasks more difficult, not easier, leading to increased reliance on heuristics (Costa et al., 2014; Keysar et al., 2012). In other words, with the higher working memory load that the processing of a foreign language requires (Hasegawa et al., 2002), cognitive recourses of Type 2 are spent to a higher degree. Type 2 processes thus cannot control the intuitive answers given by Type 1 processes, which leads to heuristical thinking affecting participants' responses to a larger extent.

Besides the disrupted cognitive fluency and the increased cognitive load, the suggested discrepancy between the activity of the two types of processes in native and foreign languages is also attributed to different levels of *affective engagement* (Keysar et al., 2012; Hadjichristidis, et al., 2019). Empirical evidence indicates that a foreign language's processing is characterised by a lower emotional response relative to the native language (Pavlenko, 2012; Caldwell-Harris, 2015; Harris et al., 2003; Harris, 2004). Harris (2006) explained the differences in emotional engagement between L1 and L2 in her Emotional Contexts of Learning Theory. She proposes that the mentioned differences are a result of the different emotional contexts in which the languages were acquired. Native language is usually acquired in a highly emotional environment, through attachment to caregivers and peers, whereas foreign language is usually not used and learned in such an emotional context (Harris, 2006). When it comes to the FLE, it is hypothesised that due to the emotional distance, there is a lower emotional response to the affect-laden problem

presented in a foreign language, intuitive heuristics (Type 1 processes) are overridden by the analytical and more objective (Type 2) processes (Keysar et al., 2012; Costa et al., 2014). Affective engagement resembles one of the dominant mechanisms underlying Type 1 processing; therefore, emotion-laden problems could trigger heuristics (Kahneman, 2003). People are guided by their emotions during judgment and decision-making, and emotionality could also be used as one of the problem-solving strategies by relying on the affect heuristic (Slovic et al., 2007). The emotional distance hypothesis therefore leads to similar predictions as the disrupted cognitive fluency hypothesis: foreign language use could diminish biases. In their review, Hadjichristidis and colleagues (2019) indicated that FLE was beneficial for the reasoning process when the presented problem involved emotions and social norms. Hence, the JDM tasks that are not grounded in emotionality would not be influenced by the foreign language use in the same manner. Hadjichristidis and colleagues (2019) listed different studies in which the JDM tasks were mostly emotionally neutral where the foreign language use didn't diminish biases, whereas in some cases, it even made the task more difficult. Furthermore, Costa and colleagues (2014) also found FLE only in the JDM tasks in which biases were grounded in emotionality. In contrast, in emotionally neutral JDM problems, the biases were not modulated by the language in which the materials were presented. This implies that emotionality is more critical for the FLE than cognitive fluency.

In sum, current hypotheses on the origin of the FLE provide opposing predictions. On the one hand, reasoning in a foreign language about meaningful, emotionally engaging verbal content could diminish biases due to reduced cognitive fluency and/or lesser emotional involvement influencing the engagement of Type 1 and Type 2 processes (Circi et al., 2021; Mækelæ & Pfuhl, 2019). On the other hand, according to the cognitive load hypothesis, foreign language use could increase biases (Costa et al., 2014; Keysar et al., 2012; Mækelæ & Pfuhl, 2019). The present research aimed to provide further empirical evidence to expand the understanding of mechanisms behind the FLE. Beyond that, we also investigated whether the FLE could be modulated by other aspects of the reasoning problem (besides emotionality), such as the presence of meaning. That is, we aimed to investigate whether the FLE is confined to meaningful content, or if it could extend to nonsensical material.

Bullshit Statements

Due to the similarities in proposed underlying mechanisms, an insightful perspective on FLE could involve examining the processing of meaningless verbal material, which (to the best of our knowledge) has not been done so far.

As with the FLE, The Dual Process Theory is also used to explain nonsensical content processing (e.g. Pennycook et al., 2015; Rachev et al., 2022; Ilić & Damnjanović, 2024). The judgement of meaningless statements puts *more pressure on the working memory* than simple meaningful sentences, similar to processing of an L2 (Pennycook et al., 2015; Ilić & Damnjanović, 2024). Another similarity relies on *the importance of emotionality* – some explanations of FLE rely on emotional processing, and even though it wasn't empirically tested, it has been proposed that the emotionality of nonsensical statements could impact its judgement (Hopkin & Rosamond 2018; Sarajlić 2018).

The exemplary meaningless verbal material used within the Dual Processes framework is bullshit statements (BS). BS represent the form of meaningless material, and their processing and evaluation rely on the mechanisms of the interaction of Type 1 and Type 2 processes (Pennycook et al., 2015). These statements are grammatically and syntactically correct and inherently appear as if they were made to communicate something, whereas, at the same time, they do not contain meaning nor truth value (Ilić & Damnjanović, 2024).

Having in mind that due to their lack of meaning BS could not be refuted, the use of bullshit in public discourse as well as its receptivity could carry enormous social consequences (Ilić & Damnjanović, 2021). Contrary to lies, BS are immune to any empirical argumentation, allowing the speaker to avoid the responsibility for the consequences of their words (Ilić i Damnjanović, 2021; Hopkin & Rosamond 2018; Sarajlić 2018). Given that distinguishing between bullshit and credible, truthful statements requires greater cognitive effort than identifying outright lies, it's not surprising that BS are so effective in today's society. (Hopkin & Rosamond 2018). Thus, it has been shown that people who consider BS as profound, are also less likely to engage in critical thinking (Pennycook 2015), tend to believe more in fake news (Pennycook & Rand 2020), and have predictable political beliefs (Pfattheicher & Schindler 2016). The proliferation of mass media has made vast amounts of information accessible to everyone anytime and people rely on this information to make decisions and shape their understanding of the world. Manipulating this information can thus influence the reasoning of individuals as well.

Additionally, it has given many individuals a platform in public discourse without any restrictions, allowing them to resort to different tacticts to ensure popularity and acceptance of their perspective. For example, political figures and popular science authors often use BS to make their messages more believable and widespread.

In empirical psychology, different types of BS were defined and investigated, such as pseudo-profound BS, which use impressive, complex, and obscure vocabulary (Pennycook et al., 2015, Ilić & Damnjanović, 2021), scientific BS constructed using scientific terminology (Evans et al., 2020), or general BS which contain words regarding common topics, such as politics, health, and relationships (Čavojová et al., 2020), etc. The participants tend to evaluate BS as more profound than mundane ones, even though they are meaningless (Pennycook et al., 2015, Čavojová et al., 2020, Ilić & Damnjanović, 2021). So far, the FLE has been addressed in the context of meaningful verbal material, so the occurrence of the FLE on BS is yet to be observed. The focus of the present study is on the more generalized type of BS, which consist of ordinary, everyday, rather than impressive vocabulary.

The use of BS as stimuli could prove especially beneficial due to the possibility of manipulating different characteristics that are relevant to the research questions regarding emotionality, imageability, meaning, etc. For example, we could create statements that differ by emotionality (e.g. emotional valence), because previous authors imply the importance of emotions for the judgment of BS: people are more prone to accept the profundity of bullshit that concerns "burning" topics, related to current issues (Hopkin & Rosamond 2018; Sarajlić, 2018), as well as the profundity of the content which is according to their beliefs and political identity (Pennycook & Rand, 2021). Experimental manipulation of meaning as a characteristic (presence or absence) could provide valuable insights into the mechanisms of emotional processing, the relation between emotions and meaning, and the importance of language use. Furthermore, using BS as stimuli provides the opportunity to control different confounding variables on a word level that could influence the results, by matching the statements by various characteristics on different levels.

To conclude, the consensus regarding the underlying cognitive mechanisms of FLE has still not been achieved, and the authors are debating whether disrupted cognitive fluency or lower affective engagement could cause these effects. To add to this debate, these proposed mechanisms do not have to be mutually exclusive. The present research aims to provide additional empirical

data that could contribute to answering this yet-open research question. We investigated whether the language in which the material is presented affects complex cognition and if the differences in the emotional response in L1 and L2 could cause these effects, broadening this perspective on the cognitive processing of nonsense.

Aims and Hyphothesises

The aim of the present study was twofold. Firstly, we wanted to investigate whether the language in which the bullshit is presented could affect its cognitive processing, that is, its profundity judgment, in the groups of participants who differ in their L2 proficiencies. Secondly, we wanted to unravel the potential mechanisms underlying the effects proposed by previous researchers (e.g. Costa et al., 2014), such as the emotionality of the statements. Therefore, we aimed to inspect if the statements' emotional valence (EV) could affect their profundity evaluations. For these purposes, we conducted two experimental studies.

Therefore, we conducted two experimental studies on highly proficient and less proficient speakers in L2, with the task of judging the profundity of positive, neutral and negative BS and every day, mundane statements (used as a control), presented in native and foreign language conditions. Due to the different theoretical explanations regarding the underlying mechanisms of FLE with conflicting predictions about the direction of effect proposed by emotional distance and cognitive fluency theories on the one hand, and the increased cognitive load theory on the other (Costa et al., 2014; Keysar et al., 2012), we hypothesised that the average profoundness ratings of the bullshit statements would differ depending on the language in which the statements are presented. About the processing of bullshit, we presumed that the emotionally charged statements (positive and negative) would be rated as more profound compared to the neutral ones, having in mind that the judgment of bullshit relies on Type 1 and Type 2 processes (e.g. Pennycook et al., 2015; Rachev et al., 2022; Ilić & Damnjanović, 2024), and that the emotional engagement leads to higher activation of Type 1 processes (Kahneman, 2003). Finally, due to the emotional distance that follows foreign language use suggested by previous empirical evidence (Pavlenko, 2012; Caldwell-Harris, 2015; Harris et al., 2003; Harris, 2004) we hypothesised that the effect of valence on the judgment of bullshit would diminish in a foreign language condition: the difference in average profoundness ratings between bullshit statements of positive or negative emotional

valence on the one hand, and the bullshit statements of neutral valence on the other will be smaller if the statements are presented in a foreign language.

Study 1

In the first study, we presented the Serbian-English bilingual speakers, highly fluent in English as L2, with bullshit and mundane statements differing by emotional valence in Serbian and English. The participants were bachelor, master, and PhD students, or recent graduates of English language, literature, and culture in Serbia, who use L2 regularly mainly in professional contexts and during leisure activities, whereas the main task of the experiment was to judge the profundity of statements.

Method

Participants

We calculated the required participants' sample size using a MorePower 6.0 power analysis (Campbell & Thompson, 2012). The results of the power analysis suggested that the optimal sample size for detecting a statistically significant difference in the 2x2x3 within-subjects factorial design was 94 participants (focused on the three-way interaction effect), with a power of 0.8, and with the effect size $\eta_p^2 = .05$, based on the previous results (eg. Keysar et al., 2012; Hayakawa & Keysar, 2018; Circi et al., 2021).

The participants (N = 96) were bilingual speakers of Serbian (L1 - native) and English (L2 - foreign) language. The sample consisted of bachelor, master, and PhD students, or recent graduates of English language, literature, and culture (Female = 76%). The mean age was 22.84 years (SD = 2.00). Participants were recruited from [blinded for review] in Serbia, from May to July 2022, via promoting the questionnaire on social networks, cooperating with the professors from the faculty, and doing fieldwork during the exam periods, when we directly and personally promoted the questionnaire to the students. Participation was voluntary.

The participants included in the present study were multilingual and highly fluent English speakers, who started learning English in early childhood not only in the school context but also via watching TV, movies, and TV shows, and listening to music. They did not acquire the language in everyday social interactions, such as using the language at home with family

members. During the data collection, they were still engaged in activities such as listening to music or watching movies and TV shows in English, and because they were all students or recent graduates of English language, literature, and culture, they used English regularly in the professional domain.

We excluded the participants based on the following 5 criteria: not passing the attention check questions, spending more than 6 months in a foreign English-speaking country, speaking English for more than 6 months within the family, and not stating Serbian as their native language or English as their foreign language. One participant who was included in the sample reported Hungarian as an additional native language besides Serbian.

Because the participants were students of English language, literature, and culture, the data about the overall average grade and the number of ECTS was collected as an approximation of the L2 proficiency measure. The average number of obtained ECTS was 182.84, whereas 9.4% of participants had an average grade lower than 7.5 (out of 10). As the initially set criteria for the necessary 120 ECTS (12 participants did not meet the criteria) and the minimum average grade of 7.5 was unmet, we decided to include these variables (the number of obtained ECTS during studies, and the average grade), as covariates in the statistical analysis.

Besides Serbian, English, and Hungarian, the participants reported that they also speak German (34.4%), Spanish (25%), Italian (20.8%), French (18.7%), Russian (11.5%), Turkish (6.2%), Greek (5.2%), Japanese (4.2%), Latin (3.1%), Persian (3.1%), Portuguese (3.1%), Chinese (2.1%), Catalan (1%), Romanian (1%), Vlach (1%), Polish (1%), Macedonian (1%), Slovenian (1%), Bulgarian (1%), Welsh (1%), and Serbian sign language (1%).

The participants started learning English at a young age (M = 6.01, SD = 1.98) and stated that they, on average, became fluent at 13.91 years old (SD = 2.83). They also reported that they began reading in English at M = 9.78 (SD = 3.43) years old and became fluent reading in English at M = 12.37 (3.29). On a scale from 0 to 10, the participants rated their proficiency in speaking (M = 9.18, SD = .89), understanding (M = 9.53, SD = .66), and reading (M = 9.49, SD = .65) in English highly.

Since 2003, after the legal reform that introduced the new curriculum framework for foreign language education in Serbia, learning L3 became mandatory for all students entering Grade 1 in elementary schools (ages 6–7) (Filipović et al., 2007). English was the most widespread L2 taught in schools from the first grade for over 95% of Serbian first graders (Vučo

& Filipović, 2013). In addition, in the educational system in Serbia, the first foreign language is also taught in secondary education (usually English; Filipović et al., 2007). Besides English, students who entered the first grade in 2003. in Serbia also learned a second foreign language (French, German, Russian, Italian or Spanish). In the present study, 5% of participants started their elementary education before 2003 and, on average, stated that they spent 18.00 (SD = 5.70) years speaking English in a work or school environment.

Additionally, they had a chance to rate on a scale from 0 to 10 different factors that might have helped them in the English learning process. Watching movies and TV shows (M = 9.54, SD = 1.10), listening to music (M = 9.46, SD = 1.47), and watching TV (M = 9.14, SD = 2.00), were the activities that contributed the most, followed by reading (M = 8.60, SD = 1.84), and self-learning (M = 8.55, SD = 1.89). Using English while interacting with friends (M = 7.10, SD = 2.77), and playing video games (M = 6.32, SD = 4.13) had a somewhat lower impact on participants' language acquisition while listening to the radio (M = 4.50, SD = 3.87), and interacting with family was reported as something that helped the least (M = 1.69, SD = 2.34).

The participants also rated on a scale from 0 to 10 to what extent they are currently exposed to English in different contexts. Listening to music (M = 9.56, SD = 1.14), watching movies and TV shows (M = 9.43, SD = 1.22), reading (M = 9.10, SD = 1.39), self-learning (M = 8.9, SD = 1.84), and watching TV (M = 7.93, SD = 3.11) were the most highly rated contexts, followed by interacting with friends in English (M = 6.76, SD = 2.74), Playing video games (M = 5.59, SD = 4.34), whereas listening to radio (M = 4.03, SD = 3.91) and interacting with family (M = 0.99, SD = 1.63) were rated as contexts in which they are exposed to English the least.

Materials and Design

The stimuli consisted of mundane (MS) and bullshit statements (BS) in Serbian and English. Bullshit statements are defined as statements that are grammatically and syntactically correct, whereas they do not contain meaning or truth value, constructed by using general, everyday vocabulary. On the other hand, mundane statements are meaningful, and also grammatically correct sentences, consisting of similar words as BS.

Statements in both languages were divided into three subgroups, which differed by emotional valence (negative, neutral, and positive). Thus, there were 12 categories of statements, each consisting of 6 statements, making a total of 72 statements. Additionally, these statements

were made in 4 versions to accommodate counter-balancing according to the Latin square design (making a total of 288 statements). The examples of the statements are presented in Table 1.

Participants rated the profoundness of all statements on a five-point Likert scale (1 - not at all profound, 2 - somewhat profound, 3 - moderately profound, 4 - very profound, 5 - definitely profound). In the standard procedure of rating profoundness, as part of the instructions, Pennycook et al.'s exact definition of profoundness (2015) was presented to the participants: "Profound is something 'of deep meaning; of great and broadly inclusive significance".

Table 1

The examples of the stimuli

Valence	Bullshit	Mundane
Negative	The lies of a sinister monster could break your scars.	The sinister monster will smash us without lies and scars.
Neutral	Through financial length, you could quietly inspect the symbols	You could quietly whisper to me the length of the financial symbols.
Positive	Let's snuggle behind the satisfied achievement.	We are satisfied with your achievement.

Statements Construction. To create the statements for the main experiment, we have conducted two pilot studies (Gorišek et al., 2022): 1) in the first one, we created a database of words controlled for lexical-semantic properties taken from lexical norms, from which 2) we created bullshit and mundane statements, and pretested their properties in the second pilot study. In the first study, we extracted a group of English words from the existing database and their familiarity, emotional valence, and imageability ratings. We also collected familiarity ratings from Serbian native speakers to ensure that the selected English words were familiar to our participants. Next, the words were translated into Serbian and rated for emotional valence and imageability. Based on these ratings, we created our database of the words and their translational equivalents familiar to Serbian speakers and matched them for emotional valence. Despite of our efforts, Serbian words were rated as slightly more imaginable than their English equivalents ($t(699) = 9.02$, $p < .001$, $d = .34$).

In the second study, we used custom-made software to randomly select 240 five-word sets from our database of translational equivalents (80 sets of positive, 80 sets of neutral, and 80 sets of negative words). The sets were matched for relevant lexical-semantic features. For each set, we created a pair of statements – a bullshit statement and a mundane statement. Therefore, we created 480 statements in total. Participants rated the statements for emotional valence and imageability, and the statements differed by emotional valence ($F (2, 71) = 1053.09$, $p < .001$, $\eta_p^2 = .97$). Nevertheless, the mundane statements were evaluated as more imaginable than the bullshit statements ($F (1, 71) = 235.20$, $p < .001$, $\eta_p^2 = .77$), and the statements in English had higher imageability ratings than their Serbian equivalents ($F (1, 71) = 59.11$, $p < .001$, $\eta_p^2 = .46$).

Adapted Language Experience and Proficiency Questionnaire - LEAP-Q. We used the adapted Language Experience and Proficiency Questionnaire (LEAP-Q) originally constructed by Marian et al. (2007) to collect information about participants' proficiency, use, and language acquisition. Following the aims of the present study, we excluded the language-specific questions for all languages other than English and included several more contexts in which the participants may have been exposed to English (such as: listening to music, watching movies and TV shows, and playing video games).

Procedure

The data was collected online through the "SoSciSurvey" platform (Leiner, 2016). The ethical approval for conducting the research was obtained from the IRB of the Department of Psychology's Research Ethics Committee. The principles of open science were respected in all research steps; therefore, preregistration is available at https://aspredicted.org/eh7gb.pdf.

After reading the informed consent, participants answered demographic questions and an adapted LEAP-Q. The bilingual participants were randomly assigned to one of four groups following the Latin square design and evaluated the profundity of bullshit and mundane statements in both languages. The English and the Serbian block of statements were presented in randomized order for each participant. Every language-specific block contained one attention check item, in the corresponding language, to make sure they rated the profoundness of the statements attentively. We excluded the data from the participants who failed any of the attention check questions. After completing the questionnaire, the participants were presented with a debriefing.

Statistical Analysis

To calculate the mean differences in the rated profoundness of a statement in Study 1 three-way repeated measures ANCOVA was conducted, with the factors: language (Serbian and English), statement type (bullshit and mundane statements), and emotional valence (positive, negative, and neutral). Covariates were the number of ECTS and average grades obtained during studies. Before the main analysis, we also measured the internal consistency in the form of Cronbach's alpha for each of the 48 (4 x 12) stimuli groups, using the combined samples from Study 1 and Study 2. The 15 statements that reduce internal consistency were excluded from the main analysis, whereas the analysis conducted on a full stimuli base is provided in the supplementary material section.

Results and Discussion

The results of the three-way repeated measures ANCOVA (presented in Table 2, and illustrated in Figure 1) show that the overall bullshit statements were evaluated as somewhat to moderately profound (M = 2.56, SE = .08), and were rated as more profound than mundane statements (M = 2.01, SE = .06). Additionally, participants' evaluations of positive, neutral, and negative statements differed significantly, with the result that affect-laden statements (positive: M = 2.56, SE = .08; negative: M = 2.45, SE =.08) were rated as more profound than neutral ones (M = 1.84, SE =.07).

The difference in profoundness ratings between affect-laden (positive and negative) and neutral statements was more pronounced in bullshit statements due to the statistically significant statement type by emotional valence interaction.

The language in which the stimuli were presented did not significantly affect the rated profoundness of statements in any condition.

Post Hoc Tests

Post hoc tests with Bonferroni correction between Language levels (e.g. positive bullshit statements in English (L2) vs positive bullshit statements in Serbian (L1)) did not reveal statistically significant differences in profoundness ratings.

Language: Serbian (L1). When the materials were presented in Serbian (L1; Figure 1, Panel A), negative ($t = 7.60$, $p < .001$, $d = .78$), neutral ($t = 4.77$, $p < .001$, $d = .35$) and positive ($t = 9.85$, $p < .001$, $d = .90$) bullshit statements were rated as more profound than their mundane

equivalents. There were no differences in profoundness ratings between positive and negative bullshit statements, the same as in mundane statements. Negative ($t = 10.98$, $p < .001$, $d = .97$) and positive ($t = 10.19$, $p < .001$, $d = 1.04$) bullshit statements were rated as more profound than neutral bullshit statements, just as negative ($t = 5.47$, $p < .001$, $d = .54$), and positive ($t = 4.89$, $p < .001$, $d = .49$) mundane statements were evaluated as more profound than neutral ones.

Language: English (L2). Post hoc tests with Bonferroni correction suggest that when the stimuli are presented in English (L2; Figure 1, Panel B) same as in their native language, participants rated neutral ($t = 3.86$, $p = .014$, $d = .32$), positive ($t = 7.71$, $p < .001$, $d = .89$) and negative ($t = 5.43$, $p < .001$, $d = .59$) bullshit statements as more profound than their mundane equivalents. Positive bullshit statements were rated as more profound than negative bullshit ($t = 5.08$, $p < .001$, $d = .39$), whereas no significant difference was registered between positive and negative mundane statements in profundity ratings. Moreover, negative ($t = 10.10$, $p < .001$, $d = .79$) and positive ($t = 11.72$, $p < .001$, $d = 1.18$) bullshit statements were evaluated as more profound than neutral bullshit statements. The same pattern was recorded in mundane statements: both negative ($t = 6.50$, $p < .001$, $d = .53$) and positive ($t = 7.13$, $p < .001$, $d = .62$) mundane statements were found to be more profound than neutral mundane statements.

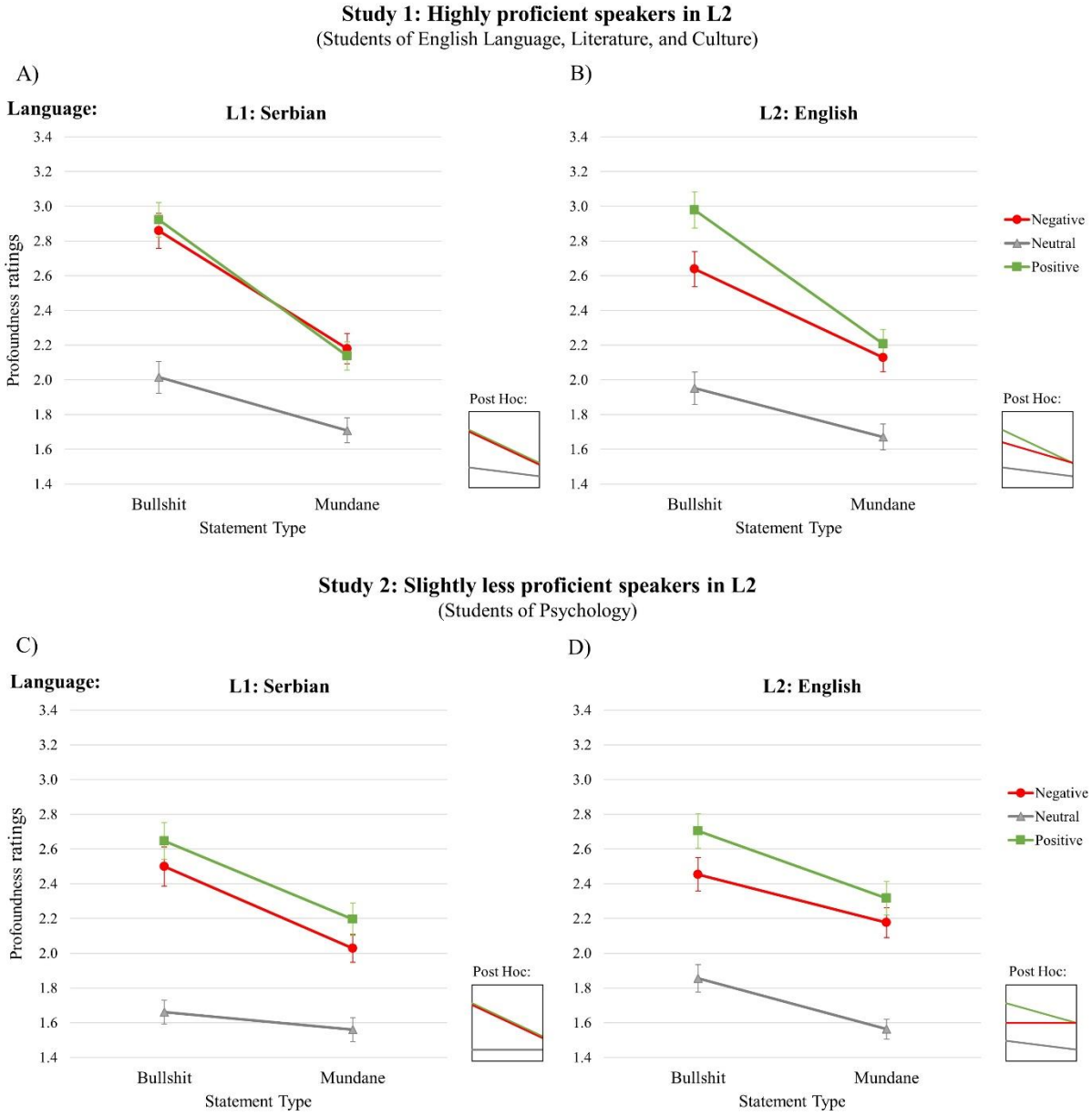
Table 2

Results of Repeated Measures Three-way ANCOVA: Effects on Profundity Ratings in Study 1

Variable name	F	p	ηp^2
Language	.28	.597	.00
Statement type	**11.20**	**.001**	**.11**
Emotional valence	**9.11**	**< .001**	**.09**
Language * Statement type	1.24	.269	.01
Language * Emotional valence	2.17	.120	.02
Statement type * Emotional valence	**3.86**	**.024**	**.04**
Language * Statement type * Emotional valence	.62	.542	.01

Figure 1

Effects of language and valence on profundity judgment of bullshit in participants differing in L2 proficiency



Study 2

In order to investigate whether the L2 proficiency could influence the effect of a foreign language use on the processing of bullshit, and if the participants in Study 1 were too proficient for the FLE to emerge, we replicated the experiment but now with Serbian-English bilingual speakers less fluent in English as L2 (as compared to the speakers who took part in Study 1). The procedure and materials were the same in Study 2 as in Study 1.

Method

Participants

For calculating the required sample size for Study 2, the power analysis was conducted the same procedure as in Study 1.

Participants (N = 95) were first-year psychology students, bilingual speakers of Serbian (L1) and English language (L2). Participants were recruited from [blinded for review] in Serbia, in December 2022. The majority of the participants (95.8%) completed the experiment as part of their coursework, whereas 4.2%. participated in the study voluntarily. 3.2% of participants did not want to state their gender, and 83.2% were female. The average participant's age was 19.23 years (SD = .95).

The sample of Study 2 included participants who were slightly less fluent in English than the participants in Study 1 but were proficient English speakers nevertheless. Most of them were multilingual and started learning English in early childhood in a school context, but also via watching movies and TV shows, listening to music, reading, watching TV, and sef-learning. The participants did not learn English in everyday social interactions, by using the language at home with family members, nor were they exposed to such context in English during the data collection. They stated they were still exposed to English while reading, watching movies and TV shows and listening to music.

Except for the obtained number of ECTS and average grade, the criteria for entering the sample were the same as in Study 1. All participants included in the sample reported Serbian as their native language, and English as their second language. None of them spent more than 6 weeks in an English-speaking country, nor did they spend time speaking English at home with family. The languages that were also listed among the languages that they speak were German

(36.8%), French (21.1%), Italian (15.8%), Russian (14.7%), Spanish (7.4%), Turkish (3.2%), Slovenian (2.1%), Japanese (2.1%), and Hungarian (1.1%).

The participants in Study 2 also started learning English at a young age (M = 6.12, SD = 1.75) and became fluent at 13.66 years old (SD = 2.15). They began reading in English at M = 10.64 (SD = 3.22) years old and became fluent reading in English at M = 12.83 (SD = 2.72). On a scale from 0 to 10, the participants rated their proficiency in speaking (M = 8.24, SD = 1.59), understanding (M = 8.95, SD = 1.00), and reading (M =8.67, SD = 1.30) in English moderately high.

All participants entered Grade 1 after the legal reform concerning the curriculum for foreign language learning in the Serbian educational system took place. Besides learning English as a mandatory subject in school, resources that further helped participants in mastering English, rated the highest by them on a scale from 0 to 10, were the following contexts in which they were exposed to English: watching movies and TV shows (M = 9.44, SD = 1.07), listening to music (M = 8.59, SD = 2.09), and reading (M = 8.22, SD = 1.96), followed by watching TV (M = 7.83, SD = 2.93), and self-learning (M = 7.59, SD = 2.18). Interacting with friends (M = 5.99, SD = 3.33), and playing video games (M = 4.47, SD = 3.65) had less impact on the participants' language acquisition, whereas listening to the radio (M = 2.95, SD = 3.50), and interacting with family (M = 2.02, SD = 2.71) where the contexts which contributed the least.

The participants also rated on a scale from 0 to 10 to what extent they are currently exposed to English in different contexts. Listening to music (M = 9.37, SD = 1.22), watching movies and TV shows (M = 9.24, SD = 1.38), and reading (M = 8.03, SD = 1.48) were the contexts in which the participants were most exposed to English language, followed by watching TV (M = 6.73, SD = 3.45) and self-instruction (M = 6.25, SD = 3.04). The participants stated that they are somewhat less exposed to English in interaction with friends (M = 4.59, SD = 3.23) and playing video games (M = 3.46, SD = 3.84). In contrast, they use English the least in contexts such as listening to the radio in English (M = 2.60, SD = 3.37), and interacting with family in English (M = .87, SD = 1.48).

Materials, Design, and Procedure

The materials and the procedure in Study 2 were the same as in Study 1.

Statistical Analysis

To calculate the mean differences in the rated profoundness of statements, three-way repeated measures ANOVA was conducted, with the factors: language (Serbian and English), statement type (bullshit and mundane statements), and emotional valence (positive, negative, and neutral). In this analysis, the statements that were shown to reduce internal consistency were also excluded, whereas the analysis conducted on a full stimuli base is provided in the supplementary material section.

Results and Discussion

Adapted LEAP-Q: Comparing the Two Groups of Participants

Between-group differences (samples from studies 1 and 2) in L2 variables from the adapted LEAP-Q are presented in Table 3. The results suggest that participants in Study 1 spent more time in the English linguistic context (M = 35.55% of overall time, SD = 14.34) than the participants in Study 2 (M = 26.09%, SD = 14.17). Also, when they are given a chance, they would choose to read (M = 53.55% of the time, SD = 22.38) or conversate (M = 42.54%, SD = 22.98) in English more often than the participants from the second group would (reading: M = 35.86%, SD = 21.05; conversating: M = 30.67%, SD = 19.00).

Additionally, the highly proficient participants rated their speaking (M = 9.18, SD = .89), understanding (M = 9.53, SD = .66), and reading English proficiency (M = 9.49, SD = .65) significantly higher than the slightly less proficient speakers from the second study (speaking: M = 8.24, SD = 1.59; understanding: M = 8.95, SD = 1.00; reading M =8.67, SD = 1.30). Besides language proficiency, the participants from Study 1 also rated their accents as more clear (M = 8.16, SD = 1.44), than the participants from the Study 2 did (M = 6.49, SD = 2.20). When asked how often others identify them as a non-English speaker on a scale from 1 to 10, based on their accent, the slightly less proficient participants stated that it happens to them more frequently (M = 5.86, SD = 2.96), compared to the highly proficient participants (M = 4.00, SD = 2.84).

Finally, regarding the different contexts and situations in which they are exposed to the English language, the participants in Study 1 reported that they were more exposed to reading ($t = 4.152$, $p < .001$), watching TV ($t = 2.53$, $p = .012$), playing video games ($t = 3.59$, $p < .001$), listening to the radio ($t = 2.71$, $p < .007$), interacting with friends ($t = 5.01$, $p < .001$), and self-

learning ($t = 7.27$, $p < .001$) in English than the participants in Study 2. In contrast, there are no significant differences between groups in exposure to watching movies and TV shows as well as listening to music in English.

Table 3

Between-group (Study 1 vs Study 2) differences for L2 variables

Variable name	t	p
Frequency of language use	4.71	< .001
Language preference - conversation	3.89	< .001
Language preference - reading	5.61	< .001
Self–assessment for language fluency – speaking	5.00	< .001
Self–assessment for language fluency – understanding	4.74	< .001
Self–assessment for language fluency – reading	5.48	< .001
Self–assessment for accent clarity	6.18	< .001
Self–assessment for accent persuasiveness	4.44	< .001

Profundity Ratings of Statements

The results of the three-way repeated measures ANOVA, presented in Table 4 and illustrated in Figure 1, indicate that bullshit statements were, on average, rated as somewhat to moderately profound ($M = 2.30$, $SE = .08$), and were evaluated as significantly more profound than mundane statements ($M = 1.97$, $SE = .07$), the same pattern as in Study 1. Affect-laden statements (positive: $M = 2.47$, $SE = .08$; and negative: $M = 2.29$, $SE = .08$) were in general rated as more profound than the neutral ones ($M = 1.66$, $SE = .05$). Due to the statistically significant two-way interaction between factors statements type and emotional valence, the difference in profundity ratings between emotion-laden and neutral statements magnifies if the statements are bullshit.

The language in which statements were presented didn't have a statistically significant effect on the general profoundness assessment but did make an impact through a three-way

interaction. The two-way interaction between emotional valence and statement type variated across the different levels of the factor language. In other words, if the stimuli were presented in English (L2), the two-way interaction was less pronounced.

Post Hoc Tests. Post hoc tests with Bonferroni correction between Language levels (e.g. positive bullshit statements in English vs positive bullshit statements in Serbian) did not reveal a statistically significant difference in profoundness ratings.

Language: Serbian (L1). When the stimuli are presented in Serbian (L1; Figure 1, Panel C), post hoc tests with Bonferroni correction showed that neutral bullshit statements do not differ by profundity ratings from neutral mundane statements. In contrast, both negative ($t = 4.89$, $p<.001$, $d = .55$), and positive ($t = 4.28$, $p<.003$, $d = .52$) bullshit statements were rated as more profound than their mundane equivalents. There was no statistically significant difference in profundity ratings between positive and negative bullshit statements, and also between positive and negative mundane statements. Nevertheless, regarding the bullshit statements, both negative ($t = 9.84$, $p<.001$, $d = .97$), and positive ($t = 11.18$, $p<.001$, $d = 1.14$) statements were rated as more profound than neutral statements. Similarly, negative ($t = 5.34$, $p<.001$, $d = .54$), and positive ($t = 6.18$, $p <.001$, $d = .78$) mundane statements had higher profundity ratings than neutral ones.

Language: English (L2). When the statements were presented in English (L2; Figure 1, Panel D), participants rated neutral ($t = 5.00$, $p<.001$, $d = .34$), and positive ($t = 4.20$, $p <.01$, $d = .45$) bullshit statements as more profound than their mundane equivalents. However, there was no statistically significant post hoc difference in profoundness ratings between bullshit and mundane statements of negative emotional valence. As well, there was no significant difference between positive and negative mundane statements, whereas positive bullshit statements were rated as more profound than negative bullshit statements ($t = 4.11$, $p<.006$, $d = .29$). Both negative ($t = 7.80$, $p<.001$, $d = .69$), and positive ($t = 10.80$, $p<.001$, $d = .98$), bullshit statements had higher profundity ratings than neutral bullshit statements. Likewise, negative ($t = 9.24$, $p<.001$, $d = .7$), and positive ($t = 10.01$, $p<.001$, $d = .87$) mundane statements were evaluated as more profound than neutral mundane statements.

Table 4

Results of Repeated Measures Three-way ANOVA: Effects on Profundity Ratings in Study 2

Variable name	F	p	ηp^2
Language	3.88	.052	.04
Statement type	**30.72**	**< .001**	**.25**
Emotional valence	**124.95**	**< .001**	**.57**
Language * Statement type	.15	.704	.00
Language * Emotional valence	.28	.756	.00
Statement type * Emotional valence	**5.91**	**.005**	**.06**
Language * Statement type * Emotional valence	**4.72**	**.010**	**.05**

General Discussion

The aim of the present study was twofold. On the one hand, we aimed to investigate whether foreign language use could impact the judgment of bullshit statements. On the other hand, provided that the impact is observed, we aimed to test the hypothesis that the emotionality of the statements presented one of the underlying mechanisms for this effect.

In addition, to examine the impact of L2 proficiency on the foreign language effect, this experiment focused on two groups of participants differing in L2 fluency levels, in two separate studies: Study 1 included highly proficient L2 speakers (students of English Language, Literature and Culture), whereas Study 2 focused on slightly less proficient L2 speakers (students of Psychology). This manipulation was motivated by previous findings that indicated the absence of FLE in highly proficient speakers (Čavar & Tytus, 2018; Brouwer, 2019).

In the group of highly proficient L2 speakers, the language use did not impact the profundity judgment of the statements in any experimental situation (the judgment of positive, neutral and negative bullshit and mundane statements did not depend on the used language). Nevertheless, in the group of slightly less proficient L2 participants, even if there were no significant general effects, the use of a foreign language influenced the judgement of statements, but only depending on the levels of emotional valence and meaningfulness of the statements. In other words, the language use modulated the effects of emotionality on the profundity assessment of meaningful and nonsensical statements.

In the following discussion, we will first examine the results that were consistently replicated across both studies. Then, we will discuss the findings associated with groups that differ in L2 fluency.

Emotionality and the judgment of bullshit

In both studies, the judgment depended on the statements' emotionality. That is, the affect-laden (positive and negative) statements were found to be more profound than neutral statements. These effects occurred regardless of the language in which the materials were presented and the statement type (i.e. in every experimental situation), making it a robust finding. Moreover, when the statements were presented in a native language, to both groups of participants, these effects were more pronounced in bullshit statements – the emotionality of the statements had a greater impact on the processing of bullshit than mundane statements. This first-time reported effects of emotionality on the judgment of bullshit support the explanation that bullshit processing relies on Dual Processes (Rachev et al., 2022).

Pennycook et al. (2015) suggest that the underlying mechanism for rating bullshit as profound is the initial tendency to accept something as meaningful and truthful, along with the deficiency of the ability to detect bullshit. In terms of the Dual Process Theory, it is supposed that accepting bullshit as profound follows an unsuccessful detection of conflict between the deficiency of meaning and the initial acceptance of the profoundness of the statement (Pennycook et al. 2015). That is, the scarcity of obvious signs that could indicate the nonsense behind bullshit statements creates a hostile environment for the judgment process, leading to the involvement of Type 1 heuristic processes and biased response: the vagueness of its meaning is interpreted as its profoundness (Pennycook et al. 2015). Hence, to refute the profoundness of these meaningless statements, conflict detection and the involvement of the Type 2 processes is necessary, which results in increased cognitive load on the working memory.

On the other hand, judging of mundane statements is a much easier task. Their meaning is clear, and a person can rely more on associative memory to refute their profoundness, by activating various representations as well as already acquired mental paths that lead to rational solutions to the problem, without putting pressure on the working memory. In the present study, the results indicate that in most cases, bullshit statements were indeed rated as more profound

than mundane ones, as in the earlier studies concerning bullshit (Pennycook et al., 2015; Čavojová et al., 2020; Ilić & Damnjanović, 2024).

Consequently, compared to mundane, the processing of bullshit statements depended more on the emotionality of the statements, suggesting that emotional involvement leads to engaging in Type 1 processing, especially in more difficult tasks where conflict detection is required (Kahneman, 2003). In addition, we suggest that due to the aforementioned mechanism that Penycoock and colleagues (2015) proposed, the initial tendency of accepting something as profound influences the evaluations of mundane statements as well, which is why its processing also depends on the emotional valence, even though to a smaller account.

The impact of foreign language use

The theoretical assumptions regarding the mechanisms underlying the FLE suggest that *the emotionality of bullshit should influence less the judgment of its profundity if presented in a foreign language due to the lower activation of Type 1 processes* (Keysar et al., 2012; Hadjichristidis et al., 2019; Costa et al., 2014). The results of our study indicate that the language modulated emotional valence's effects on the judgment of profundity, depending on participants' L2 proficiency. However, these effects still proved to be more complex than initially proposed.

Highly proficient L2 speakers

Highly proficient L2 speakers processed statements and emotional valence similarly in both their native (Serbian) and their second language (English). The only difference between language conditions was the significant post hoc difference between profundity ratings of positive and negative bullshit statements in a foreign language. In English (L2), positive bullshit statements were rated as more profound than negative bullshit statements. Nevertheless, this difference was not strong enough to impact the main analysis. The findings indicate that for individuals with a high level of proficiency in a second language (L2), the use of that L2 does not significantly affect their judgment and decision-making (JDM) processes.

Less proficient L2 speakers

Unlike with the group of highly proficient L2 speakers, in this group of participants, the language (whether it was L1 or L2) moderated the effects of emotional valence on the processing

of bullshit and mundane statements. More specifically, the interaction between emotionality and meaningfulness (statement type) was lost, the effects of the emotional valence on the judgment of statements were now similar in bullshit and mundane statements. Focusing on the different levels of valence, the language used mostly impacted the processing of negative and neutral statements, whereas positive statements were evaluated in a similar manner in L1 and L2. That is, depending on the emotion that the statements evoke, the use of a foreign language impacts the judgment of the profundity of nonsensical and meaningful statements differently.

Less proficient L2 speakers: Neutral (nonaffective) statements in L1 and L2. When presented in a foreign language, a significant difference between neutral bullshit and neutral mundane statements was recorded, in contrast to the native language.

Not differentiating the profundity of neutral bullshit and mundane statements in Serbian (L1), along with the lowest profundity ratings among emotional statements, suggests that detecting bullshit was easiest in this scenario. When we presented neutral statements in English (L2) in which the participants were not highly proficient, it may be that due to the increasing cognitive load on the working memory that follows foreign language use (Hasegawa et al., 2002), now the task of detecting bullshit became more difficult, consequently leading to higher ratings of neutral bullshit in L2. Hence, our results were *more congruent with the cognitive load theory (Costa et al., 2014), as well as with the findings that also suggest that L2 isn't always beneficial for the judgment and decision-making process, especially in emotionally neutral tasks* (Costa et al., 2014; Hadjichristidis et al., 2019). The study conducted by Muda et al. (2023) showed that it is more difficult to judge the believability of false news when presented in L2, indicating that using a foreign language could even increase biases.

Less proficient L2 speakers: Affect-laden statements in L1 and L2. The language in which the statements were presented impacted the processing of negative statements, whereas the positive statements were evaluated similarly between language conditions. In the domain of word processing, these results are in line with previous literature which indicates that language use mostly influences the emotional response to negative words (e.g. Harris et al., 2006, Colbeck &Bowers, 2012; Altarriba & Basnight-Brown, 2012, Yao et al., 2023). Similarly, previous research concerning FLE on the JDM suggests that the FLE occurs when affect (usually negative,

such as disgust, risk and loss aversion) and socio-moral norms (but breaking a norm is often associated with negative emotions) are important for the task (Hadjichristidis, et al., 2019).

When the materials were presented in a foreign language, negative bullshit and mundane statements did not differ in profundity ratings, in contrast to the native language. This occurred mostly due to higher profundity evaluations of negative mundane statements presented in L2 compared to L1 (but due to the slightly lower evaluations of negative bullshit as well). We did not expect to record that foreign language use enhances the influence of emotionality on the processing of mundane statements. One of the possible explanations relies on the mechanisms of emotional response that follow verbal stimuli. It may be assumed that the mechanisms behind emotionality differ depending on the complexity of the stimuli: whether we present the participant with words or sentences. In the case of words, the primary mechanism behind emotional response could be the associative relations between words (or phrases that are used frequently, such as childhood reprimands or course words), concepts and emotional representations, i.e. the knowledge acquired through associative memory. Conversely, in the case of sentences, besides the associative relations between words and emotions that we acquire throughout lifetime experiences (*Associative Processes - AP*), there could be an additional mechanism related to productivity as a characteristic of language use, that is activated during sentence processing, when there is a necessity to combine all the words in a sentence in a meaningful unity and to recreate the emotion of that unity, which occurs on the higher level of processing and involves working memory (*Combining Processes - CP*). The results of these two processes could sometimes be opposing. To illustrate, consider the sentence "We destroyed the menacing fast-spreading illness" and its words. The full sentence conveys a positive meaning, and could evoke positive emotions, while the words in the same sentence have negative connotations. This difference between the linguistic and psychological aspects of the same sentence may contribute to irrational reasoning, as proposed in the case of framing tasks (Mandel, 2001). Even though an interesting thought for further experimental investigation, the focus of the present study was on emotionally nonconflicting statements – we used statements in which the emotional valence of the whole statement was the same as the valence of the words it contains.

Returning to the results of the present study, we propose that foreign language use affects these two processes differently. We suggest that when we use a foreign language, it could diminish Associative Processes, due to the different emotional contexts of language acquisition

between L1 and L2, as proposed by Harris (2006) in the Emotional Contexts of Learning Theory. Because the native language is acquired in an emotionally rich environment, associative memory enhances the relations between words and emotions according to previous life experiences in which the language is used and learned, leading to greater emotional engagement (L2). On the other hand, foreign language is usually not used and learned in such an emotional context (it is more often acquired in a school context), making the words in L2 less associated with emotions (Harris, 2006). For their emotional processing, bullshit statements rely more on the Associative Processes due to the absence of their meaning: the emotional response depends more on the emotionality of the words of which it is made because it is impossible to form a unity of meaning for the whole sentence, and therefore more complex emotional response that follows it. In the present study, when negative bullshit statements were presented in L2 to slightly less proficient speakers (students of psychology), the dependence of the judgment of bullshit on its emotionality was somewhat lower compared to the L1. The reason for the minimal effects of language on emotionality could be the result of two possible causes:

1. Even this group of participants is over-fluent in L2.

2. The influence of the language use on the Associative Processes is not enough to impact the judgment of bullshit to a higher grade.

Turning to mundane statements, contrary to nonsensical bullshit statements, they do contain meaning, which allows the Combining Processes to engage. In the present study, when negative mundane statements were presented in L2 to slightly less proficient speakers, a higher influence of emotionality on the judgment of mundane statements was recorded, compared to the L1. This could imply that foreign language use enhances the combining mechanisms as a result of the higher attention levels that occur during the processing of the meaning of statements presented in a less proficient language. In other words, foreign language use raises attention levels, which makes the participants more focused on the processing of statements' meaning (Costa et al., 2014, Keysar et al., 2012), thus perhaps making them more aware and focused on the emotionality of the whole statements as well. When negative mundane statements were presented in a foreign language, due to the lack of Associative Processes engagement, the participants relied more on the Combining Processes to evaluate the emotionality. Therefore, the influence of the language was more pronounced in the case of mundane statements.

Comparing the two groups of participants, we could suggest that the foreign language use in Highly proficient speakers from Study 1 also impacted the Associative Processes, because the profundity ratings of negative bullshit in L2 decreased, resulting in a significant post hoc difference between positive and negative bullshit, that does not appear in the L1 condition. Even though the participants are highly proficient in L2, they still did not acquire a foreign language in everyday social interactions, and it could be that L2 was less associated with negative emotions than L1, resulting in the mentioned differences. On the other hand, due to enhanced fluency, foreign language use did not require additional cognitive load, leading to the similar processing of neutral statements and affect-laden mundane statements in L1 and L2.

Finally, the results of the pilot study (Gorišek et al., 2022), conducted on the same sample of statements indicate that participants differentiate the statements more by emotional valence if they contain meaning (i.e. mundane statements), and if they were presented in a foreign language.

In sum, when negative bullshit statements are expressed in one's native language, the evoked emotional response relies on the Associative Processes which are fully engaged in L1. As processing bullshit necessitates conflict detection, emotionality influences its judgment of bullshit more significantly than mundane statements. When presented in a foreign language, now the Associative Processes can't engage fully, due to the difference in emotional context of language acquisition between L1 and L2. At the same time, Combining Processes (activated during the processing of meaningful statements) enhance because of heightened attention levels that occur during L2 use, but only if the participants are not fully proficient. This leads to the levelling of the influence of emotionality on the judgment of statements between negative bullshit and negative mundane statements. The alternate and simpler explanation of this effect would refer to a response bias if the participants were unsure about their evaluations of bullshit and mundane statements making it more equivalent. Nevertheless, because this is the case only in the condition of negative statements, whereas the positive ones were rated similarly in both native and foreign languages, we could conclude that the explanation of this effect is more closely tied to the nature of the phenomenon than to the methodology used.

Conclusion

The results of these studies suggest that people are more likely to believe emotionally charged nonsense compared to neutral nonsense. The impact of emotional content on judging

nonsense and everyday statements is influenced by the use of a foreign language, albeit only for participants who are not completely fluent. When presented in a foreign language to less proficient speakers, neutral nonsense is harder to detect and negative everyday statements are harder to refute profundity-wise, leading to a more uniform impact of emotionality on the judgment of both nonsensical and meaningful statements. However, the processing of positive statements seems to be unaffected by language use. According to Dual Process Theory, both emotional involvement and using a foreign language could lead to using quick, intuitive processing (Type 1 heuristic processing).

References

Altarriba, J., & Basnight-Brown, D. M. (2012). The acquisition of concrete, abstract, and emotion words in a second language. *International Journal of Bilingualism*, *16*(4), 446-452. https://doi.org/10.1177/13670069114295

Brouwer, S. (2019). The auditory foreign-language effect of moral decision making in highly proficient bilinguals. *Journal of Multilingual and Multicultural Development, 40*(10), 865-878. https://doi.org/10.1080/01434632.2019.1585863

Caldwell-Harris, C. L. (2015). Emotionality differences between a native and foreign language: Implications for everyday life. *Current Directions in Psychological Science*, *24*(3), 214-219. https://doi.org/10.1177/0963721414566268

Campbell, J. I., & Thompson, V. A. (2012). MorePower 6.0 for ANOVA with relational confidence intervals and Bayesian analysis. *Behavior research methods*, *44*(4), 1255-1265. https://doi.org/10.3758/s13428-012-0186-0

Circi, R., Gatti, D., Russo, V., & Vecchi, T. (2021). The foreign language effect on decision-making: A meta-analysis. *Psychonomic Bulletin & Review*, 1-11. https://doi.org/10.3758/s13423-020-01871-z

Colbeck, K. L., & Bowers, J. S. (2012). Blinded by taboo words in L1 but not L2. *Emotion*, *12*(2), 217. DOI: 10.1037/a0026387

Corporate authors: Directorate-General for Communication (European Parliament), Directorate-General for Education, Youth, Sport and Culture (European Commission). (2012). Europeans and their languages. *Special Eurobarometer. 386*. https://op.europa.eu/en/publication-detail/-/publication/f551bd64-8615-4781-9be1-c592217dad83

Costa, A., Foucart, A., Arnon, I., Aparici, M., & Apesteguia, J. (2014). "Piensa" twice: On the foreign language effect in decision making. *Cognition*, *130*(2), 236-254. https://doi.org/10.1016/j.cognition.2013.11.010

Čavar, F., & Tytus, A. E. (2018). Moral judgement and foreign language effect: when the foreign language becomes the second language. *Journal of Multilingual and Multicultural Development*, *39*(1), 17-28. https://doi.org/10.1080/01434632.2017.1304397

Čavojová, V., Brezina, I., & Jurkovič, M. (2020). Expanding the bullshit research out of pseudo-transcendental domain. *Current Psychology*, 1-10. https://doi.org/10.1007/s12144-020-00617-3

Dylman, A. S., & Champoux-Larsson, M. F. (2020). It's (not) all Greek to me: Boundaries of the foreign language effect. *Cognition*, *196*, 104148. https://doi.org/10.1016/j.cognition.2019.104148

Evans, J. S. B., & Stanovich, K. E. (2013). Dual-process theories of higher cognition: Advancing the debate. *Perspectives on psychological science*, *8*(3), 223-241. https://doi.org/10.1177/1745691612460685

Evans, A., Sleegers, W., & Mlakar, Ž. (2020). Individual differences in receptivity to scientific bullshit. *Judgment and Decision Making*, *15*(3), 401-412. https://doi.org/10.1017/S1930297500007191

Filipović, J., Vučo, J., & Djurić, L. (2007). Critical review of language education policies in compulsory primary and secondary education in Serbia. *Current issues in language planning*, *8*(2), 222-242. https://doi.org/10.2167/cilp103.0

Geipel, J., Hadjichristidis, C., & Surian, L. (2015). How foreign language shapes moral judgment. *Journal of experimental social psychology*, *59*, 8-17. https://doi.org/10.1016/j.jesp.2015.02.001

Gorišek, L., Damnjanović, K., & Filipović Đurđević, D. (2022). *Foreign language effect on the judgment of bullshit* [Unpublished manuscript]. Department of Psychology, Faculty of Philosophy, University of Belgrade

Hadjichristidis, C., Geipel, J., & Keysar, B. (2019). The influence of native language in shaping judgment and choice. *Progress in brain research*, *247*, 253-272. https://doi.org/10.1016/bs.pbr.2019.02.003

Hasegawa, M., Carpenter, P. A., & Just, M. A. (2002). An fMRI study of bilingual sentence comprehension and workload. *Neuroimage*, *15*(3), 647-660. https://doi.org/10.1006/nimg.2001.1001

Hayakawa, S., Costa, A., Foucart, A., & Keysar, B. (2016). Using a foreign language changes our choices. *Trends in cognitive sciences*, *20(*11), 791-793. https://doi.org/10.1016/j.tics.2016.08.004

Hayakawa, S., & Keysar, B. (2018). Using a foreign language reduces mental imagery. *Cognition*, *173*, 8-15. https://doi.org/10.1016/j.cognition.2017.12.010

Harris, C. L., Ayçíçeğí, A., & Gleason, J. B. (2003). Taboo words and reprimands elicit greater autonomic reactivity in a first language than in a second language. *Applied psycholinguistics*, *24*(4), 561-579. https://doi.org/10.1017/S0142716403000286

Harris, C. L. (2004). Bilingual speakers in the lab: Psychophysiological measures of emotional reactivity. *Journal of multilingual and multicultural development*, *25*(2-3), 223-247. https://doi.org/10.1080/01434630408666530

Harris, C. L., Gleason, J. B., & Aycicegi, A. (2006). When is a first language more emotional? Psychophysiological evidence from bilingual speakers. *Bilingual education and bilingualism*, *56*, 257. https://doi.org/10.21832/9781853598746-012

Hopkin, J., & Rosamond, B. (2018). Post-truth politics, bullshit and bad ideas:'Deficit Fetishism'in the UK. *New political economy*, *23*(6), 641-655. https://doi.org/10.1080/13563467.2017.1373757

Ilić, S., & Damnjanović, K. (2021). The effect of source credibility on bullshit receptivity. *Applied Cognitive Psychology*, *35*(5), 1193-1205. https://doi.org/10.1002/acp.3852

Ilić, S., & Damnjanović, K. (2024). The distinctive characteristics of bullshit: intention, meaningfulness, and source reliability. *Thinking & Reasoning*, 1-31. https://doi.org/10.1080/13546783.2024.2409468

Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. *American Psychologist, 58*(9), 697–720. https://doi.org/10.1037/0003-066X.58.9.697

Keysar, B., Hayakawa, S. L., & An, S. G. (2012). The foreign-language effect: Thinking in a foreign tongue reduces decision biases. *Psychological science*, *23*(6), 661-668. https://doi.org/10.1177/0956797611432178

Leiner, D. J. (2019). SoSci Survey (Version 3.1.06) [Computer software]. Available at https://www.soscisurvey.de

Mækelæ, M. J., & Pfuhl, G. (2019). Deliberate reasoning is not affected by language. *PLOS ONE*, *14*(1), e0211428. https://doi.org/10.1371/journal.pone.0211428

Mandel, D. R. (2001). Gain–loss framing and choice: Separating outcome formulations from descriptor formulations. *Organizational Behavior and Human Decision Processes*, *85*(1), 56–76. https://doi.org/10.1006/obhd.2000.2932

Marian, V., Blumenfeld, H. K., & Kaushanskaya, M. (2007). The Language Experience and Proficiency Questionnaire (LEAP-Q): Assessing language profiles in bilinguals and multilinguals. https://doi.org/10.1044/1092-4388(2007/067)

Muda, R., Pennycook, G., Hamerski, D., & Białek, M. (2023). People are worse at detecting fake news in their foreign language. *Journal of Experimental Psychology: Applied*. https://doi.org/10.1037/xap0000475

Oganian, Y., Korn, C. W., & Heekeren, H. R. (2016). Language switching—but not foreign language use per se—reduces the framing effect. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *42*(1), 140. https://doi.org/10.1037/xlm0000161

Pavlenko, A. (2012). Affective processing in bilingual speakers: Disembodied cognition?. *International Journal of Psychology*, *47*(6), 405-428. https://doi.org/10.1080/00207594.2012.743665

Pennycook, G., Cheyne, J. A., Barr, N., Koehler, D. J., & Fugelsang, J. A. (2015). On the reception and detection of -profound bullshit. *Judgment and Decision making*, *10(*6), 549-563. https://doi.org/10.1017/S1930297500006999

Pennycook, G., & Rand, D. G. (2020). Who falls for fake news? The roles of bullshit receptivity, overclaiming, familiarity, and analytic thinking. Journal of personality, 88(2), 185-200. https://doi.org/10.1111/jopy.12476

Pennycook, G., & Rand, D. G. (2021). The psychology of fake news. *Trends in cognitive sciences*, *25*(5), 388-402. https://doi.org/10.1016/j.tics.2021.02.007

Pfattheicher, S., & Schindler, S. (2016). Misperceiving bullshit as profound is associated with favorable views of Cruz, Rubio, Trump and conservatism. *PloS one*, *11*(4), e0153419. https://doi.org/10.1371/journal.pone.0153419

Rachev, N. R., Geiger, S. J., Vintr, J., Kirilova, D., Nabutovsky, A., & Nelsson, J. (2022). Actively open-minded thinking, bullshit receptivity, and susceptibility to framing. *European Journal of Psychological Assessment*. https://doi.org/10.1027/1015-5759/a000685

Sarajlić, E. (2018). Bullshit, truth, and reason. *Philosophia*, *47*(3), 865–879. https://doi.org/10.1007/s11406-018-9990-9

Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2007). The affect heuristic. *European journal of operational research*, *177*(3), 1333-1352. https://doi.org/10.1016/j.ejor.2005.04.006Get rights and content

Vučo, J., & Filipović, J., (2013). Serbian roadmap toward European plurilingualism. *Actualizaciones en Comunicacion Social Centro de Linguistica Aplicada*, 157-160. https://d1wqtxts1xzle7.cloudfront.net/31567095/vuco_filipovic_serbian_roadmap_toward_european_plurilingualism-libre.pdf?1392404688=&response-content-disposition=inline%3B+filename%3DSerbian_roadmap_toward_European_plurilin.pdf&Expires=1731612314&Signature=clkyXHo9EOGpakiIk6az4LykVfPCyrHj2-Wa0AmPEEBiZA26uV8v0E3AYxxByCnE8noZIDBuBn5Ac54zDD3q20d-ZYWXbFUlA1gYPDDBZl8YGripiXqZOMUqYcgpMGf0QEwc6Nhl~eVeSzsasb-nFyC5C55CaaGVLE0bIwmPJkjeG7QLLGnSNae~pWimgKoHGI6V4o2zMUTIO9giCpFW2DHnEZl0jeDzZAeP6Ag1EVY~a1XMJkRWYmUqjWwDN0TdrM9-CI0x7lCBu8YVHM5h0zQL8NDNlBQoJueHjFjPY3vtYPFqLHf1Am1LIaMeAjLDAsTiIf7IFJOULvO0pYVgVQ__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

Yao, Y., Connell, K., & Politzer-Ahles, S. (2023). Hearing emotion in two languages: A pupillometry study of Cantonese–Mandarin bilinguals' perception of affective cognates in L1 and L2. *Bilingualism: Language and cognition*, *26*(4), 795-808. https://doi.org/10.1017/S1366728922000931