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THINKING IN ARABIC, WRITING IN ENGLISH: CROSS-LINGUISTIC TRANSFER AMONG THIRD-YEAR EFL STUDENTS: A CASE STUDY OF THE UNIVERSITY OF 8 MAY 1945 GUELMA, ALGERIA

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Abstract

English academic writing poses persistent challenges for Algerian English as Foreign Language (EFL) students because of first-language influence during composing. While linguistic transfer has received considerable attention, the cognitive role of Arabic as an intermediate language remains underexplored. This study investigates how thinking in Arabic (Darija) shapes English academic writing among third-year EFL students at the University of 8 May 1945 Guelma, Algeria, and identifies major patterns of cross-linguistic transfer. An explanatory sequential mixed-methods design was employed. Quantitatively, thirty academic essays were analyzed to identify errors associated with first-language influence. Qualitatively, Think-Aloud Protocols involving eight students and semi-structured interviews explored the cognitive processes underlying writing. Results revealed that 73.8% of identified errors were interlingual, indicating substantial Arabic influence. Lexical, syntactic, and rhetorical transfer patterns included lexical calques, copula omission, excessive coordination, and indirect discourse organization. Think-Aloud data showed that most participants generated ideas, planned, and organized arguments in Arabic before translating them into English, highlighting the frequent role of Arabic as a mediating cognitive resource. The findings suggest that English academic writing difficulties arise from both limited linguistic competence and cognitive transfer mechanisms. The study recommends integrating contrastive rhetoric and process-oriented writing approaches into English for Academic Purposes courses to strengthen students' academic writing proficiency overall.

Keywords

Cross-linguistic transfer Arabic, EFL academic writing, contrastive rhetoric, Think-Aloud Protocols, Algerian higher education

Introduction

The process of academic writing in a second language (L2) is universally recognized as one of the most cognitively demanding tasks for foreign language learners (Hyland, 2019). Unlike speaking, which occurs in real-time and allows for immediate interactional negotiation of meaning, writing requires the deliberate coordination of multiple cognitive processes: ideation, lexical retrieval, syntactic encoding, and discourse organization (Hayes & Flower, 1980). For students learning English as a Foreign Language (EFL) in non-Anglophone contexts, this cognitive load is considerably increased when learners' dominant language of thought, or first language (L1), differs substantially from the target language in terms of its linguistic structure and rhetorical conventions. (Manchón, 2011; Silva, 1993). In Algeria, the educational context is characterized by complex multilingualism. In informal interactions, many Algerian students use Algerian Arabic, commonly referred to as Darija. However, the use of French and other language varieties depends on the communicative setting, the educational context, and the interlocutors (Benrabah, 2013). While Modern Standard Arabic is generally associated with instruction in primary and secondary education, French has retained a stronger position in higher education, particularly in scientific and technical programmes. (Benrabah, 2007; Benrabah, 2013; Benabdelkader, 2025).

English is introduced later and is usually taught as a foreign language at around the age of fourteen. By the third year of undergraduate English studies, Algerian students have cognitive and ideological frameworks that are deeply rooted in Arabic. Although their English proficiency may be relatively advanced, their linguistic and conceptual repertoire remains more firmly established in their L1 than in English. (Benrabah, 2007; Belmihoub, 2018). At the University of 8 May 1945 in Guelma, Algeria, third-year students are required to produce extensive academic writing, including written assignments, literature reviews, and research papers. However, teachers consistently observe a discrepancy between the students' high-level conceptual understanding of their research

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topics and the linguistic quality of their written output. Sentences are often structured according to Arabic syntax, vocabulary is literally translated from Arabic, and argumentative structures follow Arabic rhetorical traditions rather than English conventions. In essence, these students are "thinking in Arabic, but writing in English" (Connor, 1996). Despite the growing body of literature on foreign language writing, empirical research focusing specifically on the cognitive cross-linguistic transfer from Arabic to English in the North African, particularly Algerian context remains limited (Benrabah, 2014; Lamri & Cherifi, 2020) . Most existing studies on Arabic-English transfer focus on the Gulf or Levantine regions, ignoring the unique mediating role of the Arabic darija in the Algerian cognitive processes. Therefore, previous research has highlighted the importance of examining cross-linguistic transfer in second-language writing, particularly in contexts where learners operate across multiple languages. Studies such as Mohamed-Sayidina (2010) and Khuwaileh and Al Shoumali (2000) have documented the influence of Arabic on English writing, while research in the Algerian context has also reported evidence of Arabic–English transfer in learners' written production (Ghezzou & Mammeri, 2017; Sarnou et al., 2012). However, the specific ways in which Arabic (Darija) influences the academic writing of Algerian EFL students, particularly at the lexical, syntactic, and discourse levels, remain insufficiently explored. This gap highlights the need for further empirical investigation of cross-linguistic transfer within the Algerian diglossic context. The study seeks to answer the following questions: What is the frequency and distribution of interlingual (L1 transfer) errors compared to intralingual errors in third-year EFL students' writing? How does mental translation from Arabic (Darija) manifest structurally at the lexical, syntactic, and discourse levels? What real-time cognitive strategies do students employ during the drafting process, as revealed by Think-Aloud Protocols (TAPs)? The main objective of this study is to investigate the nature and extent of Arabic (Darija)–English cross-linguistic transfer in the academic writing of third-year EFL students at the University of Guelma, and to determine how such transfer is manifested at the lexical, syntactic, and discourse levels and reflected in students' real-time cognitive writing processes.

1 Literature Review

The present review discusses theoretical and empirical research addressing the cognitive and the linguistic dimensions of foreign language writing. Particular attention is given to cross-linguistic transfer and the role of learners' existing linguistic knowledge in shaping written production. These perspectives provide the theoretical basis for examining Arabic–English transfer in the Algerian context.

1.1 Cross-Linguistic Transfer

Cross-linguistic transfer, historically referred to as language interference, is a fundamental concept in Second Language Acquisition (SLA). Odlin (1989) defines transfer as the influence resulting from the similarities and differences between the target language and any previously acquired language. Transfer may be either positive, when similarities between the first language (L1) and the target language facilitate learning, or negative, when differences between the two languages lead learners to transfer inappropriate linguistic features (Ellis,2008). In the case of Arabic-speaking learners of English, the substantial typological differences between Arabic, a Semitic language, and English, an Indo-European language, often result in negative transfer, particularly in academic writing (Junina, 2025; Asad, 2025). Kellerman (1987) argues that transfer is influenced not only by linguistic differences but also by learners' psychotypology, or their perception of the distance between the first and second languages. Although Algerian learners recognize that Arabic and English are structurally different, they frequently rely on Arabic cognitive patterns when composing academic texts (Bouziane, Mebtouche, 2024). Under the cognitive demands of academic writing, they tend to formulate ideas in Arabic before expressing them in English. Arabic therefore serves as an important intermediary in the writing process and may contribute to lexical, syntactic, and rhetorical transfer. (Woodall, 2002; Wang, Wen, 2002; Hyland, 2019).

1.2 Cognitive Models of second language (L2) Writing

To understand why students think in Arabic while writing in English, it is essential to examine the cognitive models of second language (L2) writing (Kormos, 2023; Li, 2023). Kellogg (1996) model of working memory emphasizes that writing is a cognitively demanding activity requiring the coordination of planning, formulation, and revision within the limited capacity of working memory. For L2 writers, the formulation stage is particularly challenging because linguistic knowledge has not yet become fully automatic. As a result, learners must devote considerable cognitive resources to selecting vocabulary, applying grammatical rules, and constructing appropriate sentence structures. Such demands may constrain the cognitive resources available for generating and organizing ideas. (Li et al., 2024; Wang et al., 2024). Similarly, Hayes and Flower (1980) influential cognitive model conceptualizes writing as a recursive process involving three major components: planning, translating,

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and reviewing. Planning involves generating and organizing ideas, translating consists of converting these ideas into written language, and reviewing includes evaluating and revising the produced text. In the context of second language writing, however, the translating stage often involves a literal conversion of ideas from the first language (L1) into the target language (L2). This process increases the likelihood of cross-linguistic transfer and reducing the fluency of text production (Kartsevski, 2023). Building on these models, Kroll (1990) proposed a framework specifically designed for bilingual writers, arguing that increasing L2 proficiency should gradually integrate conceptualization and linguistic formulation within the target language. Nevertheless, this integration is not always achieved. Among many Algerian third-year EFL students, the conceptualization stage remains largely rooted in Arabic despite their advanced level of English proficiency. Students therefore initially formulated their ideas in Arabic and subsequently rendered them in English. This creates a cognitively demanding writing process that frequently results in lexical, syntactic, and rhetorical transfer from the first language (Bouafia, 2024; Abbas, 2019). Moreover, the translation process places considerable demands on working memory, which must simultaneously maintain ideas, manipulate linguistic information, and coordinate planning during text production. Working memory facilitates thinking by temporarily holding and manipulating information during reasoning, planning, and problem-solving (Li, 2023; Baddeley, 2000).

1.3 Contrastive Rhetoric: Arabic and English

Arabic and English exhibit distinct patterns of discourse organization that reflect culturally and linguistically shaped preferences for cohesion, repetition, coordination, and the development of argumentation (Kaplan, 1966; Connor, 1996). Robert Kaplan (1966) seminal work on contrastive rhetoric provides an important starting point for understanding discourse transfer. Kaplan proposed that Arabic discourse follows a "parallel" or "circular" pattern, heavily relying on coordination, repetition, and elaborate stylistic elaboration, as opposed to the "linear" or "direct" pattern valued in English academic writing. Subsequent research by Ostler (1987) refined this understanding. Arabic is a “reader-responsible” language in which the reader is expected to identify connections between ideas, often through parallel structures and implicit links. (the heavy use of wa [and]). English, conversely, is a "writer-responsible" language, demanding explicit transitional markers and strict logical progression. Arabic nominal sentences generally consist of a nominal subject and a predicate, although their structure and interpretation vary according to definiteness, agreement, information structure, and the presence or absence of a verbal element (Holes, 2004; Ryding, 2005). Simply put, these contrasts should nevertheless be interpreted cautiously. Descriptions of Arabic discourse as “parallel,” “circular,” or relatively indirect, and of English discourse as “linear” or more directly organized, should not be understood as fixed or universal properties of the two languages. Such characterizations have been developed within particular contrastive-rhetoric studies and may vary according to genre, discourse community, educational context, and individual writer. In the present study, these descriptions are therefore treated as contextual tendencies reported in the literature rather than as defining characteristics of Arabic- or English-speaking writers. Individual variation may also arise from differences in English proficiency, writing experience, genre familiarity, and multilingual background.

1.4 Theoretical Framework

This study uses an integrated theoretical framework that combines Contrastive Analysis with Cognitive Processing Theory, particularly Kroll’s (1990) Revised Hierarchical Model. The two perspectives address different aspects of foreign language writing. Contrastive Analysis focuses on the linguistic features of learners’ productions, while Kroll’s model helps explain the cognitive processes involved in producing them.Thus,Contrastive Analysis provides the main basis for the quantitative analysis of learner errors. Accordingly,Lado (1957) and Odlin (1989) argue that differences between a learner’s first language and the target language can indicate potential areas of difficulty and may lead to negative transfer. This approach guides the classification of errors in students’ written essays. The analysis compares Arabic, including Algerian Arabic (Darija), and English at the syntactic, lexical, and rhetorical levels to identify potential interlingual errors. However, identifying linguistic differences does not fully explain how such errors are produced during writing. Kroll’s (1990) Revised Hierarchical Model is used to examine the cognitive processes involved in lexical access and mental translation. The model proposes that the strength of connections between concepts and words varies according to language proficiency. At lower and intermediate levels, connections between concepts and first-language words are generally stronger than direct connections between concepts and target-language words. Learners may thus rely on their first language when accessing and expressing meaning in the target language. In this study, such lexical access may be particularly relevant when students formulate abstract academic ideas in English. When direct connections between concepts and English lexical representations are less established, learners may use Arabic as an intermediate resource during conceptualization and lexical access. They may first formulate an idea in Arabic and then express it through

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English linguistic structures. This process may contribute to interlingual errors in written production (Benbouzid, Hamitouche, 2022). More interestingly, Figure 1 illustrates the application of Kroll's model to the Algerian context. It represents a writing process in which the learner conceptualizes an intended message, draws on available linguistic representations, and formulates it in English. When learners experience difficulty in English, they may rely on Arabic as an intermediate cognitive resource. Such reliance may contribute to linguistic patterns that are subsequently identified through Contrastive Analysis. This figure therefore illustrates the relationship between cognitive processing, mental translation, and potential interlingual influence without assuming that all observed errors originate exclusively from the first language.

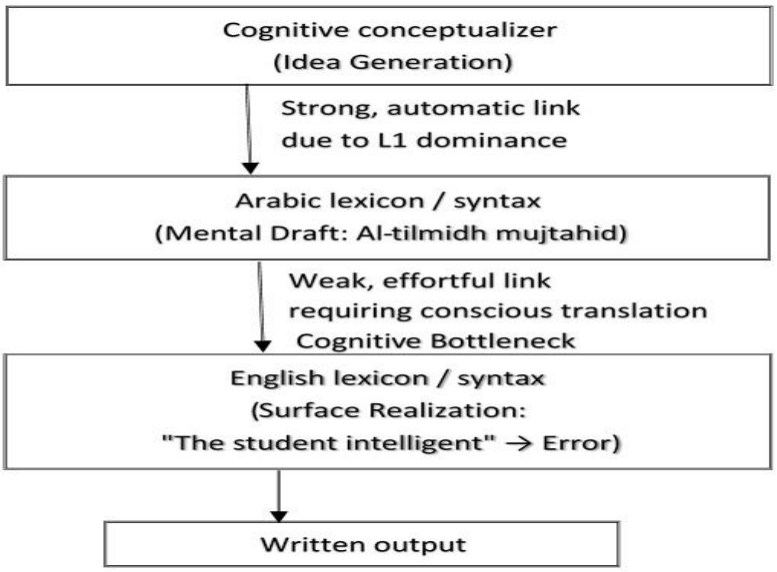

Figure 1Theoretical Model of Mental Translation in Algerian EFL Writing

1.5 Theoretical Framework and Empirical Operationalization

The theoretical perspectives outlined above are operationalized through the study's quantitative and qualitative analyses, providing complementary frameworks for identifying, classifying, and interpreting potential instances of cross-linguistic influence in students' English writing**.** In the quantitative analysis, Contrastive Analysis is used to classify the students' errors. An error is categorized as interlingual when its form is consistent with a structural or functional difference between Arabic and English and when the available linguistic evidence supports an interpretation in terms of cross-linguistic influence. However, this classification does not presume that all errors arising from differences between the two languages are due to first-language transfer. Alternative explanations, such as developmental processes or incomplete acquisition of English, are considered where appropriate. For the qualitative analysis, Kroll's Revised Hierarchical Model serves as the interpretive framework for the cognitive data gathered through Think-Aloud Protocols. This model allows for an in-depth examination of whether learners draw upon their first language when composing English texts, especially in moments of cognitive or linguistic challenge. Therefore, the Think-Aloud Protocol data are analyzed to identify instances in which participants report or demonstrate mental translation, lexical mediation, or reliance on first-language representations during English writing. These observations help clarify the cognitive processes associated with particular error patterns and provide further evidence for interpreting them as potentially related to cross-linguistic influence.

2 Material and methods

2.1 Research Design

An explanatory sequential mixed-methods design was employed for this study. Phase one, the quantitative phase, involved a linguistic error analysis of 30 written essays to identify and quantify transfer patterns. Phase two, the qualitative phase, utilized Think-Aloud Protocols (TAPs) and semi-structured interviews to explain the cognitive mechanisms behind the quantitative data. Figure 2 details the research design flow.

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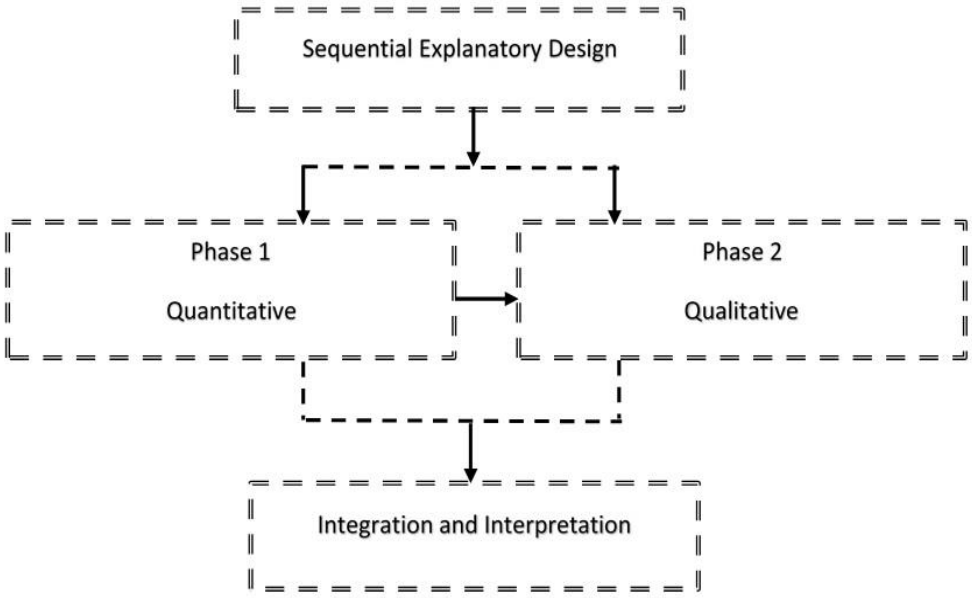

Figure 2 Sequential Explanatory Research Design Flowchart

2.2 Participants

The study was conducted in the Department of English at the University of 8 May 1945 Guelma, Algeria. Using purposive sampling, 30 third-year EFL students (20 females and 10 males) were selected. All participants were officially enrolled and regularly engaged in academic writing. They voluntarily completed the writing assignment and participated in the Think-Aloud Protocol (TAP) sessions. This selection was intended to ensure that participants had sufficient academic writing experience and could provide data relevant to the research objectives. (Creswell & Creswell, 2018). All participants were estimated to have a B2+ level of general English proficiency, based on their academic progression and approximately three years of formal instruction in Written Expression in English. From this larger sample, eight participants were subsequently purposively subsampled for the Think-Aloud Protocol (TAP) component**.** Their selection was based on their willingness to participate, availability for the TAP sessions, and ability to express their thoughts during the writing task. The subsampling also sought to ensure variation in writing performance, thereby enabling the TAP data to provide insight into different writing processes and manifestations of Arabic–English cross-linguistic transfer. Table 1 presents the linguistic profile of the sub-sample selected for the qualitative phase of the study.

Table 1 Demographic and Linguistic Profile of the Qualitative Sub-Sample (N=8)

ID	Age	Gender	Years of Intensive English Study	L1 (Arabic/Darija) Dominance	L2 (French) Proficiency
S1	23	F	7	High	Advanced (C1)
S2	24	M	8	High	Intermediate (B1)
S3	22	F	6	Very High	Advanced (C1)
S4	25	M	9	Moderate	Advanced (C1)
S5	23	F	7	High	Intermediate (B2)
S6	22	F	6	Very High	Upper-Int (B2)
S7	24	M	8	High	Advanced (C1)
S8	23	F	7	Very High	Intermediate (B1)

2.3 Data Collection Instruments

Participants were asked to write a 400 words argumentative essay during a regular classroom session under controlled conditions. The writing task was: "Should artificial intelligence replace traditional teaching in Algerian

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universities?" This topic was selected because it requires abstract reasoning, critical thinking, and the organization of complex ideas. Such cognitive demands were expected to encourage reliance on participants' first language during the planning and formulation stages of writing. Students completed the task individually without access to dictionaries, online resources, or external assistance. The resulting essays constituted the primary dataset for the quantitative error analysis. The eight participants selected for the qualitative phase completed a writing task similar in structure and difficulty to the classroom essay while participating in a think-aloud protocol. They were instructed to verbalize every thought that occurred during the writing process, regardless of whether it was expressed in Arabic, French, or English. Before the data collection session, participants received brief training and completed a practice exercise to familiarize themselves with the think-aloud procedure and ensure consistent verbalization. All sessions were audio-recorded and later transcribed verbatim for qualitative analysis. These protocols provided direct evidence of the cognitive processes underlying English academic writing. Following the think-aloud sessions, each participant took part in an individual semi-structured interview designed to explore their awareness of language use during writing. The interviews focused on participants' perceptions of mental translation, the reasons for switching between Arabic, French, and English, and the strategies they employed when facing lexical or grammatical difficulties. Additional questions examined whether participants consciously relied on their first language during idea generation and text formulation. The interviews also served to clarify and validate observations emerging from the think-aloud data. All interviews were audio-recorded, transcribed, and subjected to thematic analysis.

2.4 Data Analysis

Essays were analyzed using James's (1998) error taxonomy**.** Each error was identified and classified as either interlingual, reflecting influence from another language, or intralingual, arising from difficulties within the English system. Interlingual errors were further categorized at the lexical, syntactic, and discourse levels**.** Intralingual errors included, for example, overgeneralization and the incorrect application of English rules. To determine the source of interlingual errors, the linguistic form and context of each item were examined in relation to the corresponding Arabic and English structures, with French also considered where relevant. An error was attributed to Arabic (Darija) when its lexical choice, structure, word order, expression, or meaning corresponded to an Arabic pattern or indicated direct translation from Arabic. French influence was identified when an error displayed a specifically French lexical, syntactic, or phraseological pattern that could not be adequately explained by Arabic. Given the multilingual and diglossic context in which Algerian students use English, source-language attribution was therefore based on specific linguistic evidence rather than assumed from the mere presence of an error. Ambiguous cases were not automatically classified as interlingual, in order to avoid overstating cross-linguistic influence. Where available, Think-Aloud Protocol (TAP) data provided supplementary evidence of students' reliance on Arabic or French during the writing process, particularly through instances of language switching or reported mental translation. When neither the written form nor the TAP data provided sufficient evidence of cross-linguistic influence, the error was classified as intralingual. TAP recordings were transcribed verbatim and examined alongside the written productions to support the interpretation of the identified errors.

3 Results

This section presents the findings from the quantitative and qualitative phases of the research. The quantitative analysis focuses on the frequency and distribution of interlingual and intralingual errors identified in the students' written compositions, while the qualitative findings from the Think-Aloud Protocols (TAPs) provide insight into the cognitive processes underlying these errors. The integration of both datasets offers a comprehensive understanding of the role of mental translation in Algerian EFL academic writing.

3.1 General Error Distribution

In approximately 12,000 words of students' writings, a total of 840 linguistic deviations were identified. The analysis revealed that interlingual errors were considerably more frequent than intralingual errors. As presented in Table 2, 620 out of 840 identified errors (73.8%) were interlingual, whereas only 220 errors (26.2%) were intralingual. Figure 3 illustrates the percentage distribution of interlingual errors by level.

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Table 2 Overall Error Distribution in the Dataset (N=840 Errors)

Error Category	Frequency	Percentage	Description
Interlingual Errors (Transfer)	620	73.8%	Errors directly traceable to Arabic syntactic, lexical, or rhetorical rules
Intralingual Errors (Developmental)	220	26.2%	Errors resulting from incomplete mastery of English rules (overgeneralization)
Total	840	100%	

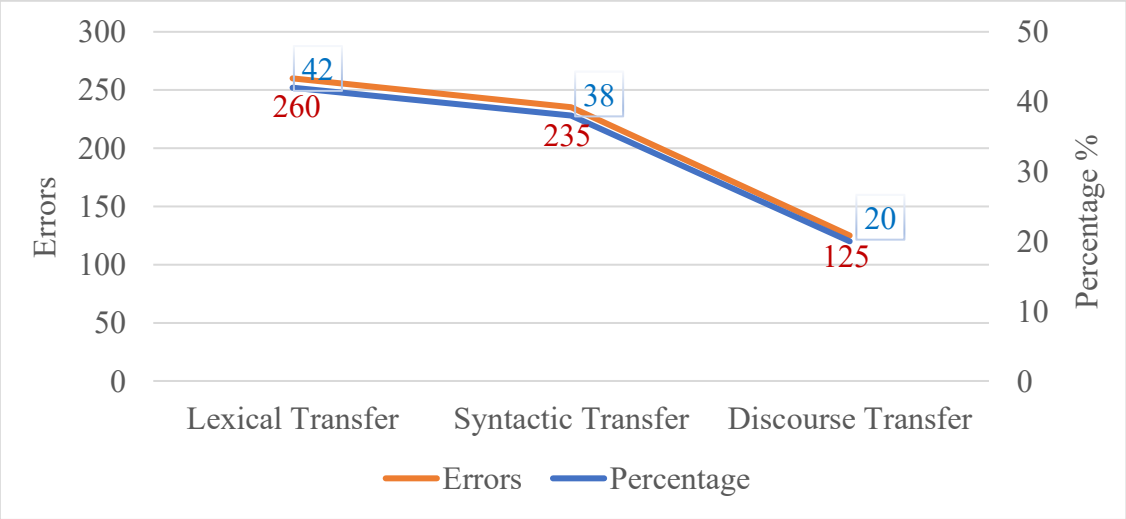

Figure 3 Percentage Distribution of Interlingual Errors by Level

3.2 Lexical-Level Transfer

Lexical transfer occurred when students translated Arabic concepts literally into English, ignoring lexical boundaries. The findings indicate that idiomatic calques were the most frequent type of lexical transfer, accounting for 98 occurrences (37.7%) of all lexical errors. This suggests that students frequently translated Arabic idiomatic expressions literally into English without considering their conventional meanings, resulting in unnatural or incorrect expressions. Lexical collocations represented the second largest category, with 75 instances (28.8%), reflecting learners' tendency to transfer Arabic verb–noun combinations directly into English. False cognates mediated by French accounted for 52 cases (20 %), indicating that French also influenced lexical selection by encouraging the use of words that resemble English forms but differ in meaning. Finally, delexicalized verb errors were the least frequent category, with 35 occurrences (13.5%). Yet, they demonstrate persistent difficulties in selecting appropriate English verb–noun combinations. Overall, the predominance of idiomatic calques and lexical collocations, together represent 66.5% of all lexical transfer errors.

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Table 3 Categorization of Lexical Transfer Errors with Authentic Corpus Examples

Lexical Category	Frequency	% of Lexical	Arabic Source / Concept	Student Literal English Calque	Expected English Equivalent
Idiomatic Calques	98	37.7%	Ayadi bayda (White hands)	The government has white hands in this sector.	The government has good intentions.
Lexical Collocations	75	28.8%	Anjaal bahth (Make research)	We must make research before deciding.	We must conduct/ do research before deciding.
False Cognates (via French)	52	20.0%	Manifester (Fr)	Students manifest to change the system.	Students protest/ demonstrate to change the system.
Delexicalized Verbs	35	13.5%	E3ti attention (Give attention)	Teachers must give attention to AI.	Teachers must pay attention to AI.

3.3 Syntactic Level Transfer

Syntactic transfer results from structural differences between Arabic, a pro-drop language characterized by nominal sentences, and English, an obligatory-subject language that follows a strict Subject–Verb–Object word order (Table 4). The results indicate that copula omission was the most frequent syntactic transfer error, with 105 occurrences (44.68%). This finding reflects the influence of Arabic nominal sentence structure, in which the verb *to be* is omitted in the present tense, leading students to produce grammatically incomplete English sentences. The overuse of the conjunction *and* (*wa*) ranked second, accounting for 80 errors (34.04%), suggesting that participants transferred Arabic coordination patterns into English instead of using appropriate subordinating connectors. While this may reflect the transfer of Arabic coordination patterns, excessive coordination is also a feature of developing L2 proficiency. However, the TAP data confirmed that participants often utilized *wa* (and) as a mental filler during translation, supporting the transfer hypothesis in this specific context. Subject–verb agreement errors represented 30 cases (12.77%). Unlike other syntactic categories, SVA errors are often associated with intralingual developmental factors, such as the complexity of the subject noun phrase or cognitive overload during drafting. Consequently, these errors are categorized as potentially resulting from the cognitive load associated with mental translation and the incomplete acquisition of complex English agreement rules, rather than direct structural transfer alone. Finally, verb–subject order was the least frequent category, with 20 occurrences (8.51%), but it still demonstrated the influence of Arabic sentence organization on English word order. Overall, copula omission and the excessive use of *and* together accounted for 78,72% of all syntactic transfer errors, confirming that structural differences between Arabic and English substantially influenced the participants' sentence construction during academic writing.

Table 4 Categorization of Syntactic Transfer Errors with Arabic Explanations

Syntactic Category	Frequency	% of Syntactic	Arabic Syntactic Rule	Student English Output	Expected English Correction
Copula Omission	105	44.68%	Al-Jumla Al-Ismiyya (Nominal sentences lack 'to be' in the present).	AI very important. Education not ready.	AI is very important. Education is not ready.
Overuse of 'And' (Wa)	80	34.04%	Wa (و) is a universal connector without logical marking.	AI is smart and it is expensive and...	Use subordination: Although it is expensive...

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Subject-Verb Agreement	30	12.77%	Arabic verbs agree in gender/number, causing L1 cognitive overload.	The algorithms have changed.	The algorithms have changed.
Verb-Subject Order	20	8.51%	Classical Arabic prefers Verb-Subject-Object order.	Exist many problems in our universities.	There exist many problems in our universities.

3.4 Discourse Level Transfer

Discourse-level transfer was analyzed across 30 argumentative essays. As detailed in Table 5, the most frequent rhetorical feature was the reliance on affective rather than logical proof, observed in 27 essays (90.0%), indicating that students tended to support their arguments with emotional appeals, personal opinions, or moral considerations instead of empirical evidence and logical reasoning. Coordinate paragraphing was identified in 25 essays (83.3%), showing that many participants organized their ideas as a sequence of equally weighted points without developing a clear hierarchical structure centered on a topic sentence. The absence of an explicit thesis statement was found in 22 essays (73.3%), suggesting that most students delayed or omitted the presentation of their main argument, a pattern consistent with Arabic rhetorical conventions. Redundancy and digression occurred in 18 essays (60.0%), reflecting the tendency to introduce background information or unrelated ideas that were not directly related to the writing assigned task. Collectively, these findings suggest that discourse-level features formed an important component of the students' English writing difficulties. The observed patterns are compatible with some rhetorical tendencies discussed in the contrastive-rhetoric literature, but they should not be interpreted as conclusive evidence that all such features resulted from Arabic rhetorical transfer. Their interpretation requires consideration of the students' individual linguistic repertoires, writing experience, English proficiency, and the specific argumentative genre examined in this study. Generally, Figure 4 provides a comparative analytical framework for examining discourse organization, while Table 5 reports the occurrence of the corresponding features in the students' writings. The frequencies and percentages should therefore be understood as empirical observations concerning this specific sample rather than as evidence of a uniform Arabic rhetorical pattern.

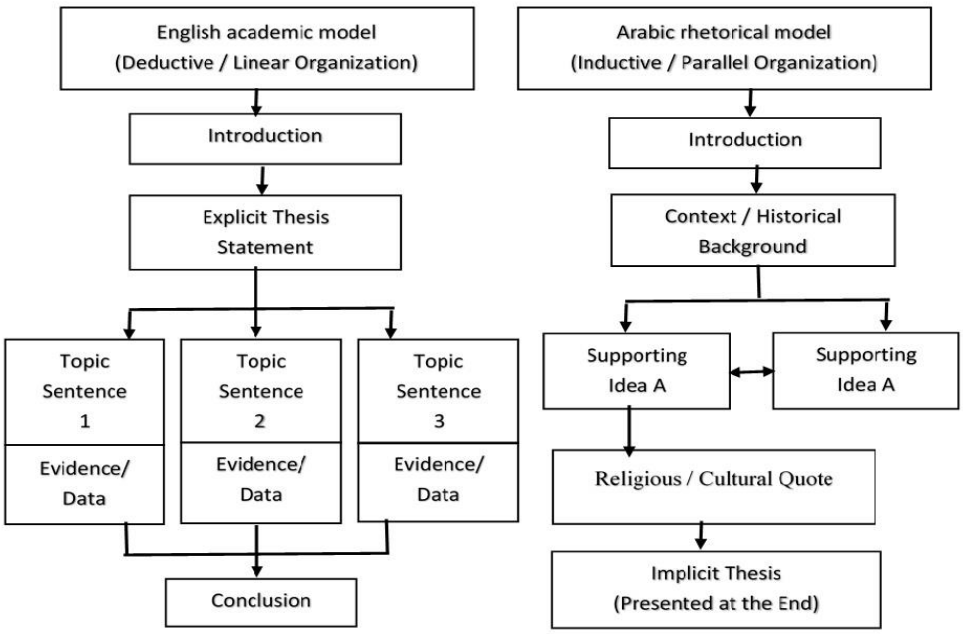

Figure 4 Comparison of English and Arabic Academic Writing Models

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Table 5 Manifestations of Discourse Transfer in Student Essays (N=30)

Rhetorical Feature	Frequency	Percentage	Description of Student Behavior
Absence of Thesis Statement	22	73.3%	Essays fail to state a clear, debatable proposition in the introduction.
Coordinate Paragraphing	25	83.3%	Paragraphs are lists of equal points without a unifying topic sentence.
Redundancy / Digression	18	60.0%	Introduction of irrelevant concepts not directly tied to the task.
Affective and Logical Proof	27	90.0%	Relying on emotional appeals rather than empirical data.

3.5 Cognitive Process Analysis (Evidence from TAPs)

The Think-Aloud Protocols provided qualitative evidence of L1 influence during the writing process. Participant S6 demonstrated extensive use of Darija during the planning stage, while Participant S3 showed a process of lexical translation followed by self-correction. Participant S1 verbalized the influence of an Arabic connector during revision, and Participant S4 demonstrated interaction between French lexical activation and Arabic syntactic patterns. These verbal reports indicate that some participants drew on Arabic and, in some cases, French during planning, lexical retrieval, and linguistic formulation. They therefore provide evidence of L1 influence and possible mental translation in particular instances. However, the TAP data do not establish that all participants consistently formulated their ideas in Arabic before translating them into English. Rather, they suggest that L1 involvement and cross-linguistic mediation formed part of the writing processes of some participants and varied according to the task and individual writing situation.

Table 6 Excerpts from Think-Aloud Protocols (TAPs) Demonstrating Mental Translation

ID	Phase	Verbalization (Transcribed)	Cognitive Strategy
S3	Drafting	I want to say 'fi khedmati l-moutafawiti'... in the service of difference? No... 'To serve diversity'? Let me write that.	Literal lexical translation followed by self-correction.
S6	Planning	Noukhsou nkoulnou enno l'intelligence artificielle amliha, walakin fi l'école kayn l-mouchkil...	Complete ideation in L1 (Darija); no English accessed.
S1	Revising	Why did I write 'and' here? In Arabic I would just say 'wa'. I know I need 'however', but my hand just wrote 'and'.	Syntactic transfer (wa) at the motor-output level despite metacognitive knowledge.
S4	Drafting	L'éducation... education. 'Must be changed'. Wait, in Arabic we say 'yalzam yetghayir'... it must change itself.	Transfer mediated by French, filtered through Arabic syntax.

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4 Discussion

The distribution of errors in the present sample indicates a substantial effect of Arabic on students' English writing. Nearly 74% of the identified errors were interlingual, suggesting that cross-linguistic influence remained prominent even among third-year EFL students. This finding challenges the assumption that learners at a relatively advanced stage of proficiency primarily exhibit intralingual developmental errors. Instead, the results indicate that L1-related influence continues to affect academic writing, particularly in the selection and use of lexical items, sentence structures, and rhetorical patterns. A considerable proportion of the interlingual errors reflected the transfer of Arabic-based lexical, syntactic, and rhetorical patterns into English. This pattern is consistent with the study assumption that students may rely on Arabic during aspects of idea generation and linguistic formulation. However, the error analysis alone does not establish that participants consistently "thought in Arabic" while writing. Rather, it provides evidence of L1-mediated production and cross-linguistic influence. The Think-Aloud Protocol data offer complementary evidence for examining whether such influence involves explicit mental translation, lexical mediation, or reliance on Arabic representations during English writing. The findings therefore suggest that first-language influence extends beyond isolated grammatical or lexical choices and may also affect the organization and coherence of students' academic writing.

4.1 Interpretation of Interlingual and Intralingual Errors

The analysis revealed that interlingual errors were considerably more frequent than intralingual errors, highlighting the strong influence of Arabic on English academic writing. Most of these errors reflected the transfer of Arabic lexical, syntactic, and rhetorical patterns into English. These findings provide quantitative evidence supporting the study's central hypothesis that Algerian EFL third–year students often tend to think in Arabic while writing in English, resulting in systematic transfer-related errors. The predominance of interlingual errors suggests that participants relied heavily on their first language during idea generation and sentence formulation. This reliance appears to influence not only linguistic accuracy but also the organization and coherence of academic texts. This marked difference indicates that the participants' writing difficulties were primarily associated with the transfer of Arabic linguistic patterns rather than with developmental problems related to English language acquisition. The fact that nearly three-quarters of all errors resulted from L1 transfer provides strong evidence that students relied extensively on Arabic during the planning and formulation of their English texts. Conversely, the relatively small proportion of intralingual errors suggests that incomplete mastery of English grammar was a secondary source of difficulty. Consequently, the results highlight the need for instructional approaches that explicitly address cross-linguistic transfer and promote greater awareness of the structural and rhetorical differences between Arabic and English. Overall, the predominance of interlingual errors reported in Section 3 suggests that cross-linguistic influence was a significant factor in the students' writing difficulties. More specifically, lexical and syntactic transfer accounted for 80% of all interlingual errors. Moreover, the TAP findings provide additional support for this interpretation. The verbal reports showed that some participants resorted to Arabic or Darija during planning, lexical retrieval, and formulation, while others demonstrated interaction between Arabic and French. These observations suggest that cross-linguistic mediation occurred during particular stages of writing.

4.2 The Cognitive Burden of Mental Translation

The TAP data suggest that mental translation may increase the cognitive demands of composing in English**.** Students such as S6 generated complex, multi-clause thoughts in Darija/Arabic during the planning phase. When they moved to the formulation phase, they appeared to convert these ideas into English linguistic forms while simultaneously managing grammatical accuracy and textual organization. This process may place additional demands on working memory (Kellogg, 1996). This may help explain why higher-order concerns, such as discourse organization (Figure 4), received less attention during the writing process. The student appeared to prioritize sentence-level translation, potentially at the expense of broader paragraph coherence. This cognitive overload also explains the occurrence of subject-verb agreement errors (Table 4); rather than reflecting direct structural transfer alone. These errors likely result from the cognitive load of mental translation, which interferes with the incomplete acquisition of complex English agreement rules. These findings provide further evidence that mental translation constitutes a major source of lexical inaccuracies in Algerian EFL academic writing.

4.3 The Persistence of Syntactic Habits

The syntactic patterns identified in the results section suggest that some Arabic–English structural differences remained influential during English composition. Accordingly, copula omission and the use of *wa* illustrate cases in which Arabic structural or connective patterns may have affected English sentence formation. This suggests that explicit grammatical knowledge does not necessarily prevent L1-influenced production during real-time

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writing. The high frequency of copula omission (Table 4) is a a characteristic feature of Arabic L1 transfer. In Arabic, the present-tense equational sentence consists simply of two nouns. Despite years of studying English grammar, 44.68% of the syntactic transfer errors involved missing copulas. This indicates that during the rapid cognitive act of writing, well-established L1 syntactic patterns take precedence over consciously learned L2 rules. Similarly, the overuse of "and" reflects the Arabic conjunction wa, acting as a universal syntactic device without requiring the writer to evaluate logical relationships between clauses. In English, however, effective coordination requires greater attention to the semantic and rhetorical relationship between clauses. Reliance on this broad connective function may therefore contribute to less differentiated sentence connections and weaker discourse organization.

4.4 Rhetorical Acculturation and Linguistic Accuracy

The findings suggest that the transfer of Arabic rhetorical conventions may contribute to discourse-level errors in English academic writing. The absence of explicit thesis statements, the use of coordinate rather than subordinated paragraph structures, redundancy and digression, and reliance on affective or culturally embedded forms of argumentation may reflect rhetorical patterns that differ from those generally expected in English academic discourse. These features can make the students' arguments appear less explicit, less linear, or less directly organized according to English academic conventions. However, these patterns should not be interpreted as evidence of a uniform Arabic rhetorical style or as conclusive evidence of direct L1 transfer. Rather, these patterns should be understood as features observed in the analyzed data that may be compatible with tendencies reported in previous contrastive-rhetoric research. Their occurrence may also reflect differences in English proficiency, previous writing instruction, genre familiarity, writing experience, and individual multilingual backgrounds. Therefore, the findings provide evidence of discourse-level differences in this particular sample and writing context, while the interpretation of their origins requires consideration of both cross-linguistic influence and other possible sources of variation in the organization and development of students' English academic writing. In this sense, discourse transfer may contribute to rhetorical patterns that diverge from conventional expectations in English academic writing and may, in some cases, affect the overall coherence and organization of students' essays. This pattern is particularly evident in the persistence of Arabic rhetorical patterns, which were the most resistant to correction, suggesting that discourse-level transfer may be more deeply established than other forms of cross-linguistic influence.

4.5 The Mediating Role of French

The pattern of false-cognate errors and the responses of participant S4 suggest that French may function as a mediating linguistic influence. The Algerian EFL context is not simply a binary Arabic–English setting but involves a broader multilingual repertoire. In some cases, a concept may be formulated in Arabic, mentally associated with a French lexical form because of the prominence of French in Algerian academic and scientific discourse, and subsequently rendered in English. This possible sequence may account for semantic anomalies that cannot be adequately explained by Arabic transfer alone. Accordingly, the findings suggest that lexical errors in Algerian EFL writing may be shaped by the combined influence of Arabic and French, highlighting the need to examine cross-linguistic transfer from a multilingual rather than exclusively bilingual perspective.

4.6 Implications for Pedagogy

Traditional written corrective feedback, such as simply marking errors with red ink, is insufficient to address the systematic cognitive and cross-linguistic processes underlying students' writing difficulties (Mao et al., 2024). Effective instruction requires targeted, process-oriented interventions that directly address the specific transfer patterns identified in this study. Accordingly, teachers at the University of Guelma and across Algeria should align their pedagogical practices with the intervention framework proposed in Table 7. A pedagogical focus on the underlying cognitive and cross-linguistic sources of learners' errors, rather than on surface-level correction alone, is likely to enhance academic writing performance and contribute to the long-term development of L2 writing competence. Generally, the findings also suggest that EFL writing instruction should move beyond grammar-oriented correction toward explicit instruction in cross-linguistic awareness, rhetorical conventions, and cognitive writing strategies.

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Table 7 Proposed Pedagogical Interventions Mapped to Transfer Types

Identified Transfer Issue	Traditional Response	Proposed Process -Based Intervention	Rationale
Lexical Calques	Circling the error.	Collocation Networking: Teach academic vocabulary in chunks. Map Arabic concepts to English semantic fields.	Breaks word-for-word translation habits.
Copula Omission / Wa Overuse	Grammar drills.	L1-L2 Contrastive Syntax Editing: Provide a text in 'Arabic-English' for collaborative editing.	Raises metacognitive awareness of structural differences.
Redundancy / Missing Thesis	Writing 'Add a thesis on essay.	Genre Analysis: Contrast authentic English and Arabic essays to highlight thesis placement.	Decultures the writing process; teaches English as a specific genre.
Cognitive Overload	Forcing 'English Only' in drafts.	Translanguaging Drafting: Allow initial ideation in Arabic/Darija; require English only in subsequent drafts.	Frees working memory by separating planning from translating.

Conclusion

This study investigated the cognitive processes underlying “thinking in Arabic, writing in English” among third-year EFL students at the University of 8 May 1945 in Guelma. By combining quantitative error analysis with Think-Aloud Protocols, the study examined both the distribution of interlingual and intralingual errors and the cognitive processes associated with cross-linguistic transfer. Regarding the first research question, the analysis of the 12,000-word corpus showed that 620 of the 840 identified errors (73.8%) were classified as interlingual, compared with 220 (26.2%) classified as intralingual. This finding indicates a substantial role of cross-linguistic influence in the students’ English academic writing. Regarding the second research question, transfer was observed at the lexical, syntactic, and discourse levels, particularly in the use of idiomatic expressions and collocations, syntactic patterns, and discourse organization. Regarding the third research question, the Think-Aloud Protocols provided evidence that some students drew on Arabic during planning and formulation, suggesting that mental translation and cross-linguistic processing formed part of their writing processes. These findings should be interpreted in light of the study’s limitations, particularly its cross-sectional design, single-institution sample, and focus on argumentative writing. Future research could therefore examine larger samples across different institutions, employ longitudinal designs, and compare different academic genres. Overall, the findings suggest that Arabic-related transfer is an important aspect of the writing process for these learners, while also highlighting the need to distinguish carefully between Arabic, French, and English sources of error in a multilingual context. Pedagogically, greater attention to cross-linguistic awareness and strategies for reformulating ideas across languages may help students develop greater control over academic writing in English.

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