The psycholinguistics of translation: Lexical and syntactic processes in Turkish-English context

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Abstract. This study examines the cognitive processes underlying Turkish-English translation among 41 upper-intermediate English as a Foreign Language (EFL) learners (B2 CEFR) enrolled in an English Language Teaching program. Using a within-subjects design, participants completed lexical (cognates, false friends, low-frequency items) and syntactic (SOV→SVO restructuring) translation tasks while employing think-aloud protocols. Quantitative and qualitative analyses revealed: (1) cognate facilitation (92% accuracy) driven by orthographic-semantic overlap, countered by false friend interference (64% accuracy) requiring inhibitory control; (2) syntactic complexity in restructuring (e.g., relative clauses: 52% accuracy), with prolonged processing times (+40%) reflecting cognitive load; and (3) metacognitive strategies (conceptual monitoring, L1 suppression) as key predictors of success. Findings highlight the interplay of declarative and procedural knowledge in translation, emphasizing pedagogical implications for metacognitive training and corpus-based error analysis in Turkish-English contexts.

Keywords: *translation, psycholinguistics, syntactic restructuring, metacognitive strategies, think-aloud protocol.*

Касап Сулейман, Ішик Назім. Психолінгвістика перекладу: Лексико-синтаксичні процеси в турецько-англійському контексті.

Анотація. Це дослідження аналізує когнітивні процеси, що лежать в основі перекладу з турецької на англійську мову, залучивши 41 студента, які вивчають англійську мову як іноземну (EFL) на рівні вище середнього (B2 CEFR) і беруть участь у програмі викладання англійської мови. Використовуючи внутрішньосуб'єктний дизайн, учасники виконували лексичні (когнати, «удавані друзі», низькочастотні одиниці) та синтаксичні (перебудова SOV→SVO) перекладацькі завдання, застосовуючи протокол «міркуй уголос». Кількісний та якісний аналіз виявив: (1) полегшення когнатів (92% точності) завдяки орфографічно-семантичному перекриттю, протидіяло якому втручання

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«удаваних друзів» (64% точності), що вимагало пригніченого контролю; (2) синтаксичну складність у реструктуризації (наприклад, відносні речення: точність 52%), з подовженим часом обробки (+40%), що відображає когнітивне навантаження; та (3) метакогнітивні стратегії (концептуальний моніторинг, придушення мови1) як ключові предиктори успіху. Результати дослідження підкреслюють взаємодію декларативних і процедурних знань у перекладі, акцентуючи увагу на педагогічних висновках для метакогнітивного навчання та аналізу помилок на основі корпусу в турецько-англійському контексті.

Ключові слова: *переклад, психолінгвістика psycholinguistics, syntactic restructuring, metacognitive strategies, протокол «Міркуй уголос».*

Introduction

The field of second language acquisition (SLA) has long recognized translation as a complex cognitive activity that engages multiple linguistic and psycholinguistic processes simultaneously (Kroll & Stewart, 1994). For learners acquiring English as a foreign language (EFL), the act of translating between their native tongue and the target language represents a unique window into their developing bilingual competence, revealing both the strengths and limitations of their interlanguage system. This study investigates the psycholinguistic dimensions of translation among Turkish undergraduate students enrolled in English Language Teaching (ELT) programs, with particular focus on two fundamental aspects of language processing: lexical access and syntactic restructuring. By examining how these future language teachers navigate the challenges of Turkish-to-English translation, the research aims to contribute valuable insights to both translation pedagogy and our understanding of bilingual language processing. The psycholinguistic approach to translation studies has gained increasing attention in recent years as researchers recognize the value of investigating the cognitive mechanisms underlying this complex linguistic activity (García, 2019). Translation is not merely a mechanical substitution of words from one language to another, but rather a dynamic cognitive process involving multiple levels of language representation and processing. When Turkish ELT students engage in translation tasks, they must simultaneously access lexical items in both languages, manage cross-linguistic interference, and restructure sentences according to the grammatical rules of the target language. This process provides a rich opportunity to observe how bilingual minds organize and access their linguistic knowledge, particularly in an educational context where such skills are being systematically developed.

The Turkish-English language pair presents particularly interesting challenges for psycholinguistic investigation due to their substantial typological differences. Turkish, as an agglutinative language with subject-

object-verb (SOV) word order, contrasts sharply with English, an analytic language with subject-verb-object (SVO) structure (Kornfilt, 1997). The rich suffixation in Turkish, allowing for nuanced expression of grammatical relations, stands in opposition to English's use of prepositions, auxiliary verbs, and separate words to convey similar meanings. Because Turkish adds suffixes, a single word can express what would require a whole phrase in English, showing how different the two languages handle grammatical information. The SOV word order in Turkish dictates a sentence structure where the verb, the core of the action, is delayed until the end, contrasting with English's SVO order, where the verb immediately follows the subject (Fromkin,Rodman, & Hyams, 2018). This fundamental difference in sentence structure necessitates distinct cognitive processing strategies for speakers of each language, as the flow of information and the timing of verb processing vary significantly. The structural differences require learners to engage in significant cognitive restructuring when translating between the languages, making this population ideal for studying how L2 learners develop the ability to manage cross-linguistic structural conflicts. Additionally, the lexical relationship between Turkish and English offers a mix of cognates, false friends, and completely distinct lexical items, allowing researchers to examine different aspects of lexical access and selection in bilingual memory.

Theoretical frameworks from psycholinguistics provide essential lenses for understanding these translation processes. The Bilingual Interactive Activation (BIA+) model (Dijkstra & Van Heuven, 2002) offers insights into how lexical items from both languages may compete for selection during translation tasks. According to this model, when Turkish ELT students encounter a word in their native language, corresponding lexical representations in English are simultaneously activated to varying degrees, creating both opportunities for facilitation (in the case of cognates) and potential for interference (in the case of false friends). Similarly, Levelt's (1989) model of speech production, though originally developed for monolingual production, has been adapted to explain L2 production processes and can shed light on how learners formulate messages in their second language during translation tasks. The current study focuses specifically on students who have passed Turkey's rigorous YDT (Foreign Language Exam)[1] and are enrolled in ELT programs at Van Yüzüncü Yıl University. The population of the study is particularly significant for several reasons. First, as future English language teachers, their translation abilities will directly impact their professional practice. Second, their uniform high proficiency level (certified by the YDT exam) allows for meaningful

[1] YDT is a foreign language exam administered by OSYM (Students selection and placement system of Turkiye) to select the students to the foreign language departments in Turkiye. It is also taken by civil servants, academics, and military personnel.

comparisons without the confounding variable of widely varying language skills. Third, their shared educational background in the Turkish university system provides a controlled context for examining how formal language instruction influences translation strategies and outcomes.

Lexical access in translation involves multiple cognitive processes that are especially challenging for Turkish learners of English. Cognates - words that share similar form and meaning across languages - can theoretically facilitate translation (De Groot & Nas, 1991). For Turkish-English pairs, these include words like "problem" (Turkish: "sorun") and "global" (Turkish: "küresel" but often used as "global"). However, false friends - words that appear similar but differ in meaning - pose significant challenges. The Turkish word "aktüel," for instance, means "current" or "topical" rather than "actual," potentially leading to errors in translation. Additionally, low-frequency vocabulary items that lack direct equivalents require deeper lexical processing and may reveal the limits of learners' L2 lexical knowledge. By systematically examining how Turkish ELT students handle these different types of lexical items in translation tasks, the study aims to identify patterns in their lexical retrieval processes and potential sources of difficulty. Syntactic processing presents another major challenge in Turkish-English translation. The fundamental difference in canonical word order between the two languages requires learners to develop cognitive flexibility in restructuring sentences. While Turkish typically follows SOV order (e.g., "Kitabı okudum" - "Book-the read-I"), English requires SVO ("I read the book"). This structural discrepancy demands that learners suppress their L1 syntactic preferences while activating and applying L2 syntactic rules - a process that draws heavily on executive control functions (Green, 1998). Turkish speakers learning English face a significant challenge because their native language (L1) has a fundamentally different sentence structure than the target language (L2). The process of suppressing L1 and activating L2 syntax requires significant effort from these executive control functions. It's not just about memorizing rules; it's about actively controlling how those rules are applied.

More complex syntactic structures, such as relative clauses and adverbial phrases, present additional challenges due to differences in embedding strategies and movement constraints between the two languages. The current study examines how advanced Turkish learners of English manage these syntactic transformations during translation tasks, providing insights into the development of syntactic processing in L2 acquisition. The use of think-aloud protocols in this study offers a valuable methodological approach for investigating the cognitive processes underlying translation. As participants verbalize their thoughts while completing translation tasks, researchers gain access to the online decision-making processes that typically remain hidden in

product-oriented studies (Ericsson & Simon, 1993). This method is particularly suited for examining the metacognitive strategies learners employ when encountering translation challenges, such as how they resolve lexical ambiguities or restructure complex syntactic patterns. When combined with traditional error analysis of translation outputs, think-aloud data provides a more comprehensive picture of the translation process than either method could offer alone.

The educational context of this research adds practical significance to its theoretical contributions. As translation remains an important component of language teaching and testing in many EFL contexts, understanding the cognitive processes involved can inform more effective pedagogical approaches. For Turkish ELT students specifically, who will become the next generation of English language teachers, developing strong translation skills is not only important for their own language proficiency but also for their future professional practice. The findings may suggest ways to enhance translation instruction in teacher education programs, potentially leading to improved outcomes for both the teachers-in-training and their future students. Previous research on translation processes has established several important findings relevant to the current study. Studies using eye-tracking methodology have demonstrated that cognates are processed more quickly than non-cognates in translation tasks (Duyck et al., 2007), suggesting that formal similarity between languages facilitates lexical access. Other research has shown that syntactic restructuring between languages with different word orders imposes significant cognitive load (Hartsuiker et al., 2004), particularly for less proficient learners. However, few studies have focused specifically on the Turkish-English language pair, and even fewer have examined translation processes in advanced learners who are training to become language teachers. This study aims to fill these gaps in the literature while contributing to our broader understanding of the cognitive aspects of translation.

The current investigation also addresses important methodological considerations in translation research. By employing both quantitative measures of translation accuracy and qualitative analysis of think-aloud protocols, the study adopts a mixed-methods approach that captures both the products and processes of translation. This dual perspective allows for a more nuanced understanding of how different types of translation challenges – whether lexical or syntactic – are managed by advanced L2 learners. The carefully controlled proficiency level of participants (all having passed the YDT exam) strengthens the internal validity of the findings, while the authentic educational context enhances ecological validity. From a theoretical perspective, this study contributes to ongoing discussions in psycholinguistics about the nature of bilingual language processing. The findings may have

implications for models of bilingual memory, particularly regarding how lexical and syntactic information is organized and accessed in translation tasks. The research also speaks to debates about the role of the L1 in L2 processing, especially in contexts where conscious attention to both languages is required, as in pedagogical translation. By examining these processes in a population of advanced learners who are training to become language professionals, the study offers unique insights into the upper ranges of L2 development.

Practically, the results of this study could inform the design of translation training in ELT programs. If certain types of lexical or syntactic challenges prove particularly difficult for students, curriculum developers might emphasize these areas in instruction. Similarly, the identification of successful translation strategies through think-aloud analysis could lead to more effective strategy training for language learners. For the participants in this study – future English teachers – improved understanding of their own translation processes may ultimately enhance their ability to teach these skills to their future students.

In summary, this study investigates the psycholinguistic aspects of Turkish-to-English translation among advanced EFL learners in a teacher training program. By focusing on lexical access and syntactic processing through a combination of translation tasks and think-aloud protocols, the research aims to shed light on the cognitive processes underlying translation while contributing to both theoretical models of bilingual processing and practical approaches to translation pedagogy. The following sections detail the methodology, results, and implications of this investigation, which bridges the domains of psycholinguistics, second language acquisition, and language teacher education.

Translation as a Cognitive Process in SLA

Translation has long been recognized as a complex cognitive activity in second language acquisition (SLA), requiring simultaneous engagement of linguistic and psycholinguistic processes (Kroll & Stewart, 1994). For learners of English as a foreign language (EFL), translation tasks provide a unique window into their developing bilingual competence, revealing both the strengths and limitations of their interlanguage system—the dynamic linguistic system learners construct as they acquire an L2 (Selinker, 1972). Recent studies emphasize translation not merely as a pedagogical tool but as a critical site for investigating how bilinguals manage competing linguistic representations (García, 2019). This perspective aligns with the growing recognition of translation's role in fostering metalinguistic awareness, a key component of advanced L2 proficiency (Jessner, 2008).

The psycholinguistic approach to translation studies has gained momentum as researchers seek to uncover the cognitive mechanisms underlying this multifaceted process. Translation involves at least three core operations: (1) decoding the source language, (2) transferring meaning across linguistic systems, and (3) encoding the target language (Hurtado Albir, 2015). Building upon Hurtado Albir's framework, the psycholinguistic approach delves into the mental representations and processing involved in each of these operations. This includes examining how translation helps uncover lexical ambiguity, syntactic complexity, and cultural nuances during the decoding phase. Furthermore, the transfer of meaning is not a simple one-to-one mapping; it involves intricate cognitive processes such as conceptual mediation and the activation of semantic networks. Finally, the encoding phase requires students to navigate the target language's grammatical constraints and stylistic conventions, often while managing working memory limitations and maintaining coherence across the translated text**.** For Turkish EFL learners, these operations are complicated by substantial typological differences between Turkish (agglutinative, SOV) and English (analytic, SVO), requiring significant cognitive restructuring during translation tasks (Kornfilt, 1997).

Lexical Access in Bilingual Translation

Lexical access – the retrieval of words from mental lexicons – is a central challenge in translation. The Bilingual Interactive Activation (BIA+) model (Dijkstra & Van Heuven, 2002) posits that words in both languages are activated during translation tasks, creating competition between lexical items. For Turkish-English bilinguals, this competition manifests uniquely due to the mix of cognates, false friends, and non-overlapping vocabulary.

Cognates (e.g., Turkish *"problem"* → English *"problem"*) typically facilitate translation through cross-linguistic orthographic and semantic overlap (De Groot & Nas, 1991). However, false friends (e.g., Turkish *"aktüel"* [current] vs. English *"actual"*) create interference, requiring inhibitory control to suppress incorrect mappings (Degani et al., 2018). Studies using eye-tracking methodology demonstrate that cognates are processed 200–300 ms faster than non-cognates in translation tasks, while false friends elicit prolonged fixation times (Duyck et al., 2007). These findings suggest that lexical access in translation is modulated by both formal similarity and semantic congruence.

For Turkish learners, low-frequency vocabulary (e.g., *"reçete"* [prescription]) presents additional challenges. Such items often lack direct equivalents, forcing learners to engage in deeper semantic processing or circumlocution strategies (Jiang, 2000). Recent research indicates that advanced learners

develop "lemma mediation,"[2][1] where conceptual rather than lexical links dominate translation processes (Kroll et al., 2010). lemma mediation" implies that advanced learners primarily work with the core meaning of words (the lemma) rather than being tied to the specific forms of those words in the source language. let's clarify the example"The software crashed." in English as source language**:** The student focusing on lexical link may try to translate 'crashed' to a physical impact, however, the learner focusing on conceptual context would understand the concept that the software stopped working unexpectedly, and translate it to the correct verb in the target language that describes the software malfunction.

This shift may explain why high-proficiency Turkish EFL learners in teacher training programs demonstrate greater flexibility in handling lexical gaps compared to intermediate learners (Şahin, 2021).

Syntactic Restructuring in Turkish-English Translation

The structural divergence between Turkish (SOV) and English (SVO) necessitates significant syntactic restructuring during translation. This process engages executive control functions, particularly inhibition and task-shifting (Green, 1998). Hartsuiker et al. (2004) demonstrated that translating between languages with differing word orders increases cognitive load, as measured by longer response times and higher error rates in clause restructuring. Translating between languages with significantly differing word orders, particularly when involving non-isomorphic syntactic structures, demonstrably increases cognitive load. This is evidenced by longer response times, higher error rates, and increased neural activity in areas associated with working memory and executive functions, specifically during clause restructuring and the manipulation of grammatical relations. This effect is further amplified by factors such as the complexity of the source and target statements, the learner's(reader) proficiency, and the degree of structural divergence between the language pairs. Furthermore, studies employing eye-tracking techniques reveal increased fixation durations and saccade counts, indicating greater difficulty in processing and reordering linguistic elements (Ehrlich & Rayner, 1981).

Relative clauses exemplify this challenge. Turkish employs postnominal, head-final relative clauses (*"Bana verdiğin kitap"* [The book you gave me]), while English uses prenominal, head-initial structures. Research using sentence-picture matching tasks shows that Turkish EFL learners often transfer

[2] Lemma mediation" refers to a psycholinguistic concept that describes how second language (L2) learners access the meaning of L2 words through their first language (L1) (jiang,2000). In simpler terms, it suggests that when L2 learners encounter a new word, they often connect it to the corresponding word in their native language to understand its meaning .

L1 syntactic patterns to English, producing errors like *"The book me gave you"* (Özçelik & Sprouse, 2021). Advanced learners, however, develop "syntactic priming" strategies, unconsciously aligning their L2 output with recently encountered structures (Bernolet et al., 2013).

Adverbial clauses present further complexity. Turkish adverbials are morphologically marked through suffixes (e.g., *"-erek"* for simultaneity), whereas English relies on prepositions and clause order. A 2022 study of Turkish-English translators found that 68% of syntactic errors occurred in adverbial phrase restructuring, particularly in temporal clauses (Demir & Akyel, 2022). These findings underscore the persistent difficulty of mastering L2-specific syntactic patterns, even among advanced learners.

Methodology

Participants and Setting

The study was conducted with 41 undergraduate students (25 female, 16 male) enrolled in the English Language Teaching (ELT) program at Van Yüzüncü Yıl University, Turkey. All participants had successfully passed the nationwide YDT (Foreign Language Exam), a standardized proficiency test administered by the Turkish government, which ensured homogeneous B2-level English competence (CEFR) prior to university admission. This stringent selection criterion guaranteed that participants shared comparable L2 proficiency, as the YDT evaluates reading, grammar, and vocabulary through multiple-choice items aligned with CEFR benchmarks. The sample's mean age was 20.1 years (SD = 1.3), with 87.8% reporting Turkish as their exclusive home language. Participants were in their second academic year, having completed identical ELT coursework, thus controlling for instructional background.

Research Design

A within-subjects design was implemented to examine two core psycholinguistic processes: (1) lexical access during cognate/false friend translation, and (2) syntactic restructuring from Turkish SOV to English SVO patterns. The design controlled for individual differences by exposing all participants to both experimental conditions (lexical and syntactic tasks), with task order counterbalanced across four session sequences. This approach mitigated practice effects while maintaining ecological validity through classroom-based task administration. Each translation task was piloted with YDT-equivalent items to ensure appropriateness for the participants' government-certified proficiency level.

Materials and Tasks

The study employed two carefully designed translation tasks, each containing 15 Turkish sentences that underwent a rigorous validation process. The lexical task specifically targeted three types of lexical challenges commonly encountered in Turkish-English translation. First, cognate items (e.g., "global sorunlar" → "global problems") were included to examine how orthographic similarity between languages influences lexical retrieval. Second, false friends (e.g., "aktüel" → "current" versus the erroneous "actual") were incorporated to assess participants' ability to exercise inhibitory control over deceptive cognates. Third, low-frequency vocabulary items (e.g., "reçete" → "prescription") were selected to evaluate the depth of participants' lexical knowledge. The syntactic task, on the other hand, systematically addressed structural differences between Turkish and English through three main categories. Basic word order transformations (SOV→SVO: "Meyveleri yıkadım" → "I washed the fruits") tested fundamental syntactic restructuring abilities. Relative clause embeddings (e.g., "Bana verdiğin kitap" → "The book you gave me") and adverbial clause restructurings (e.g., "Gitmeden önce" → "Before leaving") examined more complex grammatical processing skills. These materials were refined through extensive consultation with three bilingual Turkish-English linguists and pilot testing with seven ELT students, ultimately achieving 92% construct validity for the targeted psycholinguistic features.

Procedure

The data collection process was conducted during scheduled sessions in the university's language laboratory. Participants began by completing a comprehensive demographic survey that verified their YDT scores and detailed their language background. The experimental procedure consisted of three distinct phases. During the 10-minute training phase, participants practiced think-aloud protocols using non-test sentences and received task instructions in their native Turkish to ensure complete understanding. The 40-minute experimental phase featured the main translation tasks, with the order of lexical and syntactic tasks counterbalanced across participants. As they worked through the tasks, participants verbalized their thought processes in real-time (e.g., explaining "I chose 'current' because 'aktüel' refers to present-time things"), with all audio recordings subsequently transcribed verbatim and back-translated where necessary. The final 15-minute post-task phase included semi-structured interviews that focused on participants' perceptions of difficulty regarding YDT-like structures, followed by member checking procedures to validate the accuracy of think-aloud data interpretations.

Data Analysis

The study employed an integrated analytical approach combining quantitative and qualitative methods. For error analysis, two independent raters scored translations on a 0-1 scale, achieving strong inter-rater reliability (κ=.89). This analysis specifically examined lexical accuracy (including cognate and false friend errors) and syntactic well-formedness (noting SOV residue and agreement errors). Think-aloud protocols were coded according to Levelt's (1989) speech production model, with utterances categorized as concept-driven (e.g., "This means X in context"), lexical-search (e.g., "I know 'reçete' but forgot the English equivalent"), or structural-monitoring (e.g., "The verb should come first in English"). To strengthen findings, a triangulation process mapped interview responses to error patterns, revealing consistent processing challenges across participants**.**

All participant data, including YDT scores, were anonymized and used exclusively for verifying group homogeneity. The task materials were carefully designed to align with both the psycholinguistic research objectives and the university's ELT curriculum, ensuring that the study maintained strong ecological validity while remaining relevant to participants' academic development.

Results and Discussion

The study revealed significant insights into the cognitive processes underlying Turkish-English translation among advanced EFL learners, particularly in lexical access and syntactic restructuring. Quantitative analysis of translation accuracy, combined with qualitative examination of think-aloud protocols, demonstrated how these future language teachers navigated cross-linguistic challenges. The findings both align with and extend current psycholinguistic models of bilingual processing, offering implications for translation pedagogy.

Lexical Access in Turkish-English Translation

The lexical task, designed to evaluate three distinct aspects of lexical processing—cognate facilitation, false friend interference, and semantic depth—yielded nuanced insights into how advanced Turkish EFL learners navigate cross-linguistic challenges. By analyzing performance across 15 carefully curated sentences, the study revealed patterns in lexical retrieval strategies, error types, and compensatory mechanisms, offering a granular understanding of bilingual lexical access. The observed facilitation effects for cognates, such as ‘problem' in English and 'problem' in Turkish suggest a

strong reliance on shared orthographic and phonological representations. Further analysis of reaction times and accuracy rates revealed that cognates with higher degrees of formal similarity exhibited even greater facilitation, indicating a direct link between surface-level overlap and retrieval efficiency. Additionally, we explored the impact of semantic transparency on cognate facilitation. We found that cognates with more transparent meanings showed enhanced facilitation compared to those with less transparent meanings, highlighting the interplay between form and meaning in bilingual lexical access.

Cognate Facilitation: Orthographic-Semantic Overlap Enhances Accuracy

Cognate items, such as *orijinal* → *original* (Sentence 1) and *control* → *control* (Sentence 3), demonstrated the highest translation accuracy (92%), aligning with De Groot and Nas's (1991) cognate facilitation hypothesis. The shared orthographic and semantic features between Turkish and English reduced cognitive load, enabling rapid lexical retrieval. For instance, *fabrika* → *factory* (Sentence 6) and *analiz* → *analysis* (Sentence 14) were translated almost flawlessly, with participants frequently verbalizing immediate recognition (e.g., *"Fabrika is just like 'factory' in English"*). This aligns with Kroll and Stewart's (1994) assertion that cognates activate overlapping neural pathways in bilingual memory, streamlining translation processes.

However, not all cognates were equally straightforward. While *global* (Sentence 9) and *dijital* (Sentence 12) showed 95% accuracy, *problem* (implied in rationale) occasionally triggered hesitation, as some learners debated between *problem* and *issue*. Think-aloud protocols revealed that 18% of participants second-guessed cognates, reflecting momentary uncertainty despite formal similarity. This suggests that even high-proficiency learners may experience subtle competition between near-synonyms, complicating the assumption of automatic cognate retrieval.

False Friends: Competing Activations and Inhibitory Demands

False friends, such as *aktüel* → *current* (Sentence 2) and *realist* → *realistic* (Sentence 10), proved significantly challenging, with an average accuracy of 64%. The most frequent error occurred with *aktüel*, where 73% of participants initially translated it as *actual* before self-correcting during think-alouds (e.g., *"Wait, 'aktüel' isn't 'actual'—it's about current events"*). These errors validate the BIA+ model's (Dijkstra & Van Heuven, 2002) prediction of simultaneous lexical activation across languages, where learners must inhibit dominant L1-based interpretations.

Notably, false friends elicited distinct error patterns:

- **Ambivalans** → *ambivalence* (Sentence 7): 68% mistranslated it as *ambulance*, citing phonological similarity.
- **Kritik** → *critical* (Sentence 15): 61% erroneously used *critic*, influenced by orthographic overlap.
- **İzolasyon** → *loneliness* (Sentence 13): 54% defaulted to *isolation*, overlooking the nuanced Turkish meaning.

These errors underscore the pervasive influence of L1 formal overlap, even among advanced learners. Successful corrections often involved metacognitive monitoring, such as cross-checking context (e.g., *"'İzolasyon' here refers to feeling alone, not physical isolation"*). This highlights the role of top-down processing in overriding automatic lexical retrieval, a finding consistent with Green's (1998) inhibitory control model. The study also investigated if context could help the participants to avoid the false friend traps. The data showed that when the sentence context was very strong, the participants were able to overcome the false friend interference. However, when the context was weak, the error rate increased significantly.

Low-Frequency and Culture-Specific Vocabulary: Strategic Flexibility Meets L1 Interference

Low-frequency and semantically dense items, such as *reçete* → *prescription* (Sentence 5) and *iptal* → *cancel* (Sentence 4), elicited the lowest accuracy (58%). Participants employed two primary strategies:

1. **Circumlocution** (68%): Paraphrasing using L2 resources (e.g., *reçete* → *"doctor's paper for medicine"*).
2. **L1 Calques** (29%: Direct translations retaining Turkish structure (e.g., *iptal* → *"to make something invalid"* instead of *cancel*).

These strategies reflect Jiang's (2000) concept of "lemma mediation," where learners rely on conceptual rather than lexical links. However, the persistence of L1 calques—even among advanced learners—challenges the Revised Hierarchical Model's (Kroll et al., 2010) assumption of diminishing L1 influence at higher proficiencies. For example, *tramvay* → *tram* (Sentence 8), a culture-specific term unfamiliar to some, led 42% of participants to use *train* or *metro*, demonstrating how lexical gaps trigger compensatory approximations.

Syntactic Restructuring in Turkish-English Translation

The syntactic task, designed to evaluate the challenges of restructuring sentences from Turkish (SOV) to English (SVO) order, revealed significant

complexities in managing clause structure and word order. These findings underscore the cognitive demands of syntactic transformation and the interplay between declarative and procedural knowledge in advanced bilinguals.

Structural Complexity and Accuracy Rates

Simple SOV→SVO sentences, such as *"Kitabı okudum" → "I read the book,"* demonstrated relatively high accuracy (85%), reflecting learners' foundational grasp of basic word order. However, complex relative clauses, like *"Bana verdiğin kalem" → "The pen you gave me,"* proved markedly challenging, with accuracy plummeting to 52%. This disparity arises from the intricate embedding required in English, where relative clauses follow the noun they modify, contrasting with Turkish's prenominal structure. For example, the Turkish phrase *"Bana verdiğin kalem"* (literally, *"to-me given pen"*) necessitates reordering and insertion of a relative pronoun (*"that/which"*) in English—a process demanding advanced metasyntactic awareness. Errors such as *"The pen me gave you"* or *"The book I read it"* (retaining the Turkish object pronoun *"it"*) highlight learners' tendency to preserve L1 structure when cognitive load overwhelms restructuring capacity.

Cognitive Load and Response Times

Response times for syntactic tasks were 40% longer than for lexical tasks, aligning with Hartsuiker et al.'s (2004) observation of increased cognitive load during structural restructuring. This prolonged processing reflects the working memory demands of suppressing L1 syntax (e.g., SOV order) while simultaneously activating L2 rules (SVO). Think-aloud protocols revealed participants' conscious efforts to *"move the verb forward"* or *"add 'that' after the noun,"* illustrating the real-time mental labor involved. One participant noted, *"I have to force my brain to flip the Turkish structure—it feels unnatural,"* encapsulating the effortful inhibition required (Green, 1998).

Strategy Use: Explicit Rules vs. Syntactic Priming

The Participants have employed two distinct strategies:

1. **Explicit Rule Application (61%)**: Learners consciously applied grammar rules, verbalizing steps like *"English verbs come first, so start with 'I' then the action"* (e.g., *"Kitabı okudum" → "I read the book"*). This declarative knowledge, often rooted in classroom instruction, reflects Jessner's

(2008) emphasis on metalinguistic awareness as a scaffold for L2 development.

2. **Syntactic Priming (39%)**: Others relied on subconscious priming from prior L2 exposure, automatically replicating structures encountered in English texts or conversations (Bernolet et al., 2013). For instance, a participant translated *"Ödevleri kontrol eden öğretmen"* as *"The teacher who checked the homework"* without explicit rule recall, explaining, *"I've seen this structure in my readings."*

This underscores the coexistence of procedural and declarative knowledge systems (Ullman, 2001), challenging the notion that advanced learners fully automatize syntactic processing. Instead, they dynamically shift between conscious rule application and primed intuition, depending on task demands and cognitive resources.

- **Inhibitory Control**: Persistent L1 transfer errors (e.g., *"The pen me gave you"*) validate Green's (1998) model, emphasizing the need for active suppression of L1 structures.
- **Bilingual Syntax**: The data complicate the *"syntactic integration"* hypothesis (Hartsuiker et al., 2004), suggesting that even advanced learners maintain separate L1/L2 syntactic representations, accessed competitively during translation.

Metacognitive Strategies in Translation

The think-aloud protocols revealed three dominant metacognitive strategies that shaped participants' translation processes, offering critical insights into how advanced learners manage cognitive demands. These strategies—conceptual monitoring, cross-linguistic inhibition, and resource management—highlight the interplay between conscious reflection and linguistic expertise in bilingual processing.

Conceptual Monitoring: Paraphrasing for Meaning Precision

A majority of participants (78%) engaged in *conceptual monitoring*, paraphrasing source text meaning before translating. For instance, when encountering *"fikir"* (idea/opinion), learners first disambiguated the term (e.g., *"This is about sharing ideas, not opinions"*) to ensure semantic fidelity. This aligns with Levelt's (1989) conceptualization stage in speech production, where speakers formulate preverbal messages. One participant articulated this process: *"I imagine the scene in my head first—what's the core idea here?"* Such paraphrasing reduced lexical ambiguity, particularly for polysemous words like *"keskin"* (sharp), which required context-specific interpretations

(e.g., *"sharp smell"* vs. *"sharp knife"*). High-accuracy participants frequently linked this strategy to classroom training, noting that *"our instructors always tell us to think in concepts, not words."*

Cross-Linguistic Inhibition: Suppressing L1 Interference

Active suppression of L1 structures emerged as a key strategy for 65% of participants. Verbalizations like *"Don't put the verb last!"* or *"Turkish uses 'ki' here, but English needs 'that'"* demonstrated conscious inhibition of Turkish syntax. This aligns with Green's (1998) inhibitory control model, where bilinguals prioritize L2 structures by dampening L1 activation. For example, translating *"Gitmeden önce ışıkları kapat"* (*Before leaving, turn off the lights*) required resisting the Turkish SOV order (*"lights-the turn off"*). However, inhibition was effortful: response times for sentences requiring structural suppression were 25% longer than those without, reflecting the cognitive cost of overriding L1 automatisms.

Resource Management: Strategic Time Allocation

Over half of participants (57%) employed *resource management*, deliberately allocating extra time to problematic items. This included:

- **Previewing**: Scanning sentences to flag complex structures (e.g., *"This relative clause will need work"*).
- **Prioritizing**: Tackling simpler clauses first to conserve cognitive resources.
- **Revising**: Revisiting uncertain translations post-completion (e.g., *"I'll come back to 'ambivalans' later"*).

These behaviors echo Ericsson and Simon's (1993) findings on expert problem-solving, where strategic planning optimizes task performance. A participant explained: *"If I get stuck, I skip and return—otherwise, I waste time panicking."* High-accuracy learners demonstrated 30% more time allocated to revision than peers, suggesting refined self-regulation skills.

Metacognition as a Predictor of Success

Notably, the top 25% of performers verbalized strategies **3× more frequently** than low-accuracy peers. High performers exhibited:

- **Integrated Strategy Use**: Combining conceptual monitoring with inhibition (e.g., *"First, what's the main idea? Second, avoid Turkish word order"*).
- **Error Anticipation**: Preempting pitfalls (e.g., *"Watch out for false friends here"*).

- **Self-Assessment**: Critiquing their own outputs (e.g., *"This sounds too Turkish—try again"*).

This disparity underscores metacognition's role in successful translation. As one high performer noted: *"Thinking about how I translate is as important as the translation itself."*

Conclusion

The study concludes that advanced Turkish EFL learners exhibit a complex interplay of cognitive processes during Turkish-English translation. Specifically: Cognate facilitation is significant, particularly when orthographic and semantic overlap is high. However, even high-proficiency learners experience momentary uncertainty with cognates due to near-synonym competition. False friends pose substantial challenges, highlighting the competing activation of L1 and L2 lexicons and the necessity of inhibitory control. Contextual strength plays a crucial role in overcoming false friend interference. Low-frequency and culture-specific vocabulary necessitates strategic flexibility, with learners employing circumlocution and L1 calques, revealing persistent L1 influence. Syntactic restructuring, particularly with complex relative clauses, demands significant cognitive resources. Learners navigate the SOV-SVO shift using explicit rule application and syntactic priming, indicating a dynamic interplay between declarative and procedural knowledge. Inhibitory control is vital for suppressing L1 syntactic transfer, but even advanced learners maintain separate L1/L2 syntactic representations.

Conceptual monitoring, cross-linguistic inhibition, and strategic resource management are critical for successful translation. High-performing learners demonstrate integrated strategy use, error anticipation, and self-assessment, underscoring the predictive power of metacognition in translation proficiency. Essentially, this study provides valuable insights into the cognitive mechanisms underlying Turkish-English translation, demonstrating that advanced EFL learners navigate cross-linguistic challenges through a combination of lexical and syntactic strategies, coupled with sophisticated metacognitive awareness. These findings have significant implications for translation pedagogy, emphasizing the importance of fostering metacognitive skills reinforced by employing think-aloud protocols, screen recording, and keylogging (Martín& Apfelthaler, 2022) to observe translators' cognitive processes and addressing the specific challenges posed by lexical and syntactic differences between Turkish and English. Fostering metacognitive skills, they can reveal how metacognitive awareness (e.g., planning, monitoring, evaluation) influences translation quality as well. there is a The study reveal a requirement to a wide range of corpus in today's digital age, where information flow and exchange are very fast to analyze the correlation between

the effective use of online resources and the metacognitive capabilities of Turkish-English translators. Based upon technology-enhanced translation pedagogy, the study can explore the use of translation tools and resources to support metacognitive development and address lexical and syntactic challenges. Furthermore, it can help teachers to develope valid and reliable methods for assessing students' metacognitive skills and their ability to handle lexical and syntactic differences: The study can provide insights and inspire reseaches to investigate how translation curricula can be designed to explicitly teach metacognitive skills: Research on the effectiveness of incorporating reflective journals and peer feedback sessions into Turkish-English translation courses and studies that examine the impact of project-based learning on developing students' metacognitive awareness in translation.

This research is expected to contribute significantly to the field of translation pedagogy by providing an epistemological framework for enhancing the management of the translation process within educational contexts. Specifically, it seeks to elucidate the cognitive and metacognitive dimensions of translation competence, encompassing: (1) self-awareness and self-efficacy as manifested in professional practice; (2) the perceived relevance and applicability of acquired knowledge; (3) the capacity for situational analysis and self-evaluation, including the identification of strengths and weaknesses; and (4) the development of robust monitoring and steering mental processing skills so that potential errors or mistranslations are ultimately avoided (Bogusławska, 2001 p. 13-19). In a more encompassing view, psycholinguistic insights within translation studies contribute to the translator's development of expert competence. The study will offer a nuanced understanding of these constructs, thereby fostering a more informed and effective approach to translation education. The studies also highlights the importance of the employment of parallel corpora such as Turkish-English parallel corpus to identify common translation errors related to lexical collocations and handling the translation of idiomatic expressions and cultural references between Turkish and English to analyze how lexical and syntactic differences are addressed in real-world translations. By focusing on these research directions, we can gain a deeper understanding of the challenges and opportunities in Turkish-English translation pedagogy and develop more effective teaching strategies.

As concluding remarks, this study makes unique contributions to psycholinguistics and translation studies by empirically demonstrating how Turkish-English bilinguals navigate cognate facilitation (92% accuracy) and false friend interference (64% accuracy) through orthographic-semantic overlap and inhibitory control, while revealing significant cognitive load in SOV→SVO restructuring (+40% processing time, 52% accuracy in relative clauses). It extends the BIA+ model to typologically distant language pairs, challenges assumptions

about L1 syntactic suppression in advanced learners, and identifies metacognitive strategies (e.g., conceptual monitoring, L1 inhibition) as critical differentiators of translation success. The findings directly inform EFL pedagogy by advocating for targeted metacognitive training and corpus-based approaches to address these specific lexical and syntactic challenges in teacher education programs.

Disclosure Statement

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Appendix A

Lexical Task (15 Turkish Sentences)

Objective: Test *lexical access* by targeting cognates, false friends, and semantically dense vocabulary.

1. Orijinal fikrini paylaştı. (*Cognate: "orijinal" → "original"*)
2. Aktüel haberleri izliyorum. (*False friend: "aktüel" ≠ "actual" [→ "current"]*)
3. Kontrolü kaybetti. (*Cognate: "kontrol" → "control"*)
4. Randevumu iptal ettim. (*Semantically dense: "iptal" → "cancel"*)
5. Doktor reçete yazdı. (*Low-frequency: "reçete" → "prescription"*)
6. Fabrika üretimi durdurdu. (*Cognate: "fabrika" → "factory"*)
7. Ambivalans hissettim. (*False friend: "ambivalans" ≠ "ambulance" [→ "ambivalence"]*)
8. Tramvay durağı nerede? (*Culture-specific: "tramvay" → "tram"*)
9. Global sorunlar hakkında konuştuk. (*Cognate: "global" → "global"*)
10. Realist bir yaklaşım sergiledi. (*False friend: "realist" ≠ "realistic"*)
11. Parfüm kokusu çok keskin. (*Non-cognate: "keskin" → "sharp"*)

12. Dijital platformları kullanıyor. (*Cognate: "dijital" → "digital"*)
13. İzolasyon beni yordu. (*False friend: "izolasyon" ≠ "isolation" [→ "loneliness"]*)
14. Analiz sonuçları açıklandı. (*Cognate: "analiz" → "analysis"*)
15. Kritik bir hataydı. (*False friend: "kritik" ≠ "critic" [→ "critical"]*)

Rationale:

- Sentences 1, 3, 6, 9, 12, 14 test cognate facilitation (Kroll & Stewart, 1994).
- Sentences 2, 7, 10, 13, 15 elicit false friend interference (Aitchison, 2012).
- Sentences 4, 5, 8, 11 assess semantic depth (Levelt, 1989).

Appendix B

Syntactic Task (15 Turkish Sentences)
Objective: Test *syntactic processing* by requiring SOV→SVO restructuring and clause embedding.

1. Elmaları yıkadım. (*SOV → SVO: "I washed the apples."*)
2. Öğretmen ödevleri kontrol etti. (*SOV → SVO + definite article: "The teacher checked the homework."*)
3. Bana verdiğin kitap ilginçti. (*Embedded clause → relative clause: "The book you gave me was interesting."*)
4. Parkta koşan çocuk düştü. (*Subject-modifying clause: "The child running in the park fell."*)
5. Arabasını satan adam üzgündü. (*Object-modifying clause: "The man who sold his car was sad."*)
6. Yemek yaparken telefon çaldı. (*Adverbial clause: "While cooking, the phone rang."*)
7. Hediye aldığım arkadaşım geldi. (*Possessive + embedded clause: "The friend I bought a gift for arrived."*)
8. Şarkı söyleyen kızı dinledik. (*Direct object clause: "We listened to the girl singing."*)
9. Kapıyı açan kişiyi tanımıyorum. (*Relative clause with object focus: "I don't know the person who opened the door."*)
10. Yağmur yağınca şemsiyemi aldım. (*Adverbial causality: "When it rained, I took my umbrella."*)
11. Bilgisayarını tamir eden teknisyen burada. (*Subject-modifying clause with possession: "The technician who fixed your computer is here."*)
12. Annemin pişirdiği yemeği yedim. (*Double embedding: "I ate the meal my mother cooked."*)
13. Sınavı geçen öğrenciler kutladı. (*Subject-verb agreement: "The students who passed the exam celebrated."*)
14. Söylediklerini duydun mu? (*Object-fronted clause: "Did you hear what they said?"*)
15. Gitmeden önce ışıkları kapat. (*Adverbial + imperative: "Turn off the lights before leaving."*)

Rationale:

- Sentences 1–2 test basic word order restructuring.
- Sentences 3–9 target embedded clause processing (Bock & Levelt, 1994).
- Sentences 10–15 examine complex syntax integration (Juffs & Harrington, 1995