Investigating Cognitive Strategies for Analyzing Conceptual Integration: A Comparison of English Major and Non-English Major Undergraduate Students

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Istraživanje kognitivnih strategija pri analizi konceptualne integracije: usporedba studenata preddiplomskog studija anglistike i studenata ostalih preddiplomskih studija

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Abstract

This study explores how English major and non-English major undergraduate students differ in their ability to recognize input spaces of conceptual blends and explain the meaning contributed by individual input spaces, as well as their corresponding cognitive strategy use in meaning deconstruction. A comparative quantitative study was conducted with 72 native Croatian-speaking undergraduates at the Faculty of Humanities and Social Sciences, University of Zagreb, using a questionnaire assessing recognition and explanation of input spaces across five conceptual blends, and self-reported cognitive strategy use. The data were analyzed in phases. The preliminary statistical analysis was done using descriptive statistical methods, outlining general trends in the dataset. The analysis continued with assumption testing (Shapiro-Wilk and Levene's tests), assessing normality and homogeneity of variance. Due to data not being normally distributed and unequal variance, the Mann-Whitney U test and Welch's test were used for group comparison. The data analysis was completed with correlation analysis, using the Pearson correlation coefficient to measure the relationships between ESL study duration, recognition, explanation, and cognitive strategy use. Results of the data analysis showed that non-English majors performed better in input-space recognition than the English majors ($M=9.16$ vs. 8.09). At the same time, the latter demonstrated significantly higher explanation scores ($M=7.17$ vs. 5.73). English majors reported broader strategy use ($M=22.74$ vs. 18.11), with a statistically significant preference for mental imagery ($p=0.04$). The most frequently used strategies were elaboration and parsing, while the least used strategy was syntactic analysis. Paradoxically, longer ESL study duration correlated negatively with recognition scores ($r=-0.35$), contrary to the initial hypothesis. The disparity in recognition-explanation performance might be attributed to the groups' difference in aptitude for different phases of the blending process: non-English majors excelled at composition-phase competencies, whereas English majors showed greater proficiency in elaboration-phase competencies, which would imply that specialized linguistic instruction enhances elaboration-phase competencies at the expense of composition-phase skills. However, the limitations of this study–including a homogenous sample and reliance on self-reported cognitive strategy data–require further research to corroborate these findings and examine potential causes.

Keywords: conceptual integration, cognitive strategies, second language acquisition, meaning deconstruction, English majors

Sažetak

Ovaj rad proučava razlike između studenata preddiplomskog studija engleskog jezika i studenata drugih studijskih smjerova u njihovoj sposobnosti prepoznavanja ulaznih prostora konceptualnih blendova, kao i značenja koja isti doprinose integriranom prostoru te upotrebi kognitivnih strategija prilikom dekonstrukcije značenja. Provedena je komparativna kvantitativna analiza sa 72 izvorna govornika hrvatskog jezika, studenta Filozofskog fakulteta Sveučilišta u Zagrebu. Instrument je bio upitnik koji je ocjenjivao prepoznavanje i objašnjenje ulaznih prostora kroz pet konceptualnih blendova te upotrebu kognitivnih strategija. Analiza podataka provedena je u etapama: preliminarna statistička analiza uključivala je deskriptivne statističke metode kako bi se utvrdili opći trendovi. Uslijedili su testovi pretpostavki (Shapiro-Wilkov test i Levenov test) za procjenu normalnosti i homogenosti varijance. Uslijed heterogenosti varijanci i nepostojanja normalne distribucije, za usporedbu skupina korišteni su Mann-Whitneyev U-test i Welchov test. Analiza podataka završena je korelacijskom analizom, pri čemu je Pearsonov korelacijski koeficijent korišten za mjerenje odnosa između duljine učenja engleskog jezika, sposobnosti prepoznavanja i objašnjenja ulaznih prostora konceptualnih blendova, kao i korištenja kognitivnih strategija. Studenti drugih studijskih grupa učestalije su prepoznavali ulazne prostore u usporedbi sa studentima engleskog jezika (M=9,16 naspram 8,09), dok su potonji značajno učestalije uspijevali smisleno obrazložiti značenje koje ulazni prostori doprinose integriranom prostoru (M=7,17 naspram 5,73). Studenti engleskog jezika koristili su siri spektar strategija (M=22,74 naspram 18,11), pri čemu su statistički značajno preferirali mentalne slike (p=0,04). Elaboracija i raščlanjivanje bile su najkorištenije, dok se sintaktička analiza pokazala najrjeđe korištenom strategijom. Unatoč početnoj hipotezi da će duljina učenja engleskog jezika pozitivno korelirati s prepoznavanjem ulaznih prostora, ta je korelacija ipak bila negativna (r=-0,35). Razlika u uspješnosti prepoznavanja i objašnjenja mogla bi se pripisati razlikama u pristupu dviju skupina različitim etapama konceptualne integracije: studenti drugih studijskih grupa postigli su veći uspjeh prilikom kompozicijske faze konceptualne integracije, dok su studenti engleskog jezika bili uspješniji elaboracijskoj fazi, ukazujući kako specijalizirano lingvističko obrazovanje poboljšava elaboracijske vještine nauštrb kompozicijskih. Međutim, ograničenja ovog rada, koja uključuju homogeni uzorak i oslanjanje na samoprijavljenu uporabu kognitivnih strategija, zahtijevaju daljnja istraživanja kako bi se ova opažanja potvrdila i dodatno istražili potencijalni uzroci.

Ključne riječi: konceptualna integracija, kognitivne strategije, usvajanje drugog jezika, dekonstrukcija značenja, studenti engleskog jezika

1. Introduction

During my study at the Department of English, the underclassmen often discussed the idea that those who study languages at the tertiary level must somehow differ from their peers in their approach to language acquisition. The dreaded phrase that all those who (will) call the Department of English their alma mater have heard at some point – “But everyone speaks English!” – insinuates that studying English at the tertiary level means partaking in a redundant activity, which the underclassmen strongly opposed. They often debated whether our focus on various facets of English had led us to develop an intuitive understanding of the *feel* of it, an indecipherable awareness of structure and implicit usage rules, something we had mistakenly assumed to be near-native proficiency. Since our field of interest had later turned cognitionward, conceptual blends, based on coalescence and requiring a certain flexibility of thought to comprehend in their entirety, seemed like the perfect means for examining if indeed there was some *otherness* in what English students could do, in comparison with their non-English counterparts.

Subsequently, that idea served to guide the research focus of the study presented in this thesis and took shape as a quantitative study with comparative and correlational elements. The aim of this study is i) to examine whether there are any differences between English major and non-English major undergraduate students in their ability to recognize input spaces and clearly explain how the input spaces contribute to the meaning of the blended space, ii) to assess whether the English major undergraduate students differ significantly from their non-English major counterparts in their use of cognitive strategies during meaning deconstruction of the blended space; and iii) to explore whether the duration of ESL education positively correlates with the ability to recognize input spaces and explain their meaning, as well as with the type and number of cognitive strategies used to retrace the meaning of the blended space back to the meaning of each input space. The study hypothesizes that English major undergraduate students will, on average, display a higher rate of recognition and explanation of input spaces and will vary in their strategy use compared to the non-English major undergraduate group. Additionally, the duration of ESL study will positively correlate with the number of strategies used and the ability to recognize and explain input spaces.

The main body of the thesis consists of seven numbered sections, excluding the abstracts (one in English, one in Croatian). After the introduction, which consists of metadata, the second section contains an overview of the main theoretical episteme under which we are writing this thesis, comprising two subsections: the first subsection provides a brief introduction into cognitive integration theory, focusing on mental spaces and the process of blending, and the second subsection starts by briefly defining conceptual strategies in general, followed by segmenting into further sub-chapters dedicated to each of the 11 cognitive strategies included in the scope of this study. The third section of the thesis is dedicated to methodology and is formed by three subsections: i) the first subsection provides an in-depth explanation of demographic data, along with our reasoning for the sample choice; ii) the second subsection details the specificities of data collection and provides reasoning for the construction of the questionnaire, and iii) the third subsection explains the logic of scale determination and relates the answers from the questionnaire with the variables they were later used as.

The fourth section of the thesis contains all the information relating to the data analysis that took place upon the data collection. The section is divided into three subsections according to the type of statistical tests conducted: i) descriptive statistics, ii) inferential statistics, and iii) correlation analysis. The fifth section of this thesis discusses the implications of the results of the statistical tests, mentioning the preparatory work, the limitations of the study and the potential confounding variables, which might have influenced the outcome of the study. This section also discusses the wider impact of the results on ESL instruction and SLA research and is followed by the conclusion, which briefly summarizes the main findings of the study. The last section contains the reference list.

2. Theoretical Framework

The following section will provide a comprehensive overview of the main topics of research in this study, which are highly relevant to the field of second language acquisition (hereafter "**SLA**"). Comprised are two subsections: a theoretical overview of conceptual integration theory, which serves as the main theoretical framework employed in this thesis, and an outline of all the cognitive strategies included in our study. The aim of the section is to facilitate the understanding of the reasoning behind the chosen hypotheses and the approach to data collection and analysis, as well as to provide more clarity for subsequent interpretation of the results and discussion.

2.1. Conceptual Integration Theory

Conceptual integration theory (hereafter "**CIT**"), also known as blending theory, is a theoretical framework intended to describe how meaning is processed and generated through the integration of conceptual domains. The foundation of the theory lies in the concept of mental spaces, first introduced by Gilles Fauconnier, who defined them as temporary cognitive structures that aid in organizing and processing information (Fauconnier & Turner, 1998; Jabłońska-Hood, 2020; Coulson & Oakley, 2000). Mental spaces are dynamic structures that facilitate the organization of context-relevant information, allowing for nuanced meaning as discourse progresses (Dancygier, 2005; Fauconnier & Turner, 1998; Jabłońska-Hood, 2020; Turner & Fauconnier, 1995).

It is important to note that multiple mental spaces interact and blend to create new meanings (Jabłońska-Hood, 2020; Grady et al., 1999) in order to "account for composite concepts produced by integrating distinct semantic structures" (Kowalewski, 2022, p. 89). They are "partial assemblies containing elements, structured by frames and cognitive models" (Fauconnier & Turner, 1998, p. 102).

Mental spaces are not standalone but rather "interconnected, and can be modified as the thought and discourse unfold" (Fauconnier & Turner, 1998, p.1). This interconnectedness is crucial for the process of conceptual integration or blending, where elements from different mental spaces are combined to generate novel conceptual structures (Fauconnier & Turner, 1998, p.1). The mental spaces are essentially "the domains that discourse builds up to provide a cognitive substrate for reasoning and for interfacing with the world" (Fauconnier, 1997, p. 34), allowing for complex cognitive processes such as metaphor and analogy (Bentein, 2012; Fauconnier & Turner, 1998). What enables the emergence of new meanings and insights is the link between the mental spaces (Fauconnier & Turner, 1998; Fauconnier, 2009; Coulson, 2001).

CIT posits four mental spaces, out of which two are *input spaces,* "embracing the conceptual content integrated in the course of the blending process" (Kowalewski, 2022, p. 90), which contribute elements to the blending process. They are partial structures serving as source material for integration, frequently derived from real-world knowledge, cultural concepts, or linguistic expressions: they are not fixed but dynamically constructed during discourse (Fauconnier & Turner, 1998; Kowalewski, 2022). The third mental space is *generic space*, which provides an abstract structure that is shared between the input spaces, containing common elements or relations that enable cross-space mapping. The generic space provides a scaffold for aligning input spaces and identifying counterparts between them (Fauconnier & Turner, 1998), and acts as a template for selective projection of elements into the blended space (Sweetser, 2001; Mierzwińska-Hajnos, 2016). The fourth mental space is the *blended space*, emerging from the combination of elements from the input spaces and creating a new structure which reflects the integration of these concepts (Coscarelli, 2011; Fauconnier & Turner, 1998; Mierzwińska-Hajnos, 2016; Sweetser, 2001). Different conceptual domains can be combined to generate emergent meanings that are not present in either of the input spaces (Jabłońska-Hood, 2020), meaning that "blends are not predictable solely from the structure of the inputs" (Fauconnier & Turner, 1998, p.136). These mental spaces constitute the conceptual integration network, where conceptual blending occurs (Fauconnier & Turner, 1998; Coulson & Oakley, 2000), and where cross-space mapping "connects counterparts in the input spaces" (Fauconnier & Turner, 1998, p. 137), facilitating the blending process.

A crucial aspect of meaning emergence is the selective projection of elements from input spaces into the blended space: this process generates a new meaning, indicating that the blended space's meaning is more than just the sum of its constituents. Conceptual integration is therefore a cognitive process that is "dynamic, supple, and active in the moment of thinking" (Fauconnier & Turner, 1998, p.133), and the blending process includes three different processes: composition, completion, and elaboration (Fauconnier & Turner, 1998, p.144). During composition, content from the input spaces is selectively projected to the blend (Fauconnier & Turner, 2002), while completion involves utilizing background knowledge and applying cognitive and cultural models to the blend (Fauconnier & Turner, 1998, p.144). Elaboration, the last of the three operations, "develops the blend through imaginative mental simulation" (Fauconnier & Turner, 1998, p. 144), allowing the development of a new structure, which—as we had already stated—is not provided by the inputs. Elaboration can thus lead to inferences, arguments, and ideas that may affect cognition, potentially modifying the initial inputs and changing our view of the corresponding situations (Fauconnier & Turner, 1998, p. 144).

Furthermore, Fauconnier and Turner (1998) identified five optimality principles that guide the integration process towards creating coherent and effective blends. They noted that while there is "a common structure for all the blends, (…) not all phenomena that manifest that structure are equally good blends" (p. 162). These principles are topology, web, unpacking, and good reason (Fauconnier & Turner, 1998, pp. 162-163). These optimality principles serve as constraints, ensuring that the blending process produces meaningful and cognitively efficient results, and go as follows: i) *integration*, which posits that a blend must form a unified structure (Fauconnier & Turner, 1998, p. 163), meaning that the elements of the blend should combine in such a way that they should appear as a singular, unified structure; ii) *topology*, which specifies that any element in the blend should "match the relations of its counterpart" (Fauconnier & Turner, 1998, p. 163), meaning that if certain elements in the input spaces are connected in a certain way (e.g. hierarchy, causality, etc.), these relationships should retain their sense within the blend; iii) *web*, a principle which states that the blend should maintain connections to the input spaces (Fauconnier & Turner, 1998, p. 163); iv) *unpacking*, which postulates that the blend should make it possible to retrace "the inputs, the cross-space mapping, the generic space, and the network of connections between all these spaces" (Fauconnier & Turner, 1998, p. 163), thus ensuring that it will remain interpretable; and v) *good reason*, the final principle, which states that the significance of an element in a blend will "include relevant links to other spaces and relevant functions in running the blend" (Fauconnier & Turner, 1998, p. 163), if the blend is to have a meaningful purpose.

In this study, CIT will be employed to investigate how English major students might differ from non-English major students in their ability to identify and explain the input spaces and the related cross-space mapping and selective projection. Moreover, CIT serves as a framework to observe how the students engage in completion and elaboration via employing different cognitive strategies, which will be discussed in section 2.2. CIT methodology will be used for interpreting the patterns—if any—observed in the recognition and explanation scores, as well as in strategy use between the two groups, in order to examine how the conceptual integration processes might be influenced by prior linguistic instruction and the subsequent metalinguistic competencies.

2.2. Cognitive Strategies in Meaning Deconstruction

The following section will briefly delineate the cognitive strategies that we identified as the most represented in existing academic literature, providing a comprehensive basis for analyzing meaning deconstruction. Since one of the aims of our study was to explore if there exist any differences in strategy use between English-major and non-English major undergraduate students, it is crucial to establish a clear understanding of these strategies and their role in language processing, as they are "almost always potentially conscious (…) and potentially controllable" (Pressley, Borkowski & Schneider, 1987, p. 91). Cognitive strategies are mental processes that individuals employ to facilitate comprehension, learning, or retaining new information (O'Malley & Chamot, 1990, p.1), the individual having an active role in the process of comprehension. They play a significant role in the way the learners process and internalize novel linguistic information, and they are indispensable for accomplishing complex linguistic tasks (Romanchuk, 2023; Kövecses, 2005) and have shown to be especially significant in the study of bilingualism and multilingualism (Pleyer & Winters, 2015; Talebi & Seifallahpur, 2015).

The selection of cognitive strategies was influenced by a broad review of SLA and cognitive linguistics literature as well as the findings of the pilot study, and thus cannot be attributed to a single, unified framework that fully delineates all cognitive strategies included in this study. The strategies were chosen based on their reoccurring appearance across multiple theoretical models and empirical studies rather than belonging to a single unification system proposed by a specific author. This exploration will not only provide a theoretical foundation for our study but also offer practical implications for language teaching and learning methodologies. Each strategy will be discussed in terms of its definition, application, and potential impact on language processing, laying the foundation for our subsequent analysis of strategy use among different student populations. The strategies encompass contextual analysis, elaboration, parsing, visualization, schema activation, figurative language processing, semantic networking, morphological analysis, syntactic analysis, and mental imagery. Although implicit learning (section 2.2.8) is included in this study and appears alongside other cognitive strategies, it inherently differs from the rest by being more of an unconscious process rather than a consciously applied strategy. However, feedback from the pilot study had shown that participants mentioned intuitive understanding as the way they deconstructed the meaning of the blend into its input spaces: since we had decided to transform the question from open-ended type to multi-select choice type, we had not wanted to intentionally limit them in expressing their strategy use during meaning deconstruction. Therefore, while implicit learning appears next to 10 cognitive strategies included in this study, it is acknowledged as functionally distinct from them and is treated accordingly in the discussion.

2.2.1. Contextual Analysis

The first strategy on our list is contextual analysis, which involves examining the surrounding context of a word, phrase, or expression to derive its meaning and significance (Sun & Wang, 2024; Arévalo-Romero et al., 2023; Wong & Law, 2022). This approach is fundamental in language processing and comprehension (Kintsch, 1988; Perfetti & Stafura, 2014; Zwaan & Radvansky, 1998), and involves assessing both the immediate linguistic content, such as surrounding words, sentence structure, and discourse cues, and situational context, which is important for understanding meaning in communication (Lafford, 2007; Wen, 2023). Since it is a prerequisite for understanding code-switching in bilingual speakers, it is an important area of interest for SLA, as inferencing information from context is a critical process in language acquisition (Nation, 2013). If seen through the prism of CIT, contextual analysis takes place during the composition phase of the blending process by identifying relevant elements from input spaces through linguistic and situational cues, since it is based on the integration of new linguistic input with existing mental spaces, using the context as a means of conceptualizing the meaning.

However, overreliance on contextual analysis may create significant challenges for the learners: they might not manage to systematically learn vocabulary and grammar (Raudszus & Segers, 2021), ultimately leading to potential gaps in foundational language skills (Parel, 2004). Even though contextual analysis contributes to language acquisition, it can result in incorrect inferences when the context is misleading, ambiguous, or insufficient (Kaivanpanah & Rahimi, 2017; Sadeghi & Marzban, 2019). Moreover, the effectiveness of contextual analysis is influenced by the learner's L1 and its distance in terms of structure from L2, meaning that cross-linguistic differences may increase the difficulty of interpretation of contextual information (Larsen–Freeman, 2007). Additionally, as exposure to L2 culture is important for recognizing subtle contextual nuances, its lack can negatively affect comprehension and acquisition (Larsen-Freeman, 2018; Mori, 2007). Therefore, contextual analysis should be practiced through activities which require inferencing and critical thinking, such as cloze exercises and contextual guessing tasks (Nassaji, 2003; Nation, 2013), since it facilitates comprehension when used effectively (Balcı & Üğüten, 2018; Saks & Leijen, 2018). The actual application of this strategy can greatly vary, as it is dependent on the immediate linguistic surroundings: for example, understanding the meaning of *couch potato* could be achieved by analyzing the words in a sentence related to watching television and inactivity. Unlike schema activation (section 2.2.5), which relies on pre-existing cultural knowledge, contextual analysis focuses on immediate linguistic and situational cues. Similarly, while parsing (section 2.2.3) involves the structural decomposition of linguistic expressions, contextual analysis emphasizes inferring meaning from surrounding discourse. This strategy also contrasts with semantic networking (section 2.2.7), as it prioritizes external linguistic context over conceptual associations between ideas.

2.2.2. Elaboration

The next cognitive strategy is elaboration, which involves relating new information with prior knowledge (Priawasana et al., 2020; Xiong et al., 2014), thereby deepening the existing knowledge and facilitating comprehension. It is widely used in SLA, where it facilitates the acquisition of lexicon and grammar (Müller & Višić, 2023). The theoretical roots of elaboration as a cognitive strategy lie in the processing theory, which postulates that deeper semantic processing achieves higher memory retention compared to shallow processing (Lehman & Karpicke, 2016). Elaboration is not a linear process but rather a complex network of processes that happen subconsciously: it involves creating associations and forming mental images, which subsequently ameliorate the encoding process and promote retrieval (Stevenson, 1981). For the purposes of our study, we have decided to include elaboration separately from semantic networking (section 2.2.7) and mental imagery (section 2.2.11): the latter two can exist as standalone strategies despite being activated during the use of elaboration since their individual activation patterns and the degree of their contribution vary.

When observed through the prism of CIT, elaboration is crucial for the completion phase of the blending process, where prior knowledge and cognitive models are applied to supplement the emerging meaning of the blended space (Fauconnier & Turner, 1998). It enables the development of a nuanced understanding of conceptual blends by connecting new inputs with previously acquired knowledge and significantly contributes to meaning construction by integrating facets of previous experiences into the interpretation of novel linguistic phenomena. In SLA, elaboration is most often used by learners to remember new vocabulary by linking words to personal experiences. For instance, when presented with a novel conceptual blend, such as *armchair critic*, an individual using elaboration might remember a lived situation where someone was verbalizing their unsolicited opinions from a comfortable, seated position, and thus the individual might tie their recollection of that event to the interpretation of the conceptual blend. However, it is important to note that the effectiveness of elaboration is dependent on culture: learners from collectivist cultures tend to do well in group-oriented elaboration tasks, using shared cultural narratives, whereas learners from individualistic cultures gravitate towards using personal experiences during elaboration tasks (Mizrachi, 2013; Suh, 2016). Furthermore, individual learning styles significantly impact the effectiveness of elaboration: reflective learners tend to prefer elaboration over blind memorization, which suggests that personalized learning strategies for such learners can enhance retention and facilitate comprehension (Ingham, 1991).

2.2.3. Parsing

The third cognitive strategy on our list is parsing, which consists of deconstructing an expression into its constituent parts to analyze its structure and derive meaning (Dussias, 2004; Dussias & Sagarra, 2007). It enables learners to identify relationships amongst elements, such as semantic relationships and syntactic roles, which are indispensable for understanding complex linguistic inputs (Lewis & Vasishth, 2005; Chen & Manning, 2014; Stella & Engelhardt, 2022). The way that individuals parse linguistic input is dependent on cognitive load and working memory, as parsing necessitates skilled memory retrieval processes, suggesting that the ability to effectively parse linguistic inputs is closely connected with the retrieval of specific and relevant information from one's memory (Logacev

& Vasishth, 2015). Parsing can be influenced by working memory capacity (Chen & Manning, 2014): individuals with lower working memory capacity tend to commit comprehension errors as a direct result of incorrect parsing due to parsing being a cognitive strategy that is dependent on the ability to effectively manage cognitive resources (Stella & Engelhardt, 2022). Thus, learners with lower memory capacity might have difficulties with interpreting highly ambiguous or complex linguistic input if they rely exclusively on parsing, potentially overlooking figurative meanings. Nevertheless, research has shown that explicit instruction in syntactic structure can improve learners' abilities to parse complex linguistic input and comprehend their grammatical relationships (Lim et al., 2020).

Within the framework of CIT, parsing is essential for the initial stages of meaning construction, as it involves identifying and analyzing input spaces. Learners determine the conceptual inputs of the blend by deconstructing its individual elements and assessing their contributions before unifying them into a blended space: parsing thus contributes to the composition phase of the blending process. However, the way that learners approach parsing may be influenced by their cultural and educational background (Yessenova et al., 2019): bilingual speakers are prone to adapting their parsing strategies based on their language exposure, which suggests that parsing is crucial in language learning (Dussias, 2004). Said adaptability is required for efficient parsing, ensuring the understanding of linguistic inputs across languages.

2.2.4. Visualization

Visualization is a cognitive strategy that denotes imagining situations in which a particular linguistic item could be used to enhance the comprehension and retention of linguistic elements. It allows learners to increase their ability to effectively interpret contextual cues, which is important for understanding and interpreting new linguistic inputs (Walters, 2006); it can also facilitate the interconnection of linguistic inputs, enabling a deeper understanding of meaning and usage contexts. The embodied language hypothesis posits that motion-related terms activate the motion-sensitive visual cortex, connecting language processing with visual perception (Francken et al., 2015): this connection between language and visual stimuli is important for understanding the way that students visualize scenarios when interpreting linguistic input (Mo, 2024). Furthermore, visualization has been proven to be beneficial to various aspects of SLA: a study by Jeong-Ryeol and SungTae (2006) found that middle school students' listening comprehension abilities were greatly improved by using visualization materials, suggesting that visualization can be applied across different language skills. Visualization is also crucial for building pragmatic awareness since it enables learners to simulate appropriate usage contexts for linguistic inputs, especially when it comes to idiomatic and culturally embedded expressions (Nation, 2001).

However, visualization can conversely present difficulties for learners who struggle with abstract thinking or for those who have had limited exposure to culturally specific scenarios. Language instructors can train the learners by providing prompts or tasks that require the learners to place new linguistic inputs within a culturally appropriate context, highlighting the importance of scaffolding (Shao, 2024). Such an approach can lead not only to enhanced comprehension but also to a deeper connection to L2, thus positively affecting SLA outcomes (Yong et al., 2021). From the perspective of CIT, visualization takes place during the elaboration phase of the blending process: when learners imagine situations where an expression could be used, they are effectively creating a blended space that combines elements from their existing mental spaces with new linguistic input. Unlike mental imagery, which focuses on creating internal visual representations of linguistic inputs and which is more closely defined in section 2.2.11, visualization highlights constructing hypothetical situations where a linguistic item might occur. For instance, when interpreting a conceptual blend such as *butterfingers*, an individual using visualization might envision a scene where a person is unsuccessfully trying to grip a stick of butter that keeps slipping from their fingers. Such visual representation could thus help the individual to relate an abstract concept to a relatable vivid image, which facilitates the understanding of the blend by contextualizing it in an imagined scenario.

2.2.5. Schema Activation

The next cognitive strategy is schema activation, consisting of using previously acquired cultural references, traditions, or beliefs to support the interpretation and understanding of new linguistic inputs (Bartlett, 1995; Carrell, 1983). It relies on mental frameworks serving as a repository of cultural and social knowledge gained through long-term exposure to social conventions, traditions, and beliefs, serving to facilitate the interpretation of new linguistic inputs, otherwise known as schemata (Gilakjani & Ahmadi, 2011; Liyan et al., 2014). When learners face unfamiliar linguistic inputs, they select appropriate cultural schemas to deduce meaning based on their existing knowledge structures (Anderson, 2018). For example, when faced with the interpretation of the blend *couch potato*, speakers who are familiar with Western cultural references might activate schemas related to leisure and sedentary lifestyle activities, such as watching television for extended periods of time. Those schemas contain prior cultural knowledge, which enables them to deduce the emergent meaning of the blend beyond its literal components.

Schema activation is especially important for properly understanding figurative language, idiomatic expressions, and cultural references since it permits learners to contextualize linguistic inputs in a manner similar to that of native speakers' (Bante, 2023). It has been shown that learners with high exposure to the target culture perform better at activating relevant schemas, which serves to increase their comprehension and contextualization of language (Zaker, 2017). However, the lack of broad cultural awareness might negatively affect the learners' ability to effectively navigate linguistic diversity (Li & Wang, 2015). A rather evident potential drawback of schema activation is cultural misinterpretation, since incorrect application of cultural knowledge may lead to misunderstanding (Frumuselu, 2018), especially in speakers whose culture is distant from the target culture. Since schemata are dynamic, practicing schema activation may lead to increased comprehension ability. Furthermore, through the prism of CIT, schema activation can be viewed as a crucial component in the process of creating and manipulating mental spaces. By virtue of activating relevant schemas, learners are accessing already established mental spaces which carry social and cultural knowledge: the schemas contribute to the generic space in the conceptual integration network, presenting the abstract structure which guides the blending process, which in turns enables learners to integrate the new linguistic inputs more successfully into their existing knowledge structures.

In contrast to contextual analysis (section 2.2.1), which uses immediate linguistic and situational cues, schema activation relies on rooted cultural knowledge and collective understanding to infer meaning. Similarly, while elaboration also involves connecting linguistic items to extralinguistic reality in the form of personal experiences (section 2.2.2), schema activation connects linguistic items to shared cultural constructs. Finally, unlike semantic networking, which involves finding connections amongst related concepts (section 2.2.7), schema activation focuses on culturally specific patterns that are related to social practices and collective understanding but may not have direct semantic connections.

2.2.6. Figurative Language Processing

The next strategy is figurative language processing, which includes the interpretation of non-literal meanings, such as metaphors, idiomatic expressions, and similes by using linguistic and cognitive knowledge, allowing the speakers to surpass surface meaning (Shao, 2024), thereby recognizing the figurative sense based on conceptual metaphors and cultural literary conventions (Kövecses & Benczes, 2002). Since figurative expressions often depend on conventional metaphorical mappings amongst conceptual domains, they require the learners to recognize said mappings and successfully apply them to new contexts (Kövecses & Benczes, 2002; Lakoff & Johnson, 1980). Hence, this cognitive strategy may prove to be demanding when there is a significant difference between the conceptual metaphors present in L1 and those present in L2: the discrepancy might result in misunderstandings and obstruct effective communication (Al-Harbi, 2019).

As the cognitive effort required between the literal and figurative meanings is relatively high, learners might struggle with cross-cultural understanding if they are unfamiliar with culturally specific metaphors, which may result in a decreased ability to comprehend and use figurative language (Chen & Lai, 2013; Heidari, 2015). It is thus important to actively train figurative language processing, as proficiency may be achieved by continued exposure to authentic language materials and cultural immersion (Kövecses & Benczes, 2002). Research has shown that metaphorical competence, which comprises figurative language processing, is very important for SLA (Alwan, 2023; Zhou et al., 2022). Tasks devised to increase awareness of figurative language can significantly improve learners' comprehension of idiomatic expressions, ultimately helping the retention of non-literal language (Boussaid, 2023; Samani & Hashemian, 2012).

If observed within the framework of CIT, figurative language processing occurs within the completion and elaboration phases of the blending process: learners must integrate elements from different conceptual spaces whilst applying their existing mental framework to align them to finally form a cohesive blended space. For example, if a learner were to use this strategy whilst interpreting the blend *butterfingers*, it would require them to recognize the metaphorical mapping between the slipperiness or loss of grip evoked by the butter and clumsiness. That is why, in comparison with other cognitive strategies presented in this section, figurative language processing requires deeper cognitive engagement with abstract conceptual mappings: rather than relying on immediate textual surrounding, like contextual analysis (section 2.2.1), or focusing on cultural schemas, like schema activation (section 2.2.5), it prioritizes cognitive patterns which might exist across different cultures. Ultimately, this strategy is necessary for advanced language proficiency, as it provides the learners with the necessary tools to successfully manage complex linguistic environments.

2.2.7. Semantic Networking

The list of cognitive strategies continues with semantic networking, a strategy which includes exploring associations between an expression and other related concepts, facilitating the organization and retrieval of information, and thus improving vocabulary retention and conceptual understanding (Alahmadi, 2020; Jun & Jamaludin, 2022). Semantic networking enables learners to create meaningful connections, which in turn expedites recalling and applying new vocabulary in different contexts (Jun & Jamaludin, 2022). Furthermore, it supports the development of a deeper understanding of L2 by focusing on the relationship amongst various concepts. For instance, when faced with the blend *eager beaver*, learners employing semantic networking might associate it with hard work, diligence, or ardor; if they connect the expression with similar ones, like *workaholic*, they can expand their conceptual understanding, which can make the expression easier to recall and use in relevant contexts.

However, semantic networking has its challenges. Since learners are creating associations, not only is there always a risk of them creating incorrect or oversimplified associations, which might result in misunderstanding, but learners from different cultural backgrounds may also develop different semantic networks for the same concepts, ultimately resulting in cross-cultural misunderstanding (Alahmadi, 2020). In order to practice semantic networking, learners can engage in activities such as mind mapping, word association, and semantic feature analysis tasks, which develop active exploration and visualization of relationships amongst concepts (Derbak et al., 2023; Jun & Jamaludin, 2022). Since learners form associations between concepts and trace the connections between mental spaces, semantic networking can be viewed through the lens of CIT as a process contributing to the completion phase of the blending process. While the exploration of associations helps activate relevant conceptual structures, semantic networking may also perform a role in the composition phase of the blending process by influencing which elements of the input spaces are selectively projected into the blend. Nevertheless, its primary function aligns more closely with the completion phase, where associations can be used to develop the emerging meaning.

When compared with other strategies included in our study, semantic networking has similarities with elaboration (section 2.2.2) and schema activation (section 2.2.5). Even though both elaboration and semantic networking imply connecting new information to existing knowledge, the former focuses on personal experiences, while the latter observes conceptual relationships between ideas. Similarly, even though both schema activation and semantic networking denote accessing and using existing knowledge structures, the former focuses more on broader cultural knowledge, while the latter focuses on the specific relationships between concepts.

2.2.8. Implicit Learning

Although not a cognitive strategy in the strict sense, implicit learning has been included in its study due to its prominence in the pilot study. During pilot testing, participants reported relying on intuitive knowledge when deconstructing meaning, which led us to incorporate implicit learning as an option in the questionnaire. While other cognitive strategies involve conscious effort, implicit learning occurs at a subconscious level, and therefore, the participants may perceive it as a means of meaning deconstruction rather than a conscious, deliberate strategy. Implicit learning denotes the unconscious acquisition of knowledge through repeated exposure without explicit instruction or awareness of the underlying rules (Li & DeKeyser, 2021). It occurs naturally: when learners are exposed to linguistic input in various contexts and scenarios, they gradually internalize patterns and structures, in contrast to explicit learning, which involves conscious effort and metacognitive awareness (Lichtman, 2016). This process is critical for SLA since it allows learners to assimilate grammatical structures and idiomatic expressions through exposure, rather than formal education: hence, it highly influences the fluency and accuracy in language use, enabling learners to develop an intuitive sense of correctness in L2 without reliance on conscious rule application (Grañena, 2015). Since implicit learning expands the procedural knowledge necessary for reaching fluency, it positively affects the long-term retention of linguistic knowledge.

However, since implicit learning is, by its nature, unstructured, learners may retain incomplete or incorrect knowledge, which can result in the fossilization of errors (Han & Selinker, 2005). Its effectiveness may depend on factors such as age, cognitive aptitude, and prior exposure (DeKayser, 2003); thus, to optimize acquisition and retention, learners may benefit from a balance between explicit and implicit instruction. Implicit learning is especially impactful in naturalistic settings where learners engage with authentic learning materials since they stimulate intuitive language acquisition (Bolibaugh & Foster, 2021). Immersive activities, such as extensive reading and listening to L2 spoken by native speakers, enhance implicit learning, and exposure to a plethora of content in L2 provides an input environment that enables the unconscious absorption of linguistic structures (Li & DeKeyser, 2021). Additionally, language instructors can aid in developing this process by providing comprehensive linguistic input and creating environments that are similar to real-life language settings, which helps minimize explicit instruction (Wirahyuni & Martha, 2022).

In terms of the CIT framework, implicit learning could be observed as contributing primarily to the completion phase of the blending process: while the learners unconsciously process linguistic input, they may use background knowledge and apply cognitive knowledge without being explicitly aware of doing so. That unconsciousness is what separates it from elaboration (section 2.2.2), which requires conscious effort to connect new linguistic input with prior knowledge, and parsing, which also requires deliberate deconstruction of the linguistic input. Similarly, while contextual analysis (section 2.2.1) necessitates a deliberate effort to assess the immediate linguistic surroundings, and schema activation (section 2.2.5) requires the evoking of cultural knowledge, implicit learning operates subconsciously, focusing on unconscious pattern recognition.

2.2.9. Morphological Analysis

The next cognitive strategy is morphological analysis, which denotes splitting words into their constituent morphemes so as to deduce their meaning and grammatical function. It is widely used in vocabulary acquisition and reading comprehension in SLA since it is indispensable for apprehending the structure of complex lexemes (Abdullah et al., 2023). Learners can decode unfamiliar vocabulary by inspecting the internal composition of lexemes, which in turn widens their lexical knowledge and serves to improve their ability to identify meanings and grammatical roles across various linguistic contexts (Abdullah et al., 2023; Sulistyawati et al., 2021). For instance, if presented with a lexeme such as *disenchantment*, learners can segment it into constituent morphemes: i) a prefix of negation, “dis-”; ii) root verb with a meaning of charm, “enchant”; and iii) a suffix denoting a state, “-ment”. That process can, therefore, help the learner infer additional information from unfamiliar lexemes and enrich their vocabulary with the help of pattern and rule recognition, which is indispensable for writing in L2 (Abdullah et al., 2023).

Moreover, practicing morphological analysis through targeted exercises, especially those explicitly introducing morphological patterns, such as segmentation tasks or affixation practice, can develop a deeper understanding of word formation and meaning (Abdullah et al., 2023; Sulistyawati et al., 2021). Interestingly, research has found that the tendency to employ morphological analysis positively correlates with reading comprehension and spelling abilities, where learners with a higher level of proficiency in using morphological analysis tended to perform well in text interpretation skills (Choi et al., 2020). If observed within the framework of CIT, morphological analysis takes place during the contribution phase of the blending process since it involves breaking down linguistic input into its components, which is analogous with the process of identifying elements from input spaces. In comparison with other strategies included in this study, morphological analysis stands out on its own, especially since it is commonly practiced in institutionalized language instruction. Unlike syntactic analysis (section 2.2.10), which focuses on sentence-level relationships, it centers on the internal structure of lexemes. Unlike parsing (section 2.2.3), which concentrates on breaking down an entire sentence into its syntactic components, morphological analysis focuses only on the word formation process. Finally, morphological analysis operates within the bounds of a single lexical item, as opposed to semantic networking (section 2.2.7), which focuses on the link between different items.

2.2.10. Syntactic Analysis

The penultimate cognitive strategy to be presented is syntactic analysis, which uses the grammatical structure of an expression in order to infer its meaning and function. This strategy helps learners understand the relationships between elements within a sentence, which is indispensable for comprehending complex linguistic structures (Angelelli et al., 2021). Syntactic analysis is thus necessary for developing the ability to understand and produce grammatically correct sentences: it enables the learners to recognize patterns in sentence structure, subsequently improving their overall language proficiency (Poulsen et al., 2021). When encountering a complex sentence in L2, a learner using syntactic analysis to process linguistic input might divide it into its constituent syntactical roles (e.g. subject, verb, object, etc.) to better understand its structure, and ultimately, meaning (Mulder et al., 2023; Chen et al., 2018), which is especially important when L2 exhibits significant structural differences from L1.

Additionally, syntactic analysis has a positive impact on reading comprehension, writing skills, and language proficiency in general (Zhang & Kang, 2022). Learners can benefit from explicit instruction in syntactic rules, subsequently improving their ability to correctly apply syntactic analysis: the most used activities are error correction tasks and syntactic parsing, which directly develop the skill of using syntactic analysis by dissecting sentences into their syntactic components (Chen et al., 2018). Gradual inclusion of authentic L2 materials can expose learners to syntactic patterns in context, which may heighten their grammatical competence (Nogolová et al., 2023). As their L2 proficiency increases, learners start to display syntactic processing which starts to align with that of native speakers. This suggests that exposure to complex syntactic structures positively affects language development (Brothers et al., 2021).

In terms of CIT, syntactic analysis could be categorized under the composition phase of the blending process, as identifying and organizing elements from input spaces is similar to the way that learners analyze syntactic structures to form coherent meanings (Adger, 2014). Morphological analysis (section 2.2.9), while also examining structure, focuses on grammatical structure, whereas syntactic analysis focuses on sentence structure. Even though syntactic analysis might sometimes overlap with parsing (section 2.2.3), syntactic analysis prioritizes the understanding of grammatical relationships within a sentence, whereas parsing refers to breaking down the sentence into smaller units. Unlike contextual analysis (section 2.2.1), which derives meaning from the surrounding context, syntactic analysis focuses specifically on scrutinizing grammatical structures within the sentence itself.

2.2.11. Mental Imagery

Finally, the last strategy to be described in this thesis is mental imagery. This strategy involves the creation of mental representations of words, phrases, and linguistic structures, enabling learners to visualize the linguistic elements in order to increase comprehension and retention (Barsalou, 2008; Paivio, 1986). Mental imagery frequently isolates linguistic units and centers on their mental representation, which makes it useful for processing abstract linguistic concepts, such as grammatical structures or morphological patterns (Nation, 2001). It is grounded in dual-coding theory, which postulates that information is processed in verbal and non-verbal (visual) formats to reinforce encoding and recall (Paivio, 1971). Its effectiveness in vocabulary retention comes from its dual coding of verbal and visual information (Nation, 2001), which serves to create multiple memory pathways (Frost et al., 2013). Learners can, by associating linguistic items with concrete or abstract images, reinforce memory traces and thus facilitate recollection (Frost et al., 2013).

Mental imagery is a useful tool in SLA because it encourages deep processing of new linguistic inputs. Visual stimuli affect language comprehension, and mental imagery provides an additional cognitive layer that supports long-term retention of lexical and conceptual knowledge (Nation, 2001). It can also be effective for learning abstract concepts, idiomatic expressions, and vocabulary without direct equivalents in the learner's L1. For example, when unpacking the blend *butterfingers*, a learner using mental imagery might create an internal representation of hands continuously dropping objects due to butter-coated fingers. This internal image reinforces the connection between the blend's literal components (butter and fingers) and its idiomatic meaning. In relation to other cognitive strategies included in this study, mental imagery might at first seem similar to visualization (section 2.2.4), but they differ both in process and purpose. While visualization involves creating hypothetical usage scenarios (Walters, 2006), mental imagery focuses on constructing mental visual representations of linguistic elements and their relationships (Paivio, 1986). Unlike visualization, which might place the phrase in a real-life situation (e.g. visualizing a person dropping a plate during lunch), mental imagery focuses on the mental representation of the slippery fingers themselves, which in turn makes the blend more memorable and easier to remember. In the context of CIT, mental imagery takes place during the elaboration phase of the blending process. Once the input spaces are identified, learners employing mental imagery construct internal simulations that integrate elements from the input spaces into a cohesive mental model. Said ability to visualize abstract relationships enhances understanding and reinforces the emergent meaning of the blended space.

3. Methodology

The following section will present the research design, data collection and analytical methods used to investigate differences in meaning deconstruction of conceptual blends and the cognitive strategy use between English major and non-English major undergraduate students. The study employs a comparative quantitative design with a structured questionnaire to measure the recognition and explanation of input spaces across five blends, as well as the cognitive strategy use. The methodology is structured around three research questions:

(i) Do English major and non-English major undergraduate students differ in their ability to recognize input spaces in conceptual blends?

(ii) Are there significant differences in how English major and non-English major undergraduate students explain the contribution of input spaces to the meaning of the blended space?

(iii) Is there a difference in the frequency of use and type of cognitive strategies between the English major and non-English major undergraduate students?

(iv) Does the duration of ESL education correlate with recognition accuracy, explanation quality, or cognitive strategy diversity?

The study hypotheses that:

(i) English major undergraduates will more frequently recognize input spaces of conceptual blends.

(ii) English major undergraduates will more frequently coherently explain the meaning brought by input spaces than non-English major undergraduate students.

(iii) English major undergraduates will, on average, use more cognitive strategies during meaning deconstruction, as well as show a greater intragroup variability.

(iv) Longer ESL study durations will correlate positively with recognition accuracy, explanation quality, and cognitive strategy diversity.

The following section is organized into three subsections: i) sample and demographic data, which presents the selection criteria, inclusion and exclusion protocols, and demographic characteristics of the sample, ii) instrumentation, which describes the questionnaire design and provides the rationale for blend selection and cognitive strategy categorization, and iii) scale determination and variable definitions, which presents the operationalization of variables and describes the methods used in the statistical analysis. Ethical considerations included anonymized data collection and voluntary participation. **Sample and Demographic Data**

The data was collected via a convenience, non-probability sample, consisting of native Croatian-speaking undergraduate students from the Faculty of Humanities and Social Sciences at the University of Zagreb, Croatia. It was predetermined that the minimum number of participants would be approximately 70 (ultimately evaluating to n=72), with the division factor between the groups being the participants' major, the participants majoring in English forming one group (n=35), and the participants not majoring in English forming another (n=37). This division into two groups represents the basis for the comparative analysis, as the aim of the study is to ascertain whether studying English at a tertiary education level has an impact on the recognition and explanation of blends, as well as if the cognitive strategies used in meaning deconstruction will be different for those majoring in English when compared to their non-English major counterparts.

It is important to note that the premise was that the majority participants will have had gone through obligatory English study as a part of their primary and secondary institutional education, as ESL is studied by a large majority of primary and high school students in Croatia: according to Kapović (2022), this majority in the school year 2019/2020 amounted to 95.82 % for primary schools (p.289), and 95,92 % for secondary schools (p. 295), comprised of 99.91 % for gymnasiums, and 93.92 % for vocational schools (p. 298). Thus, by the time the students reach university level, they will have had a minimum of 12 years of ESL education. This consistent and long-term exposure to ESL education across the Croatian school system provides a solid foundation for the assumption that all the participants would have studied ESL for roughly the same amount of time preceding their enrolment at the Faculty of Humanities and Social Sciences. Consequently, if the English major group displayed trends which differed from those displayed by the non-English major group, it could be claimed with more confidence that the acquisition that took place as a part of the undergraduate study of English might be the reason for the intergroup differences, as the pre-tertiary ESL education of both groups had been roughly equal.

With that in mind, and in order to maximally mitigate the possible skewedness of the results, it was decided that the duration of ESL study would also be included in the instrument, in case such information might turn significant for interpretation of the results later.

Furthermore, the questionnaire was set up so that the participants had to state their native language and level of study. In case they selected that their native language was not Croatian or that they were not an undergraduate student at the Faculty of Humanities and Social Sciences, they were immediately disqualified from proceeding with the completion of the questionnaire, being redirected to the final page of the questionnaire, thanking them for their participation. Both constraints were necessary to ensure the uniformity of participants in as many traits as possible to mitigate any confounding variables.

3.2. Instrumentation

The survey was conducted via a questionnaire (available in full in the Appendix), which was divided into two main sections – one containing demographic questions, while the other contained five subsections, one per blend. The survey was disseminated via multiple social media platforms, such as Facebook, Instagram, and WhatsApp, as well as via official channels of the faculty (mail distribution lists). The questionnaire was hosted on Google Forms and shared within an invitation letter as a clickable link. The answers were being collected from May 2023 until May 2024 due to the pool of potential participants for the English major group being much smaller and thus requiring a significant amount of time to collect the necessary number of responses.

Some of the demographical questions served as elimination criteria. The participants were first asked about their native language, with a Boolean response which evaluated to either *Croatian* or *Other*. If participants didn't select Croatian as their native language, they were automatically redirected to a page thanking them for their efforts, as they were not eligible to participate in the study. The same logic was applied to the next question, where participants needed to state if they were undergraduate students at the Faculty of Humanities and Social Studies at the University of Zagreb: if they selected *yes*, they could continue normally with the completion of the questionnaire. If they selected *no,* they were directed to the final page, where they were thanked for their contribution. The next demographical question evaluated the duration of the ESL study up until the completion of the questionnaire. The final demographical question asked about the major of the participant, with two mutually exclusive responses: *English* for English majors, and *Other* for non-English majors.

In order to avoid potential fatigue in participants, it was deemed that the number of blends included in the questionnaire could not be more than five, as the completion of responses per blend could vary anywhere between a minute and five minutes, thus adding up significantly for participants who took more time, potentially affecting the quality of responses if the completion of the questionnaire required excessive time. Five random blends, all of them being of approximately equal frequency in use in everyday language, were chosen: *couch potato*, *brain freeze*, *armchair critic*, *butterfingers*, and *eager beaver*. These blends were chosen because they were likely to be familiar to participants due to their popular use, ensuring that the focus of the study was the use of cognitive strategies and not the novelty of the blends themselves. All the blends consisted of two words (incidentally, input spaces were referred to as 'words' in the questionnaire), except *butterfingers*, so as to maximally facilitate the awareness of the participants about the bipartite construction of the blends and to easily quantify the answers relating to recognition and explanation. As the focus of the study was not the correct understanding of the semantics of blends, but rather the strategies used when unpacking their meaning, it was decided upfront that the participants were going to be given the meaning of each blend, ensuring their understanding.

Their first task was to recognize the input spaces of each blend (Q1: "*What words are combined in the expression [BLEND]?*"): it was included as a means of checking whether the participants would be able to understand the ensuing question, dealing with the explanation of each of the input spaces of a blend. The second question was aimed at explaining what the individual input spaces contributed to the overall meaning; it was emphasized that the answers should be written in full sentences, in order to reduce the potential ambiguity during the rating process (Q2: "*Explain how these individual words help create the overall meaning of the expression. Please write in full sentences.*"). There were no right or wrong answers in terms of factuality: the focus was purely on measuring whether participants were able to provide a meaningful explanation of each of the input spaces, as well as whether they were able to explain both input spaces. The third task in each subsection was a multi-select question where the participants were asked to select which of the strategies they had used while reconstructing the meaning of the blend ("Q3: *Which strategy or strategies did you primarily use to connect the individual words or ideas to the overall meaning? Select the option(s) that best describe(s) your thought process.*"). The question included the eleven cognitive strategies that we have described in section 2.2. While the strategies listed as possible choices do not represent an exhaustive list of all cognitive strategies, it was deemed necessary to ensure that the list is not overly long in order to avoid inducing choice overload and decision fatigue in participants. The order of the strategies was different for each of the questions, reducing the possibility of placement influencing the frequency of selection of a particular category. The strategies were presented descriptively and in simple language, and were operationalized as follows:

I. contextual analysis was presented as "Used the context in which the expression was presented";

II. elaboration was presented as "Related the expression to prior knowledge or experiences";

III. parsing was presented as “Broke down the expression into its individual parts”;

IV. visualization was presented as “Imagined situations where the expression could be used”;

V. schema activation was presented as “Relied on cultural references, traditions, or beliefs”;

VI. figurative language processing was presented as “Used understanding of idiomatic expressions or metaphors”;

VII. semantic networking was presented as “Explored associations between the expression and other related concepts”;

VIII. implicit learning was presented as “Relied on an intuitive understanding of language and context”[1];

IX. morphological analysis was presented as “Analyzed the structure of the words in the expression”;

X. syntactic analysis was presented as “Focused on the grammatical structure of the expression”: and

XI. mental imagery was presented as “Created mental images of the words and their relationships”.

Such construction of the questionnaire was not incidental: before the questionnaire had been formally disseminated, an informal pilot study was conducted with a small number of acquaintances in order to identify potential issues. The pilot study had shown several areas which required improvement, and Q3 was subsequently revised into a multiple-choice format, decreasing the cognitive load for participants by offering predefined and understandable response options: this choice serendipitously also simplified the rating process for the strategy-use data, since it meant including a definite number of strategies and minimizing the chance of incomplete answers. The participants in the pilot study had reported needing more time than was indicated at the beginning of the questionnaire: after the change of the structure of Q3 of each blend section, it was concluded that the completion time was accurately represented in the introductory section of the questionnaire.

[1] Implicit learning was phrased this way in order to reflect the way that the participants described their thought process in the pilot study: they reported that, when explaining the meaning brought by input spaces, they were relying on intuitive pattern recognition rather than a consciously used strategy. Even though implicit learning does not function in the same manner as the other cognitive strategies, it was included due to participants’ self-reported experience of using unconscious processing in meaning deconstruction.

3.3. Scale Determination and Variable Definitions

The collected responses needed to be converted into statistically evaluable data types to be quantified. Although a rating scale was planned before the start of the dissemination of the questionnaire, it was deemed necessary to assess the entirety of the collected responses before the official conversion process would begin. The initial assessment of the data showed that the best approach would be to convert the data into Boolean and integer values to facilitate conducting statistical analyses and presenting the results visually.

To start, three separate Boolean values were extrapolated from the response to Q1, as well as Q2, of each blend set: whether the participant recognized and/or explained the first input space, whether they recognized and/or explained the second input space, and whether they recognized and/or explained both input spaces of a blend. The first question of each blend set, pertaining to the recognition of input spaces, was easily convertible into *true-false* values, as it had a definite correct answer; however, the second question of each blend set required a more nuanced approach, due to it dealing with the explanation of the input spaces and thus not having an inherently definitive answer. It is worth noting that, during the data conversion process of Q1, we noticed that there were participants who misunderstood the question and provided responses in line with Q2 instead, thus having their responses evaluated as *false* in the rating process. This was taken into consideration in the subsequent interpretation of results, which is presented in the discussion (section 5).

The aim for the data conversion of Q2 was to completely disregard any notion of validity of answers in terms of their factuality and focus on the *ability* of the participant to coherently explain each and/or both input spaces of a blend. During the rating process, two interconnected issues arose: in some cases, although it was obvious that the participant did know how to respond to the question, they failed to fulfill the technical constraint imposed upon their response (i.e. that a response should follow the form of structured sentence(s), where incomplete phrases were taken as *false*), automatically rendering their response invalid. It was also noted that the spectrum of responses considered *true* varied greatly in terms of the depth, length, and specificity of explanation. In the end, three separate values were assigned to each participant, where the value evaluated to *true* if the criteria were met and *false* if the response failed to meet the criteria, each of the values corresponding to one of the criteria below:

- successfully and clearly providing an explanation for the meaning brought forward by the first input space of a blend;
- successfully and clearly providing an explanation for the meaning brought forward by the second input space of a blend; and

- successfully and clearly providing an explanation for the meaning brought forward by both input spaces of a blend.

Later, these values were summarized into totals: one for the total number of input spaces explained (with a minimum of 0 and maximum of 10), and one for the total number of times that the participant had explained both input spaces (with a minimum of 0, maximum of 5). The variable for the total count of explanation of input spaces was used in all following analyses, whereas the variable evaluating the total times a participant recognized both input spaces was kept as a potential source of supplemental data in case additional clarity was needed when interpreting other findings.

Since Q3 in each blend set was a multi-choice question, the responses to it were converted into 11 Boolean variables per blend, evaluating to *true* if a strategy was selected and *false* if not. Each blend set also got assigned numeric (integer) variable, which recorded the number of strategies used per blend, with a minimum of 1 and a maximum of 11. The strategy variables were then summed for easier use, so as to avoid having five variables for each category: 12 values were assigned to each participant, out of which 11 corresponded to the total number of recorded use of each of the above-mentioned strategies (each of them having a minimum value of 0, and a maximum of 5), and the last value was the total count of strategies used (with a minimum of 5, and a maximum of 55). These variables are more closely described in the introduction of section 4 and were used for all the following analyses.

The following section will present the process and results of data analysis. All the calculations and visualizations were done in Python within the Jupyter Notebook environment, using several open-source libraries: Pandas for data analysis, NumPy for array-handling, Matplotlib and Seaborn for boxplot and heatmap generation, SciPy for statistical tests and Scikit-learn for correlation analysis.

3.4. Pilot Study and Its Influence on Strategy Selection

Before the official dissemination of the questionnaire, and due to the explorative nature of this study, an informal pilot study was conducted with a small group of participants (n=12) to pinpoint potential issues in the questionnaire design. The initial questionnaire (as presented in the pilot study) contained 10 blend sets of three questions per blend, where Q1 and Q2 were worded the same as the form they kept in the final version of the questionnaire. In the initial form of the questionnaire, Q3 was an open-ended question ("*Describe your thought process in connecting the individual words or concepts to the overall meaning.*"), and a significant number of participants (8 out of 12) reported finding it challenging to discern the difference between it and Q2. They reported that their inability to decisively interpret the question significantly prolonged the completion time. Upon receiving their feedback, we decided to convert the Q3 response into a multi-select choice response so that it would not only be easier for the participants to interpret the question but also to facilitate the data conversion process, avoiding inconsistencies in the rating and curbing the potential inability of the participants to precisely express their though process during meaning deconstruction.

Additionally, participants reported fatigue due to the scope of the blend analysis section of the questionnaire since it amounted to 30 questions in total in the initial version of the questionnaire. The length of the questionnaire also made the completion time very long; hence, in the final version of the questionnaire, we only included five blends, amounting to 15 questions in total (three questions for each blend). That served to shorten the completion time and decrease the potential fatigue in the participants.

4. Data Analysis

This section will present the data analysis in the order in which it was conducted. The section consists of three subsections, divided by the type of statistical methods used: i) descriptive statistical methods, providing a brief overview of general patterns in the data; ii) inferential statistical methods, comprising assumption testing, as well as group statistical tests; and iii) correlation analysis. Some tables and graphs were exported directly from Jupiter Notebook, so the represented values are sorted by the variable names, not natural language wording. These variable names are consistent and go as follows:

- **Years_Studied** – This integer variable contains the self-reported years spent in active ESL instruction.
- **Total_Recognized** – This integer variable records the number of times a participant correctly recognized an input space across the blends. Ranges 0-25.
- **Total_Explained –** This integer variable records the number of times a participant provided a cohesive explanation of the meaning of an input space across the blends. Ranges 0-25.
- **Total_Cases_of_Recognized_Both** – This integer variable records the number of times a participant correctly recognized both input spaces in a blend. Ranges 0-5.
- **Total_Cases_of_Explained_Both** – This integer variable records the number of times a participant provided a cohesive explanation of the meaning of both input spaces in a blend. Ranges 0-5.
- **Total_Number_Of_Recorded_Strategies** – This integer variable records the total amount of strategies which a participant self-reported to have used while providing a cohesive explanation of input spaces across all blends. Ranges 5-55.

- **Contextual Analysis –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of contextual analysis (section 2.2.1) providing an explanation of input spaces across all blends. Ranges 0-5.

- **Elaboration –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of elaboration (section 2.2.2) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Parsing –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of parsing (section 2.2.3) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Visualization –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of visualization (section 2.2.4) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Schema Activation –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of schema activation (section 2.2.5) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Figurative Language Processing –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of figurative language processing (section 2.2.6) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Semantic Networking –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of semantic networking (section 2.2.7) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Implicit Leraning –** This integer variable records the total amount of times a participant had self-reported to have used implicit learning (section 2.2.8) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Morphological Analysis –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of morphological analysis (section 2.2.9) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Syntactic Analysis –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of syntactic analysis (section 2.2.10) while providing an explanation of input spaces across all blends. Ranges 0-5.

- **Mental Imagery –** This integer variable records the total amount of times a participant had self-reported to have used the cognitive strategy of mental imagery (section 2.2.11) while providing an explanation of input spaces across all blends. Ranges 0-5.

4.1. Descriptive Statistics

To ascertain how the two groups performed overall, the starting point of the data analysis was the use of descriptive statistical methods. The findings of these tests were followed by normality and variance tests and served as deciding factors for the further steps in the analysis. The presentation of the results starts with the variables evaluating the duration of ESL study, the total recognition score, and the total explanation score, followed by the frequency of recognition and explanation of both of the input spaces of a blend, ending with variables evaluating the strategy use (the total number of used strategies, as well as the frequency of use per strategy). The results are presented in tabular and graphical form to facilitate reading.

English Majors Descriptive Statistics

	Years Studied	Total Recognized	Total Explained	Total Cases of Recognized Both	Total Cases of Explained Both
mean	16.830000	8.090000	7.170000	3.910000	3.480000
std	3.650000	3.120000	2.910000	1.650000	1.580000
count	35.000000	35.000000	35.000000	35.000000	27.000000
min	10.000000	0.000000	0.000000	0.000000	0.000000
max	26.000000	10.000000	10.000000	5.000000	5.000000

Non-English Majors Descriptive Statistics

	Years Studied	Total Recognized	Total Explained	Total Cases of Recognized Both	Total Cases of Explained Both
mean	13.730000	9.160000	5.730000	4.430000	2.200000
std	2.660000	1.620000	3.190000	1.010000	1.730000
count	37.000000	37.000000	37.000000	37.000000	35.000000
min	9.000000	4.000000	0.000000	1.000000	0.000000
max	20.000000	10.000000	10.000000	5.000000	5.000000

Table 1: Descriptive statistics (mean, standard deviation, count, min, max) for main variables for English major group (above) and non-English major group (below)

Our starting point will be an overview of the general trends within the groups. As shown in Table 1, the English major group on average studied ESL longer (M=16.83, SD=3.65, n=35), but with more variability within the group, compared to their non-English major counterparts (M=13.73, SD=2.66, n=37). The differences between the minimum duration of ESL study were similar for non-English majors (min=9) and for English majors (min=10), while the maximum age for the English major group (max=26) was considerably higher than that of the non-English major group (max=20).

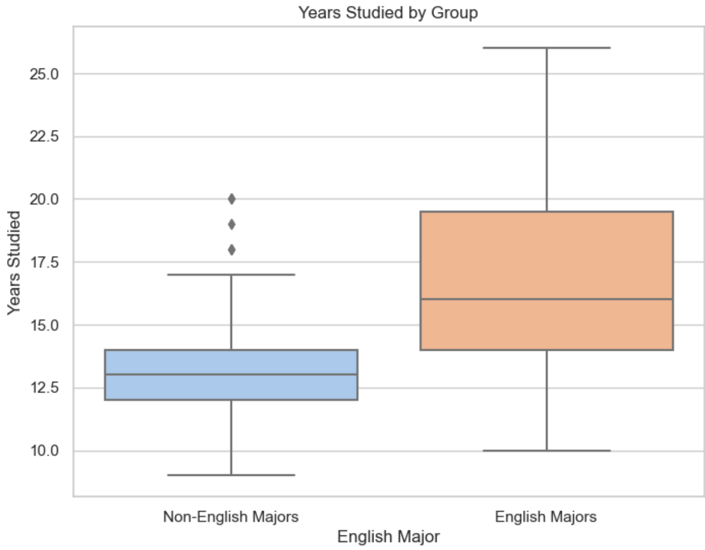


Figure 1: The difference in duration of the study of English between non-English majors and English majors

The difference between the groups is visually represented in Figure 1, where it is evident that the median is higher for the English major group, along with a wider interquartile range, showing more variability within the group compared to the interquartile range of the non-English major group, which is noticeably narrower. The non-English major group is also shown to have had several outliers who reported studying ESL much longer than most of their group but overall had much less variability in the duration of ESL study, thus representing a somewhat uniform sample.

Although it was posited that the frequency of correct recognition of the English major group would be either equal to or higher than that of the non-English major group, the non-English major group's total recognition scores (M=9.16, SD=1.62, min=4) were higher on average, had had less variability, and a higher minimum value, compared to the total recognition scores of the English major group (M=8.09, SD=3.12, min=0), as shown in Table 1. The non-English major group also more frequently recognized both input spaces of a blend (M=4.43, SD=1.01, min=1) compared to the English major group (M= 3.91, SD=1.65, min=0), as well as had less intragroup variability and a higher minimum score value. Not a single participant in the non-English major group failed to recognize both input spaces of a blend at least once.

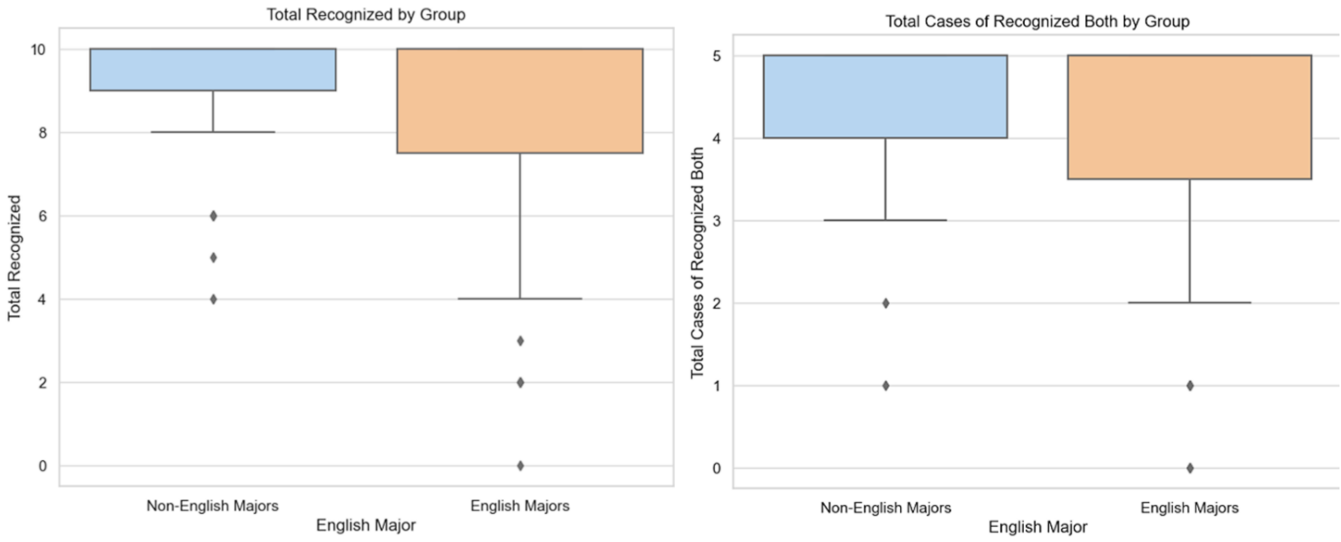
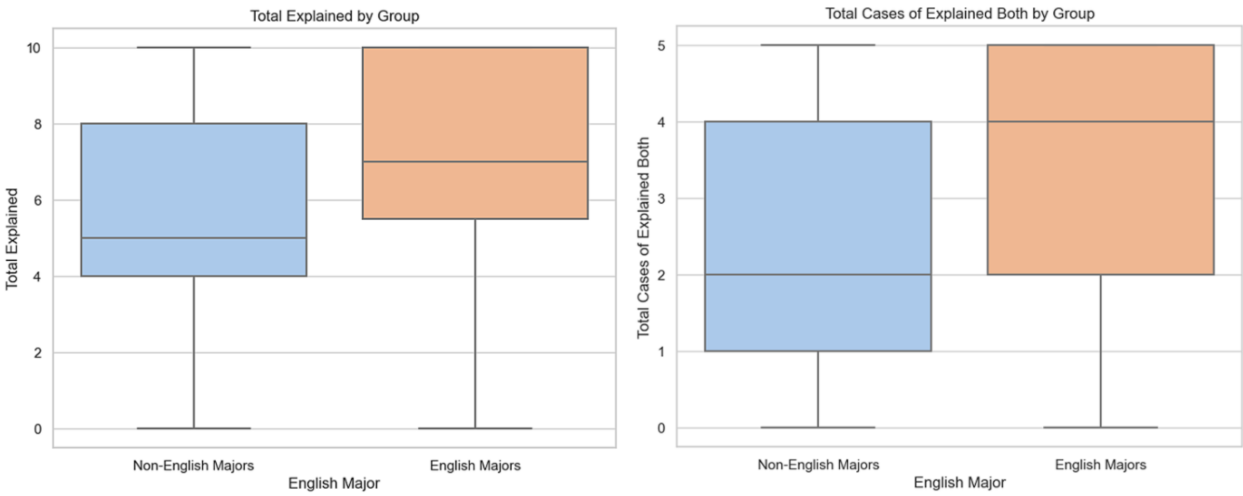


Figure 2 and Figure 3: Comparison of total recognition scores (left) and total counts of recognition of both input spaces of a blend (right) between non-English majors and English majors

The boxplot graph shown in Figure 2 visualizes that the median for total recognition scores is higher for non-English majors, and the range is narrower rhan that of their English major counterparts, with most participants scoring in the 8-10 range. Although the non-English major group had a couple of outliers who scored much lower (4-6 range), they were closer to the median compared to the English major group. The Figure 3 presents the comparison of instances of recognizing both input spaces of a blend, where the groups didn't differ significantly in median and having outliers who performed significantly worse than the majority of their group, but with the interquartile range being wider for English majors. The visualization suggests that the non-English major group scored higher more consistently than the English major group in recognizing input spaces of given blends, having a narrower range of scores and less variability within the group.

In contrast, as shown in Table 1, the explanation scores were aligned with our hypothesis that the English major group would, on average, have a higher frequency of correct explanation of input spaces of blends (M=7.17, SD=2.91) than the non-English-major group (M=5.73, SD=3.19). The variability within the group was slightly less for the English major group, and the minimum and maximum numbers of correct explanations per participant were the same for both groups (min=0, max=10). The English major group also showed a higher frequency of correct explanations of both input spaces of a blend (M=3.48, SD=1.58) than the non-English major group (M=2.20, SD=1.73).



Figures 4 and 5: Comparison of total explanation scores (left) and total counts of explanation of both input spaces of a blend (right) between non-English majors and English majors

As visualized in the *Figures 4 and 5*, in comparison with the non-English major group, the English major group's explanation scores showed a higher median but a wider interquartile range, indicating more variability within the group, albeit a higher frequency of correct explanations. Both groups showed a wide range of responses, although most responses were clustered together, and there were no outliers. These boxplots illustrate that the non-English major group showed more consistency, scoring lower but with less variability than the English major group, which tended to score higher but displayed greater differences in individual performance.

Following the general analysis of the recognition and explanation scores, the same tests were conducted on the variables pertaining to strategies in order to ascertain the least and most used strategies, as well as to observe the strategy count between the groups, which may showcase any differences in strategy usage between groups.

Variable	Non-English Majors					English Majors				
	Mean	Std	Count	Min	Max	Mean	Std	Count	Min	Max
Total Strategies	19.11	9.07	37	5	42	22.74	8.85	35	5	37
Contextual Analysis	2.65	1.99	37	0	5	2.54	2.12	35	0	5
Elaboration	2.78	1.80	37	0	5	3.03	4.52	35	0	5
Parsing	2.54	1.79	37	0	5	3.06	1.76	35	0	5
Visualization	1.92	1.55	37	0	5	2.26	1.95	35	0	5
Schema Activation	1.32	1.43	37	0	5	1.71	1.74	35	0	5
Figurative Language Processing	2.14	1.78	37	0	5	2.14	1.93	35	0	5
Semantic Networking	1.08	1.28	37	0	4	1.06	1.21	35	0	5
Implicit Learning	1.84	1.52	37	0	5	2.57	2.05	35	0	5
Morphological Analysis	0.89	1.29	37	0	5	1.34	1.55	35	0	5
Syntactic Analysis	0.49	1.04	37	0	5	0.63	1.40	35	0	5

Mental Imagery	1.46	1.66	37	0	5	2.40	2.03	35	0	5

Table 2: Descriptive statistics for strategy variables for the English major group and non-English major group

As shown in *Table 2*, the non-English major group on average reported less frequent (M=19.11, SD=9.07) overall strategy use (the count of total of used strategies, where the same strategy can be used a maximum of 5 times, or 1 per blend) than the English-major group (M=22.74, SD=8.85), with slightly less variability within the latter group. Out of the participants who reported to have utilized contextual analysis, the non-English major group showed a slightly higher frequency (M=2.65, SD=1.99) than the English major group (M=2.54, SD=2.12), as well as slightly less variability, although the usage was relatively high for both groups. There were slightly more intergroup differences in the reported usage of elaboration, where the English-major group (M=3.03, SD=1.52) showed a higher frequency of strategy use, as well as less variability within the group, than the non-English major group (M=2.78, SD=1.80). This trend was continued with the reported usage of parsing, where the English-major group (M=3.06, SD=1.75) showed a higher frequency of strategy use and slightly less variability than the non-English major group (M=2.54, SD=1.79), although both groups reported high frequency of use compared to the frequency of use of other strategies.

Although the English major group on average reported a higher frequency (M=2.26, SD=1.95) of use of visualization, the intragroup variability was higher than that of the non-English major group (M=1.92, SD=1.55), which was also the case for the reported use of schema activation, where the English major group (M=1.71, SD=1.74) also had a higher frequency, but less variability, than the non-English major group (M=1.32, SD=1,43). Both groups had the exact same mean (M=2.14) of reported usage of figurative language processing, but the English major group standard deviation was slightly higher (SD=1.93) than that of the non-English major group (SD=1.78), showing more variability within the group. Conversely, for the use of semantic networking, the non-English majors showed both a higher frequency (M=1.08, SD=1.28) and higher intragroup variability compared to the English majors (M=1.06, SD=1.21), although the differences were minor.

In contrast, the English major group reported a much higher frequency of use of implicit learning (M=2.57, SD=2.05) than the non-English major group (M=1.84, SD=1.52), albeit with the latter group having a lower standard deviation, thus showing less variability. Morphological analysis was overall not used frequently, although the English major group (M=1.34, SD=1.55) reported higher frequency of use, as well as more variability, than the non-English group (M=0.89, SD=1.29). This trend was also displayed with the use of syntactic analysis: the strategy was scarcely used within both groups, but the English major group (M=0.63, SD=1.40) reported a slightly higher frequency of use and more variability compared to the non-English group (M=0.49, SD=1.04). Finally, mental imagery was moderately used by both groups, with the English major group (M=2.40, SD=2.03) reporting higher frequency of use, and displaying higher intragroup variability, than the non-English group (M=1.46, SD=1.66).

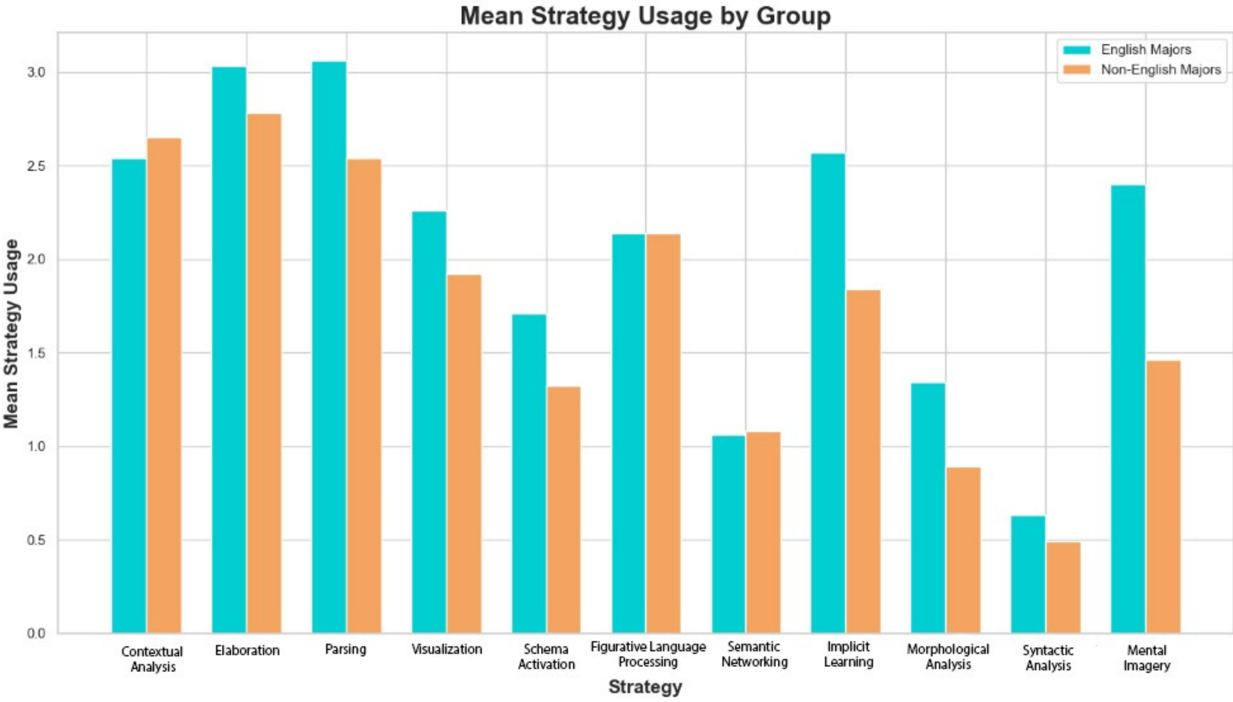


Figure 6: Bar graph of mean values of each of the 11 strategies per group

The mean usage across strategies is shown in Figure 6 to simultaneously represent the values between the two groups. Since the English major group reported a generally higher frequency of use of strategies, the bars representing their results are generally higher than those of the non-English major group. The two most used strategies were elaboration and parsing, with the English major group having higher mean values for both strategies. The English major group also had a much higher mean of use mental imagery and implicit learning, and, since the latter was not originally conceived as a deliberately applied strategy, its frequency of selection is significant. The third most-used strategy overall was contextual analysis, where the non-English major group scored slightly higher than the English major group. The only strategy for which both groups had the same mean was figurative language processing. The least used strategies were semantic networking, where the non-English major group had a slightly higher mean, and syntactic analysis, where the English major group had a slightly higher mean.

4.2. Inferential Statistics

After having described the general trends of the main variables, the analysis continued onto inferential statistical methods. The purpose of those tests was to make inferences about the general population from the sample data by comparing the groups to each other, as well as to assess the relationship amongst the variables. The inferential statistical methods used can be divided into three subsections: assumption testing (normality and variance testing, comprising Shapiro-Wilk and Levene's test), group comparison tests (the non-parametric Mann-Whitney U test and the parametric Welch's test) and correlation analysis (Pearson's correlation).

4.3. Assumption Testing

As most parametric tests assume that data is normally distributed, the next step of the analysis included conducting normality and homogeneity of variance tests to assess how to proceed further. For that purpose, the Shapiro-Wilk test was chosen to determine whether the assumption of normal distribution of data is valid. Levene's test was selected to measure the equality of variances across the groups to decide which inferential tests to employ next.

The Shapiro-Wilk test was performed on the two recognition variables (total recognition score and the count of instances of correctly recognizing both input spaces of a blend), the two explanation variables (total explanation score and the count of the cases of correctly explaining both input spaces of a blend), as well as on total strategy scores, to assess the distribution of data and mitigate the possibility of the results of subsequent tests being misleading.

Variable Name	English Major Shapiro-Wilk p-value	Non-English Major Shapiro-Wilk p-value
Total Recognized	0.00	0.00
Total Explained	0.00	0.02
Total Recognized Both	0.00	0.00
Total Explained Both	0.00	0.00

Table 4: Results of Shapiro-Wilk test for recognition and explanation variables for both groups

The results of Shapiro-Wilk test showcased a very low p-value ($p < 0.05$) for all recognition and explanation variables, proving the data not to be normally distributed, as shown in Table 4. This indicated that it would be necessary to use non-parametric tests on those variables in the progression of the analysis.

Variable Name	English Major Shapiro-Wilk p-value	Non-English Major Shapiro-Wilk p-value
Total Strategies	0.18	0.24
Contextual Analysis	0.00	0.00
Elaboration	0.00	0.00
Parsing	0.00	0.00
Visualization	0.00	0.00
Schema Activation	0.00	0.00
Figurative Language Processing	0.00	0.00
Semantic Networking	0.00	0.00
Implicit Learning	0.00	0.00
Morphological Analysis	0.00	0.00
Syntactic Analysis	0.00	0.00
Mental Imagery	0.00	0.00

Table 5: The results of Shapiro-Wilk Test conducted on strategy variables

As shown in *Table 5*, the variables for the total number of used strategies per participant for both groups showed p-values higher than 0.05 (p=0.18 for English majors; p=0.24 for non-English majors), meaning that the data was normally distributed and thus could be further analyzed by parametric tests. The p-values for all other strategy variables (p=0.00) showed that the data was not normally distributed, and thus could not be analyzed by parametric tests without seriously questioning the validity of the results.

This indicated that parametric tests would not present an accurate depiction of the existing trends, as their presupposition of data being normally distributed would be false. To gain additional insight into the dataset, it was deemed necessary to assess whether the assumption of homogeneity of variance is correct. Levene's test was first conducted on the two recognition and two explanation variables to check whether the variances between the two groups were equal. The results of Levene's test returned p-values above the threshold of 0.05 for all variables, showing that the variances between the groups were equal, as seen in **Error! Reference source not found.**.

Variable Name	Levene P-Value
Total Recognized	0.07
Total Explained	0.44
Total Recognized Both	0.11
Total Explained Both	0.79

Table 6: Levene's test for the recognition explanation variables

As shown in the *Table 7*, the results of Levene's test for strategy variables returned p-values higher than 0.05 for most variables, meaning that most variances were equal. Notable exceptions were the variable evaluating the use of mental imagery (p=0.03), the variable evaluating visualization (p=0.02), and the variable evaluating the use of implicit learning (p=0.00), their p-values indicating significant differences in variance between the two groups. The only other variable that came close was the one evaluating the use of elaboration (p=0.05), which was over the statistically significant limit but which may also hint at significant differences in variance due to being very close to the threshold.

Variable	Levene P-Value
Total Strategies	0.68
Contextual Analysis	0.58
Elaboration	0.05
Parsing	0.91
Visualization	0.02
Schema Activation	0.20
Figurative Language Processing	0.89
Semantic Networking	0.43
Implicit Learning	0.00

Morphological Analysis	0.27
Syntactic Analysis	0.62
Mental Imagery	0.03

Table 7: Levene's test for strategy variables

The results of Levene's test for strategy variables showed that a standard t-test could have been used in further analysis, had the Shapiro-Wilk test not shown that the distribution of the data was not normal for almost all variables. However, as the assumption of normality was proven to be false, the analysis proceeded with Mann-Whitney U test. For the three variables that showed heterogeneity of variance, evaluating mental imagery, visualization and implicit learning ($p=0.03$; $p=0.02$ and $p=0.00$ respectively), as well as for the lone variable that was right on the threshold, which evaluated elaboration (i.e. $p=0.05$), we decided to perform Welch's t-test, since the variances were unequal and we still wished to compare the means, but the normality assumption was not a severe issue.

4.3.1. Group Comparison Tests

Further testing was necessary to compare the performance of the two groups. As the results of the Shapiro-Wilk test showed that most of the data did not follow a normal distribution, parametric tests were unsuitable for further analysis. The Mann-Whitney U test was chosen as a non-parametric test necessary to compare two independent groups since it is based on the principle of ranking data across both groups, making it less sensitive to non-normal distributions and outliers. We chose Welch's t-test (unequal variances test) since it calibrates for differences in variances between groups by modifying the degrees of freedom, providing more reliability for comparing means when there is no homogeneity of variance.

The group comparison testing started with employing the Mann-Whitney U test for all the strategy variables, and the two variables measuring the total number of times a participant had recognized and explained input spaces. The purpose of the test was to ascertain if there were any significant differences in the strategy usage and the recognition and explanation rate between the English major and the non-English major group by assigning ratings to the data and consequently ranking it between the two groups. The test itself does not provide directionality, in the sense that it can tell which group performed better, but instead serves to indicate the level of statistical significance of differences between the groups.

Variable	Mann-Whitney U Statistic	P-Value
Total Strategies Used	794.50	0.10
Contextual Analysis	624.50	0.79
Elaboration	694.00	0.60
Parsing	755.00	0.22
Visualization	701.00	0.54

Schema Activation	718.00	0.41
Figurative Language Processing	647.00	1.00
Semantic Networking	652.00	0.96
Implicit Learning	776.00	0.14
Morphological Analysis	748.00	0.23
Syntactic Analysis	644.50	0.97
Mental Imagery	811.50	0.06
Total Recognized Input Space	764.00	0.22
Total Explained Input Space	645.50	0.04

Table 8: Results of the Mann-Whitney U test for the strategy variables, as well as for the total count of recognition and explanation of input spaces

As is shown in *Table 8*, the results of the Mann-Whitney U tests showed that the only statistically significant difference occurred for the total number of explained input spaces due to the p-value being less (p=0.04) than the threshold of 0.05. The only other variable coming close in terms of statistical significance was the variable denoting the usage of mental imagery, which evaluated to a value close to the threshold of statistical significance (p=0.06). These results indicate no significant difference in strategy usage between the English major group and the non-English major group. However, a statistically significant difference was suggested between the English major and the non-English major group in their ability to explain input spaces in blends.

Furthermore, as we had previously determined that three of the strategy variables (the variables evaluating the use of mental imagery, visualization, and implicit learning), as well as the variable evaluating the use of elaboration (which had a value at the threshold of statistical significance), showed unequal variance, it was deemed necessary to employ Welch's test to adapt by modifying the degrees of freedom for differences in variance between the groups, thus providing more reliable results.

Variable	Welch t-statistic	P-value
Elaboration	0.62	0.53
Visualization	0.81	0.42
Implicit Learning	1.72	0.09
Mental Imagery	2.14	0.04

Table 9: Results of Welch's test for the four strategy values which showed or almost showed a lack of homogeneity of variance

The results of Welch's test, as shown in *Table 9Table 9*, showcased that the statistically significant difference between the two groups existed only in employing mental imagery (p=0.04), whereas the other three tested strategies had p-values higher than 0.05 (p=0.53 for elaboration; p=0.042 for visualization; p=0.09 for implicit learning) and thus suggesting no statistically significant difference in the use of those strategies. The findings of Mann-Whitney U test and Welch's test showed that, regardless of the differences displayed between the groups in the results of the previous descriptive methods we have conducted (calculating the mean, median, standard deviation, etc.), the only variables which displayed statistical significance were the variable for the total of all successful explanations of input spaces and the variable for mental imagery. Thus, we cannot conclusively affirm that the differences displayed by other variables in the descriptive tests were indicative of statistically significant differences.

4.4. Correlation Analysis

Since the variable denoting the duration of ESL education displayed a normal distribution in the previous tests, it was selected to be used as the primary independent variable for correlation analysis so as to see its linear relationship with other variables. Since we needed to evaluate the relationship between two continuous variables, we chose the Pearson correlation, as its purpose is to ascertain if higher values in one variable (duration of ESL study) correlate with higher or lower values in another variable. The other variables included in the test were the recognition and explanation variables, and all the strategy-related variables. The correlation analysis aimed to explore latent patterns in strategy use and identify potential predictors of higher frequency of recognition and explanation of input spaces.

Variable	Correlation Coefficient (r)
Total Recognized	-0.35
Strategies Count	0.22
Figurative Language Processing	0.20
Semantic Networking	0.17
Implicit Learning	0.17
Syntactic Analysis	0.17
Morphological Analysis	0.16
Elaboration	0.16
Mental Imagery	0.15
Schema Activation	0.09
Total Explained	-0.09
Contextual Analysis	-0.03
Visualization	-0.03

Table 10: Results of Pearson correlation test for variable Years Studied

The *Table 10* shows the results of correlation analysis for the variable denoting the duration of ESL study in descending order, where the variables were sorted by the absolute value of the correlation coefficient, denoting the strength of their relationship with the *Years Studied* variable. The highest value, albeit still moderate in terms of effect, was found when calculating the correlation coefficient between the duration of the ESL education and the total recognition count ($r=-0.35$). Nonetheless, the resulting coefficient was negative, indicating that the relationship was inversely proportional: the participants who studied ESL longer had a lower total recognition count than those who studied ESL for a shorter time. The next value in strength, although weak in terms of effect, was the correlation coefficient calculated from comparing the total number of recorded strategies and the duration of ESL study ($r=0.22$), which suggested that the participant studying ESL for longer time tended to report to use more strategies than their counterparts who spent less years studying ESL. A similar level of positive correlation was also found comparing the duration of ESL study with the recorded use of implicit learning (r=0.20), indicating that the frequency of its usage increased proportionally with the duration of ESL study. This trend was also observed, albeit at an even weaker degree of correlation, for figurative language processing (r=0.20), semantic networking (r=0.17), implicit learning (r=0.17), morphological analysis (r=0.16), elaboration (r=0.16) and mental imagery (r=0.15). It is important to note that none of the values came close to the maximum absolute value of correlation coefficient, which is 1. However, these values are still indicative of potential trends, even though the degree of correlation is not very high: the data sample was simply not large enough to enable conclusive or explicit claims of correlation for the variables in question.

Variable	Correlation Coefficient (r)
Mental Imagery	0.60
Elaboration	0.53
Parsing	0.53
Implicit Learning	0.52
Morphological Analysis	0.51
Total Explained	0.45
Syntactic Analysis	0.44
Semantic Networking	0.40
Figurative Language Processing	0.33
Visualization	0.29
Contextual Analysis	0.25
Schema Activation	0.22

Table 11: Results of Pearson correlation for the total number of strategies used by a participant with the specific strategies and recognition and explanation scores

When it comes to the results of results of Pearson correlation for the variable denoting the total number of used strategies per participant (an integer value with a minimum of 5 and a maximum of 55) with the other strategy variables as seen in *Table 11*, it was noted that it displayed significant correlation with other variables, indicating potential interdependence amongst the strategies. The strongest correlations were observed with mental imagery (r=0.60), elaboration (r=0.53), and parsing (r=0.53). These values can be considered strongly correlated, as they are within the range of $0.5 < |r| < 0.7$, and they suggest that participants who reported a higher overall strategy use were also prone to use these three strategies. The variable denoting the total number of explained input spaces showed a moderate correlation with the total number of used strategies (r=0.45). The variables for visualization (r=0.29), contextual analysis (r=0.25) and schema activation (r=0.22) all showed values in the range $|r| < 0.3$, displaying weak correlation. Notably, even the lowest observed correlation coefficient for the variable denoting total strategy use (compared with schema activation, r=0.22) still indicated a positive relationship, which hints at the interconnectedness of strategy use. It is also important to note that the weakest Pearson correlation coefficient for an individual strategy against the total number of used strategies was equal in significance as the second-highest correlation coefficient for the variable denoting the length of ESL study (r=0.22, value for the variable denoting the total number of strategies used), which serves to emphasize that the correlation between the total strategy use and the use of individual categories is much higher than that of the correlation of duration of ESL study and the use of individual strategies.

5. Discussion

The following section will discuss the findings of the data analysis and their wider theoretical and practical implications. The section is divided into two parts: the first section presents the interpretation of the main findings, while the second section delves into limitations and future research directions.

5.1. Interpretation of Main Findings

The section will first discuss the implications of descriptive and inferential statistical test results, later transitioning to discussing the implications of the results of correlation analysis. The aim is to connect the results of the data analysis with the theoretical framework the study was built on so as to provide additional insights and commentary, since the results of the data analysis revealed unexpected patterns in recognition and explanation scores, as well as significant differences in strategy use between the English major group and non-English major group and both expected and unexpected relationships amongst ESL study duration, recognition and explanation scores, and strategy use.

One unexpected finding was that non-English majors outperformed English majors in recognizing input spaces. This result did not match our initial hypothesis that English majors will have an equal or higher frequency of correct recognitions of input spaces of blends than their non-English major counterparts due to their advanced linguistic background. However, this result might be explained with unclarities in the questionnaire: in answer to the first question in the section of each blend, where the participants were asked explicitly about *words* combined in a particular blend, the English majors sometimes tended to provide explanations of input spaces without explicitly identifying them, thus essentially failing the task and their answer evaluating to *false* in later analysis. The confusion might be due to the question being formulated too literally, where the English major group considered the answer too obvious or banal to be correct. Alternatively, the unexpected finding may be linked to differences in processing styles between the groups. English majors, used to linguistic analysis, may have unconsciously overanalyzed the task or chosen to focus on the conceptual coherence of the blend rather than the structural recognition of its components. Their extensive exposure to linguistic analysis might have caused them to prioritize inferential reconstruction of meaning over mechanical identification of input spaces. The presence of English majors who scored exceptionally low on recognition tasks suggests that some participants within the group might have engaged in implicit reasoning instead of explicitly identifying input spaces, which suggests that metalinguistic awareness and linguistic intuition may interfere with direct identification when tasks are perceived as too simple and/or redundant. However, when asked to coherently explain the elements brought by input spaces to the meaning of the blended space, English majors outperformed non-English majors, which aligns with our initial hypothesis. Their explanations were more frequently detailed and cohesive than those of the non-English major group, demonstrating that their linguistic training and metalinguistic awareness might have enabled them to conduct deeper analysis. Their ability to articulate the relationship between the input spaces and the emergent meaning of the blend implies a greater comprehension of meaning construction involved in conceptual integration. This may indicate that metalinguistic competencies support deeper conceptual analysis, enhancing the ability to deconstruct meaning at a higher level of abstraction. The English major group might have relied more on blended space comprehension rather than a breakdown of input spaces. Therefore, the difference in the performance of the groups between the recognition and explanation tasks might suggest that the cognitive mechanisms of conceptual integration are differently engaged in recognition tasks as opposed to the explanation tasks.

Furthermore, the differences in strategy use between the groups provide additional insights into their respective approaches to meaning deconstruction and blend interpretation. While both groups reported using various strategies, there were obvious patterns in the frequency and preference of some strategies. Out of the eleven strategies included in the study, the most popular ones were parsing, elaboration and mental imagery. Parsing was particularly widely used amongst the non-English major group, which implies that non-English major group treated the blends as compositional linguistic structures, choosing a more explicit, surface-level deconstruction. While elaboration was slightly more used within the English major group, which may point to them tending to lean more on associative and experiential knowledge, mental imagery was especially popular amongst English majors, indicative that creating mental images facilitates meaning retention. In contrast, the least used strategies were schema activation, morphological analysis, and syntactic analysis. Schema activation was seldom used in both groups, possibly because the task focused on widely known blends rather than culturally specific references. Morphological analysis was slightly more frequently used among the English major group, but its overall usage was very low, indicating that even though English majors may have been more aware of word formation processes, they did not use them as primary interpretation tools. Finally, the least used strategy across both groups was syntactic analysis, which highlights that blend interpretation and meaning reconstruction are, rather than syntactic, primarily a semantic process. As syntactic analysis and morphological analysis were the two most underutilized strategies for both groups, it may follow that blend comprehension is mainly conducted using semantic-leaning rather than syntactic-leaning strategies.

What is indicated by these trends is that the non-English major group tended to gravitate towards more straightforward decomposition techniques, such as parsing and semantic networking, relying more on explicit deconstruction and contextual clues, which implies a more structured cognitive approach, with a preference for rule-based dissection of meaning. In contrast, the English major group favored implicit learning and mental imagery, which points to them engaging in intuitive and holistic processing, possibly due to their increased exposure to linguistic structures. However, as noted earlier, implicit learning is not a consciously applied strategy: since it is an unconscious process, the fact that the participants reported using it suggests that they linked their meaning deconstruction with an intuitive sense of correctness instead of a deliberate strategy. This is consistent with the findings from the pilot study, where participants reported relying on implicit understanding during meaning deconstruction on their own accord. Thus, while non-English majors engaged in explicit, analytical processing, English majors tended to lean towards implicit, integrative processing. As CIT posits that meaning construction consists not only of identifying input spaces but also of blending them into a coherent emergent structure, it is possible that English majors, with their advanced ESL training, may be more adept at constructing blends rather than deconstructing them into input spaces. They might be more accustomed to observing blended spaces holistically rather than decomposing them into components, which would explain their lower recognition rate but higher explanation rate of input spaces. As CIT posits that successful blending requires both the identification of the input spaces and their recombination into a new meaning, and as the ability to recognize the input spaces relates to structural awareness, whereas explaining the meaning brought by input spaces involves conceptual mapping and integration, it cannot be decisively stated which group displayed higher level of successful blending, since neither group scored higher in both the recognition and the explanation of the input spaces.

The correlation analysis served to further contextualize these trends, revealing relationships amongst the duration of ESL study, cognitive strategy use, and the ability to recognize and coherently explain the input spaces. Despite our initial hypothesis that the duration of ESL study would positively correlate with recognition scores, they correlated negatively, albeit at a moderate value ($r=-0.35$), meaning that the participants were less likely to recognize the input spaces the longer they studied ESL. However, as discussed previously in this section, there is a possibility that longer-term ESL learners pay decreased attention to individual lexical components of blends, leading to lower recognition scores, due to being accustomed to relying less on explicit recognition strategies. The duration of ESL study showed a weak correlation ($r=0.22$) with the total number of strategies used, revealing that longer-term ESL learners tend to employ a wider range of cognitive strategies. This finding supports the idea that extended exposure to L2 develops more diverse approaches to meaning construction, although it is in no way conclusive, as the correlation coefficient was rather low. Out of all the strategies, the duration of ESL study displayed the highest positive correlation with figurative language processing ($r=0.20$) and implicit learning ($r=0.17$), although the correlation coefficients were very weak: these results imply that learners with longer ESL exposure were more proficient in inferring meaning through metaphorical and contextual reasoning, rather than through explicit breakdown of meaning.

Additionally, overall strategy use was compared with individual strategies, as well as with the ability to explain input spaces, so as to identify any potential patterns hinting at their interconnectedness. Since implicit learning was included, which differs from other strategies by operating subconsciously, its reported usage in the study suggests that intuitive processing is activated in meaning deconstruction. While it is not a strategy in the same sense as syntactic analysis or elaboration, its presence in participants' responses implies that learners perceive subconscious linguistic assimilation as a cognitive mechanism. Its inclusion was the direct result of the pilot study findings, as it was necessary to provision for its role in meaning deconstruction due to the pilot study participants independently reporting having relied on intuition during the explanation of input space meanings. The results demonstrated that strategy use is not isolated, and that there are cognitive interdependencies in the approach to meaning deconstruction. The correlation analysis showed a high degree of positive correlation for mental imagery ($r = 0.60$), elaboration ($r = 0.53$), and parsing ($r = 0.53$), as well as for implicit learning ($r = 0.52$) and morphological analysis ($r = 0.51$). It follows that learners who reported using a higher number of strategies were more likely to use these five strategies. A moderate level of correlation was found for syntactic analysis ($r=0.44$), semantic networking ($r=0.40$) and, to a slightly lesser degree, figurative language processing ($r=0.33$), which suggests that these three strategies function as secondary mechanisms in meaning deconstruction, not as universally used as mental imagery, elaboration, parsing, implicit learning, and morphological analysis. Visualization ($r = 0.29$), contextual analysis ($r = 0.25$), and schema activation ($r = 0.22$) displayed the weakest correlation with total strategy use, which implies that they were used more selectively and triggered situationally rather than consistently as a part of learners' strategy repertoire. Lastly, the total explanation score showed a moderate positive correlation with the total number of used strategies, which indicates that, while using more strategies does not guarantee a better ability to recognize input spaces, it implies that a higher number of strategies used may facilitate meaning deconstruction.

5.2. Limitations and Future Research Directions

It must be noted that this study was not without some significant limitations, and therefore, its implications cannot be taken as conclusive until replicated with a greater level of confidence. To start off, the sample was not representative of a larger population, as we had used convenience sampling from a single faculty. Not only was the sample convenient, but it was also small ($n=72$), which reduces the statistical power of the results. Additionally, there is a possibility of selection bias since the non-English major students willing to participate may differ from the general population. Also, as the participants were sorted into groups based on whether they were majoring in English or not, we did not make a distinction within the non-English major group based on their specific field of study. Even though the non-English major group might have contained students majoring in other languages alongside students from non-philological disciplines, we had decided that including an additional variable (i.e. the participants' major) would have rendered the statistical analysis needlessly complex for the anticipated length of this thesis. However, subsequent research could examine the differences between philological and non-philological students to ascertain whether linguistic background outside of English major influences the ability to deconstruct blends.

In addition to sample limitations, there were also some methodological concerns. One major limitation was the lack of multiple testing correction for correlation analyses: the exploratory nature of our correlation analysis across 11 cognitive strategies inherently increases family-wise errors, an unfortunate limitation of multidimensional studies (Steiner, 2009). Although our findings provide potential trends, there is a risk of false positives, thus requiring replication with appropriate corrections for multiple comparison, as well as a representative sample, in future research. Furthermore, as the cognitive strategy use was self-reported, it was susceptible to recall bias; as we have mentioned in section 5.1, questionnaire design issues might have affected the recognition scores. The study emphasizes the value of a pilot study, allowing for empirical feedback to shape methodological choices; however, despite having conducted an unofficial pilot study, which led us to revise the original questionnaire, some unintended issues in the questionnaire may have persisted. As already mentioned in section 3.2, we had initially designed Q3 (strategy section) of the questionnaire as an open-ended question requiring participants to describe their thought process when interpreting blends. However, pilot participants reported difficulty distinguishing Q2 (explaining the meaning brought by each input space) from Q3 (describing how they arrived at their answers to Q2). To address that issue, we converted Q3 into a multi-choice format, thereby allowing the participants to select predefined strategies that best matched their thought process, thus also limiting the number of strategies. Even though this revision reduced ambiguity and ensured response reliability, it also simplified complex cognitive strategies into categorical answers in plain language. Thus, this approach might have overlooked nuanced interactions between strategies, not capturing the full complexity of cognitive processing in blend interpretation. Finally, another limitation was the lack of response time analysis, which could have provided additional insight into the way the participants approached blend recognition and explanation or if they spent more time focusing on certain blends.

This study's value is found in exploring new hypotheses instead of adhering to explicit conclusions regarding strategy use and efficacy: while our data seem to indicate cognitive strategy use patterns, we caution against overinterpreting these differences given the study's limitation. However, it could serve as inspiration for future research, which should aim to include a larger and more diverse participant pool, thus improving the generalizability of the findings and facilitating determining whether the trends apply across different populations. Ensuring that participants come from various linguistic and cultural backgrounds might help determine if blend interpretation and strategy use are influenced by cultural factors. Comparative studies could try to ascertain whether learners from different L1 backgrounds approach blend recognition and explanation differently. Another promising direction would be to test whether explicitly teaching cognitive strategies (e.g. mental imagery, elaboration, or schema activation) improves recognition and explanation abilities, where controlled experiments could measure the impact of specific strategy training on blend comprehension.

6. Conclusion

This study examined how English major and non-English major undergraduates differ in their ability to recognize and explain input spaces in conceptual blending, as well as their use of cognitive strategies during meaning deconstruction. The findings revealed significant differences in the way that the two groups approach meaning deconstruction of conceptual blends. Contrary to our initial hypothesis, non-English majors displayed a higher frequency of recognizing input spaces (M=9.16 vs. 8.09) than English majors; however, the latter group expectedly outperformed the former in explaining the contributions of the input spaces to the blended space (M=7.17 vs. 5.73). These findings suggest that non-English majors perform better in input-space identification and breaking down blends into constituent parts without deeper analysis, thereby being more adept at composition-phase mechanics of the blending process, while English majors excelled in their ability to "run the blend" (Fauconnier & Turner, 2002), displaying advanced elaboration-phase skills.

The results illustrated that specialized linguistic training affects cognitive strategy use: English majors reported broader strategy repertoires (M=22.74 vs. 18.11), with preferences for strategies requiring holistic conceptual integration, while non-English majors tended to use explicit decomposition strategies, reflecting a more surface-level analytical approach. This aligns with CIT's emphasis on expertise-dependent blending processes: advanced learners prioritize emergent meaning simulation over mechanical component analysis. The negative correlation between ESL study duration and recognition scores (r=-0.35) suggests that, as proficiency increases, learners may unconsciously deprioritize explicit input-space identification. However, the positive correlation with strategy diversity (r=0.22) implies that prolonged L2 exposure positively affects cognitive flexibility, albeit at the potential cost of structural awareness.

Finally, this study contributes to understanding how linguistic training shapes cognitive processing patterns. The findings validate CIT's distinction between composition (input-space identification) and elaboration (meaning simulation), showing that advanced learners are less likely to use mechanical decomposition, preferring instead holistically approaching the composition of the blend. While this study offers new observations, its limitations—including a homogeneous sample of Croatian undergraduates and reliance on self-reported strategy data—warn us not to overgeneralize. Future research should employ mixed methods to triangulate strategy use and expand cross-linguistic comparisons to determine cultural influences on blend interpretation. Longitudinal studies tracking strategy development across proficiency levels could elucidate how expertise alters conceptual integration patterns. Additionally, testing the efficacy of strategy training could contribute important information to empirical pedagogical practices.

7. Appendix

Below is the questionnaire used as the instrument for this study, in the sequence it was presented to the participants. The preamble and guidance for the participants is highlighted in gray. In the case of text selection questions, the choices were presented in the rightmost column. The leftmost column serves to increase readability, as every cell in it corresponds with a page in the questionnaire.

<table>
<tr><th colspan="2">Question</th><th>Choice answer (if any)</th></tr>
<tr><td colspan="3">Cognitive Strategies and Conceptual Integration
Dear Participant,
Thank you for taking the time and effort to participate in this study. The purpose of this research is to investigate the conceptual integration abilities of undergraduate students. Your insights will contribute to our understanding of how language background and education influence the ability to reconstruct the path to the emergent meaning of blended language items.
Please be assured that your participation in this study is voluntary, and all your responses will be anonymous and confidential. No personally identifiable information will be collected, and the data will be used solely for research purposes.
Read each question carefully before answering. For multiple-choice questions, please select the most appropriate option(s). For open-ended questions, provide your answer in the space provided. Please answer all questions honestly and to the best of your ability. Take your time to complete the questionnaire but try not to overthink your answers. Once you have completed the questionnaire, please submit your responses.</td></tr>
<tr><td rowspan="4">DEMOGRAPHIC INFORMATION</td><td>What is your native language?</td><td>- Croatian
- Other</td></tr>
<tr><td>Are you a student at the Faulty of Humanities and Social Sciences, University of Zagreb?</td><td>- Yes
- No</td></tr>
<tr><td>What is your current academic level?</td><td>- Undergraduate
- Graduate
- Postgraduate</td></tr>
<tr><td>What are you currently majoring in?</td><td>- English
- Other</td></tr>
</table>

<table>
<tr><td></td><td>How many years have you been studying English, including your primary and secondary education? (Answer with a number)</td><td>[NUMERIC VALUE]</td></tr>
<tr><td colspan="3">BLEND ANALYSIS</td></tr>
<tr><td colspan="3">In this section, you will be provided with a list of expressions and their meanings. These expressions were created by combining different ideas or concepts. Your task is to think about the individual ideas within each expression and explain how they relate to the overall meaning. Please describe your thought process as you work through each expression.</td></tr>
<tr><td rowspan="4">COUCH POTATO</td><td colspan="2">Meaning: A person who spends a lot of time engaging in sedentary activities.</td></tr>
<tr><td>What words are combined in the expression “couch potato”?</td><td>[TEXTUAL VALUE]</td></tr>
<tr><td>Explain how these individual words help create the overall meaning of the expression (please write in full sentences).</td><td>[TEXTUAL VALUE]</td></tr>
<tr><td>Which strategy or strategies did you primarily use to connect the individual words or ideas to the overall meaning? Select the option(s) that best describe(s) your thought process:</td><td>- Used the context in which the expression was presented
- Related the expression to prior knowledge or experiences
- Broke down the expression into its individual parts
- Imagined situations where the expression could be used
- Relied on cultural references, traditions, or beliefs
- Used understanding of idiomatic expressions or metaphors
- Explored associations between the expression and other related concepts
- Relied on an intuitive understanding of language and context
- Analysed the structure of the words in the expression
- Focused on the grammatical structure of the expression
- Created mental images of the words and their relationships</td></tr>
</table>

<table>
<tr><td rowspan="4">BRAIN FREEZE</td><td colspan="2">Meaning: A sudden, sharp headache experienced when consuming something cold.</td></tr>
<tr><td colspan="2">What words are combined in the expression “brain freeze”?</td></tr>
<tr><td colspan="2">Explain how these individual words help create the overall meaning of the expression (please write in full sentences).</td></tr>
<tr><td>Which strategy or strategies did you primarily use to connect the individual words or ideas to the overall meaning? Select the option(s) that best describe(s) your thought process:</td><td>- Used the context in which the expression was presented
- Related the expression to prior knowledge or experiences
- Broke down the expression into its individual parts
- Imagined situations where the expression could be used
- Relied on cultural references, traditions, or beliefs
- Used understanding of idiomatic expressions or metaphors
- Explored associations between the expression and other related concepts
- Relied on an intuitive understanding of language and context
- Analysed the structure of the words in the expression
- Focused on the grammatical structure of the expression
- Created mental images of the words and their relationships</td></tr>
<tr><td rowspan="4">ARMCHAIR CRITIC</td><td colspan="2">Meaning: A person who offers opinions or criticism from a position of limited knowledge or experience.</td></tr>
<tr><td colspan="2">What words are combined in the expression “armchair critic”?</td></tr>
<tr><td colspan="2">Explain how these individual words help create the overall meaning of the expression (please write in full sentences).</td></tr>
<tr><td>Which strategy or strategies did you primarily use to connect the individual words or ideas to the overall meaning? Select the option(s) that best describe(s) your thought process:</td><td>- Used the context in which the expression was presented
- Related the expression to prior knowledge or experiences
- Broke down the expression into its individual parts</td></tr>
</table>

<table>
<tr><td></td><td></td><td>- Imagined situations where the expression could be used
- Relied on cultural references, traditions, or beliefs
- Used understanding of idiomatic expressions or metaphors
- Explored associations between the expression and other related concepts
- Relied on an intuitive understanding of language and context
- Analysed the structure of the words in the expression
- Focused on the grammatical structure of the expression
- Created mental images of the words and their relationships</td></tr>
<tr><td rowspan="4">BUTTERFINGERS</td><td colspan="2">Meaning: A person who frequently drops or mishandles objects.</td></tr>
<tr><td colspan="2">What words are combined in the expression “butterfingers”?</td></tr>
<tr><td colspan="2">Explain how these individual words help create the overall meaning of the expression (please write in full sentences).</td></tr>
<tr><td>Which strategy or strategies did you primarily use to connect the individual words or ideas to the overall meaning? Select the option(s) that best describe(s) your thought process:</td><td>- Used the context in which the expression was presented
- Related the expression to prior knowledge or experiences
- Broke down the expression into its individual parts
- Imagined situations where the expression could be used
- Relied on cultural references, traditions, or beliefs
- Used understanding of idiomatic expressions or metaphors
- Explored associations between the expression and other related concepts
- Relied on an intuitive understanding of language and context
- Analysed the structure of the words in the expression
- Focused on the grammatical structure of the expression</td></tr>
</table>

		- Created mental images of the words and their relationships
EAGER BEAVER	Meaning: A person who is enthusiastic and hardworking, sometimes excessively so.	
	What words are combined in the expression "eager beaver"?	
	Explain how these individual words help create the overall meaning of the expression (please write in full sentences).	
	Which strategy or strategies did you primarily use to connect the individual words or ideas to the overall meaning? Select the option(s) that best describe(s) your thought process:	- Used the context in which the expression was presented - Related the expression to prior knowledge or experiences - Broke down the expression into its individual parts - Imagined situations where the expression could be used - Relied on cultural references, traditions, or beliefs - Used understanding of idiomatic expressions or metaphors - Explored associations between the expression and other related concepts - Relied on an intuitive understanding of language and context - Analysed the structure of the words in the expression - Focused on the grammatical structure of the expression - Created mental images of the words and their relationships

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