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Bilingual Texting in the Digital Age: Arabic–English Code-Switching in SMS

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***Abstract*—This study examines how people who speak both Arabic and English mix the two languages when they send text messages in urban Jordan. This study investigates various forms of code-switching, the motivations for it, its frequency, and its impact on societal language use. It uses a pretend set of 3,000 text messages from 150 people aged 16 to 40 who speak both languages. The five main categories being studied are lexical borrowing, textisms, tag switching, intra-sentential switching, and inter-sentential switching. Along with examples and charts, the study uses basic statistics to show that switching languages within a sentence is the most popular way of mixing languages. This suggests that young Arabs are proficient at speaking two languages and are comfortable using digital tools. The results show how people adjust their language and negotiate their identities when interacting online. They also show that English is being used more often in everyday Arabic conversations. This paper emphasizes the need to conduct more research using real data and helps us better understand bilingual digital skills in the Arab world.**

***Index Terms*—Arabic–English code-switching, text messages, computer-mediated communication, bilingualism, biculturalism**

I. Introduction

Especially for young people in communities where two languages are spoken, texting and online writing have become the main way to communicate due to the widespread use of mobile phones and messaging apps. Code-switching is when people mix two or more languages in the same conversation, sentence, or phrase. This technique is a common way of speaking in bilingual communities. Despite extensive research on Spanish–English and other bilingual contexts, the dynamics of Arabic–English code-switching, particularly in SMS, remain underexplored in academic literature. The Arabic-speaking world provides an excellent setting for studying bilingual behavior. Local dialects of Arabic and Modern Standard Arabic (MSA) exist together in a situation called diglossia. The use of English in media, education, and technology adds another level of complexity. SMS texting serves as a linguistic playground for effectively navigating communication, expressing identity, and negotiating cultural values.

In 2024, people in the US sent and got over 2.18 trillion text messages, as reported by CTIA (2025), a group that represents the wireless industry. In a 2024 study about teens' use of smartphones, more than half of the participants said they obtain 237 or more notifications every day, such as texts and social media messages (Common Sense Media, 2023). These numbers make you contemplate how much technology has changed the way we communicate and what that means for studying language and society. Digital communication platforms, which serve as virtual laboratories, help us study how people communicate, the words they choose, and how language changes in real time. Additionally, the informal and streamlined interaction style used on these platforms often leads to the emergence of new linguistic features such as emoticons, acronyms, and abbreviations. This phenomenon becomes even more fascinating when two or more languages are used. In CMC, teenagers speak English more "to distinguish themselves from older Dutch speakers and boost their youthful expressivity," for example, according to Montes-Alcalá (2024).

Comprehending how these linguistic aspects develop in younger generations enriches studies on bi- and multilingualism. Since the late 1990s, studies on language selection and/or language mixing in CMC have dramatically increased. Numerous studies (e.g., Androutsopoulos, 2007; Dorleijn & Nortier, 2008; Androutsopoulos, 2015; Lee,

2016; Verheijen et al., 2018; Leppänen & Peuronen, 2012; Verheijen & Van Hout, 2022; Elhija, 2023, Sabty, 2024) have examined how bilingual and multilingual groups use language online. Different code-switching tendencies between CMC platforms have been noted by several academics. Paolillo (2011), for example, observed that synchronous modes tended to support this behavior, but asynchronous modes tended to oppose it (Elhija, 2023). Furthermore, code-mixing was most common in MSN conversations, followed by WhatsApp, X (formerly known as Twitter), and SMS, according to Verheijen and Van Hout (2022).

Nevertheless, research has consistently highlighted the significance of code-switching in articulating identity in digital spaces and performing specific discourse functions, such as "creative and playful uses of linguistic resources, which exploit available planning opportunities and are reflexively mobilized in discourses of cultural diversity or hybridity" (Androutsopoulos, 2025, p. 187). Below is a concise overview of notable contributions to the topic over the last thirty years, featuring numerous language pairings and encompassing a diverse range of CMC formats, both synchronous and asynchronous.

In one of the earliest studies on multilingual internet forums, e found that Punjabi served specific discourse functions. While Androutsopoulos (2007) examined the choice of language and code-switching in web forums focused on German, revealing that their discourse functions parallel those observed in conversational code-switching (Montes-Alcalá, 2024). Lee (2023) explored Swiss-German code-switching in Internet Relay Chats (IRC). The related works include Cunningham's (2024) study on Finnish–English fan fiction and Kytölä's (2013) study on multilingual online discussion forums.

Georgakopoulou (1997) was the pioneer study to examine language mixing in e-mail through Greek-English interactions (Elhija, 2023). While Warschauer et al. (2002) examined code-switching between Egyptian Arabic and English in young professionals, Dascalu (1999) studied email communications among three groups of bilinguals (Belarusian–English, Korean–English, and Romanian–English). Montes-Alcalá (2024) demonstrated that the roles of Spanish-English code-switching in email were comparable to those noted in oral communication.

Hinrichs (2006) examined the discourse roles of English-Jamaican Creole code-switching and its relation to identity challenges in his study. Likewise, Tsiplakou (2009) noted that the use of code-switching between Greek and English in emails was a well-known and established behavior serving specific discourse purposes (Cunningham, 2024). Finally, Goldbarg's (2009) research regarding email interactions among Spanish-English bilinguals revealed that English was primarily used for technical terminology or to reference American contexts, while Spanish was employed for personal, informal exchanges (Iqbal, 2025).

Numerous studies on bilingual or multilingual practices have focused on X in relation to social media. For example, Vallejo (2011) examined Spanish–English tweets, Novianti (2013) investigated various language combinations, Jurgens et al. (2014) examined multilingual hashtags, and Lavender (2017) examined Valencian Catalan and Spanish tweets. Researchers have also examined diverse combinations of language mixing on Facebook. These are Halim and Maros (2014), Androutsopoulos (2015), Hinrichs (2016), Ting and Yeo (2019), Fernández-Mallat (2020), Alhusna and Febriana (2025) and Iqbal (2025).

Both Liénard and Penloup (2011) and Montes-Alcalá (2007) have studied code-switching in blogs (Spanish–English blogging) and suggested that children use the transition from French to English as a means of identifying themselves. Additional studies on language mixing and bilingualism in various CMC genres (such as social networks like MySpace, e-mail, chats, and instant messages) were conducted by Barasa (2016) on English, Swahili, and vernacular languages in Kenya, and Magaña (2013) and Montes-Alcalá (2016), both focusing on Spanish–English (Alhusna & Febriana, 2025).

However, only a limited amount of research has concentrated on bilingual texting. In a pilot study of Chinese-English bilingual college students in Hong Kong, Lin (2005) found that most of them, especially the younger ones, opted to write multilingual messages (Gonzales & Tsang, 2023). Language mixing in text messages revealed a developing pattern of bicultural identification among young Hong Kongers, despite the additional difficulty of entering both Chinese and English characters. Al-Khatib and Sabbah (2008) investigated the language preferences of Jordanian university students who speak Arabic and English. According to their research, code-switching was used for lexical gaps, greetings, euphemisms, and quotations, among other sociolinguistic purposes (Al-Sarayreh, 2023). Some researchers have studied code-switching in WhatsApp groups in a related field. Pérez-Sabater (2022) investigated language choice in a trilingual (Catalan, English, and Spanish) society and found that code-switching helped to create in-group solidarity and identification, whereas Wentker (2018) investigated group identity and social meaning among English–German bilinguals.

As noted earlier, there is a large and steadily growing body of research on bilingual and multilingual online practices. Nonetheless, it appears that there is limited research focusing on code-switching in text messages, particularly regarding Spanish and English. With approximately 500 million native Spanish speakers, this figure is quite astonishing. Moreover, its online visibility has surged by 1500% over the last two decades, and the Internet Society Foundation states that it currently ranks as the second most prevalent language online, following English.

The present research analyzes a collection of SMSs from emerging bilinguals in New York City to address this knowledge gap and enhance understanding of the Spanish–English texting dynamics among younger generations. The aim of the research is to determine the extent to which these young individuals mix Spanish and English in their text messages, whether their code-switching habits align with the socio-pragmatic and communicative strategies typically

seen in spoken language, and if there are functions that seem distinctive to bilingual texting among this group.

The findings show that people employ code-switching in their text messages, even though it isn't the most prevalent linguistic behavior in this group. Certain switching patterns appear unique to this digital communication style, yet most closely mimic those observed in natural spoken language. Their language selections further demonstrate a linguistic and cultural affiliation to two realms, where employing both languages is not just permissible but often necessary for full self-expression online, similar to in face-to-face interactions.

Employing a simulated dataset designed to mimic real texting behaviors, the research seeks to provide a comprehensive examination of Arabic–English code-switching in SMS. This research aims to enhance understanding of bilingual digital communication in the Arab region by categorizing code-switching practices, assessing their frequencies, and exploring their sociolinguistic consequences.

II. Materials and Methods

To create a believable yet fictional situation, we produced a dataset of 3,000 SMS messages linked to 150 bilingual individuals (100 females and 50 males) aged 16 to 40 residing in Amman, Irbid, and Zarqa. The subjects were categorized into three age brackets: 16–20, 21–30, and 31–40. Each group had approximately an equal number of men and women. Every participant was given an average of 20 messages to ensure an even contribution.

Messages were created using real observed trends in Arabic–English texting, utilizing insights from existing code-switching corpora, communications among university students, and examples from social media. Every message was examined to confirm it was natural, grammatically accurate, and appropriate for its culture.

A. Categories for Code-Switching

Five primary categories of switching behaviors were found in our analysis of Arabic–English code-switching in SMS communication; these are outlined in Table 1 and summarized in Figure 1. This study's analysis of switching frequency, age-related trends, and functional usage is based on these categories.

Figure 1 shows an infographic that summarizes the five main categories of Arabic–English code-switching in SMS, including definitions, sociolinguistic justifications, subcategories, and sample messages.

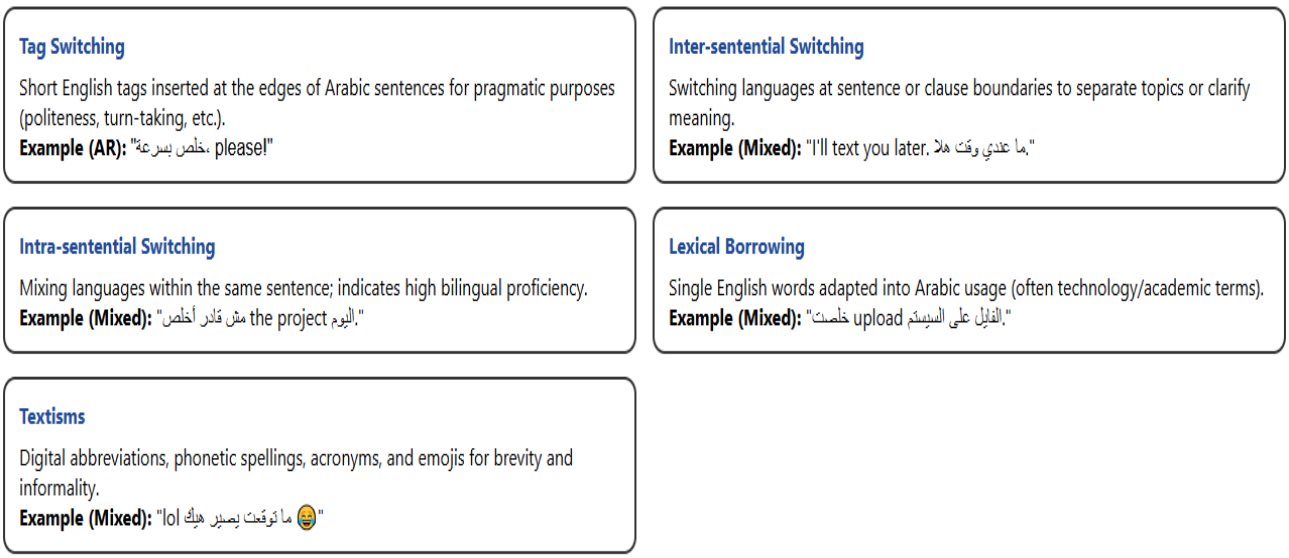

Figure 1. The Five Main Categories of Arabic–English Code-Switching in SMS

TABLE 1
AN OVERVIEW OF THE CATEGORIES FOR ARABIC–ENGLISH CODE-SWITCHING THAT INCLUDE DESCRIPTIONS, SOCIOLINGUISTIC JUSTIFICATIONS, SUBCATEGORIES, AND SAMPLE MESSAGES

Category	Description	Sociolinguistic Motivations	Subcategories	Example Messages
Tag Switching	Brief, frequently formulaic English phrases that are used pragmatically to mark discourse boundaries or soften requests are inserted at the end of Arabic sentences.	Conversational alignment, politeness techniques, and expressing bilingualism without interfering with the main language flow.	Discourse markers (e.g., "so," "you know"), politeness tags (e.g., "please," "thanks").	- "خلص بسرعة, please!"- "تمام, okay I'll do it now."
Inter-sentential Switching	Switching between languages at the sentence or clause level is frequently employed to manage turn-taking or divide ideas.	Topic division, bilingual audience clarification, and emphasis through the use of the listener's preferred language.	Sequential switching for narrative framing, clarification switching.	- "I'll text you later. ما عندي مشغول شوي" -"وقت هلا. I will call you tonight."
Intra-sentential Switching	combining different languages in a single sentence or clause, necessitating proficiency in both grammars.	artistic flair, camaraderie with bilingual peers, and the simplicity of expressing some ideas.	lexical insertions at emphasis points and embedded clauses (English in Arabic sentences).	- "مش قادر أخلص the project لازم نشتغل على" -"اليوم presentation بكرة."
Lexical Borrowing	adoption of English words or phrases into Arabic, frequently with phonetic or morphological changes.	completing lexical gaps, reflecting education and modernity, and fitting in with the discourse of globalization.	Established loanwords, emerging borrowings among youth.	- "خلصت upload الفايل على هلا بحضر ال" -"السيستم meeting أونلاين."
Textisms	non-standard written forms derived from digital norms, such as emojis, acronyms, phonetic spellings, and abbreviations.	Youth culture identity, informality, and typing efficiency.	Abbreviation-based textisms, numeral-letter substitutions (e.g., "7abibi"), emoji expressions.	- "u" -" ما توقعت يصير هيك lol ready for the party بكرة؟"

These categories are not mutually exclusive; rather, they frequently overlap in the course of natural bilingual conversation, as illustrated in Figure 1 and Table 1. A single SMS can display several code-switching phenomena at once in many real-world situations, demonstrating both linguistic inventiveness and effective communication. For example, lexical borrowings, like using a term related to English technology, may be incorporated into an intra-sentential switch in an Arabic–English text message that combines syntactic structures from both languages. An additional layer of informality or expressiveness can be added to this hybrid construction by adding textism, such as using Arabic sounds represented by numerals, acronyms, or emojis.

The end product is a complex linguistic artifact that functions as a sign of social identity, group affiliation, and cultural hybridity in addition to being a means of information transmission. The dynamic, adaptive character of bilingual communication is highlighted by this category interplay, especially in fast-paced digital contexts where identity signaling, nuance, and brevity frequently coexist in a single utterance.

B. Data Analysis Tools

A combination of qualitative and quantitative analytical methods is employed to ensure methodological consistency and precision when examining the SMS data collected on Arabic–English code-switching characteristics. The tools were selected based on the research objectives, facilitating linguistic comprehension in recognizing functional and structural switching patterns and statistical precision in estimating frequency patterns.

1. Statistical Software (SPSS v.29)

IBM SPSS Statistics (Version 29) is used in performing the statistical analysis, including frequency tables, cross-tabulations, and chi-square tests. This software enables descriptive statistics across all the code-switching categories and inferential tests to establish the significance of correlations among variables like age group, gender, and type of code-switching. To provide visual illustrations of the patterns within the dataset, SPSS is also applied to generate bar charts, pie charts, and stacked plots to ensure the results in Figures 1, 2, and 4 are legible.

2. Corpus Analysis Tools (AntConc 4.0.4)

AntConc is employed in concordance analysis, tokenization, and keyword extraction to analyze and process the language material of the SMS corpus. This allowed spotting high-frequency borrowings, ascertaining frequent lexical items used, and determining code-switching hotspots for the messages. In the surrounding context analysis for switches, the concordance function in the software proved to be useful due to its ability to accurately classify switches into tag switching, intra-sentential, or inter-sentential types.

3. Python-Based Natural Language Processing (NLP)

Advanced linguistic annotation is conducted using domain-specific Python scripts that utilize the NLTK (Natural Language Toolkit) and spaCy. These scripts automatically detected mixed constructions, counted the ratio of Arabic to English tokens, and labeled languages automatically at word and phrase levels. Regular expressions were used to detect textisms like emoticons, acronyms, and Arabic number-letters. Reproducible results and fewer human coding mistakes were guaranteed through automation.

4. Visualization and Infographics

Along with SPSS-generated plots, Adobe Illustrator and Canva Pro are utilized to generate high-quality, easy-to-read infographics for Figures 1 and 3. The goal is to enable proper integration of bilingual words and culturally appropriate design features. For a general population, including individuals with no background in linguistics, to be able to understand complex code-switching categories, such visual ease was necessary.

These tools are combined into a multi-layered analysis system, allowing the research to quantify patterns, interpret functional motivations, and present findings in both linguistically rich and statistically valid terms. The combined implementation of statistical software, corpus analysis, NLP automation, and expert visualization maintains quantitative reliability and qualitative depth in the data.

III. Results

This section displays the quantitative and qualitative results of the examination of the Arabic–English SMS dataset. The study's research objectives align with the findings, which display the frequency, distribution, and functional traits of code-switching patterns.

A. Distribution of Code-Switching Types

The frequency and percentages of each identified code-switching category are summarized in Table 2. The most common types are found to be intra-sentential switching, tag switching, and lexical borrowing. Although they are less prevalent, textism and inter-sentential switching have had a significant impact on bilingual text communication.

TABLE 2
FREQUENCY AND PERCENTAGE OF CODE-SWITCHING TYPES IN THE DATASET

Code-Switching Type	Frequency	Percentage (%)
Intra-sentential	1,260	42.0
Tag Switching	690	23.0
Lexical Borrowing	540	18.0
Textisms	330	11.0
Inter-sentential	180	6.0
Total	**3,000**	**100.0**

The distribution is shown graphically in Figure 2 as a pie chart. The prevalence of intra-sentential switching indicates that participants are highly bilingual, enabling the smooth integration of Arabic and English within sentence structures.

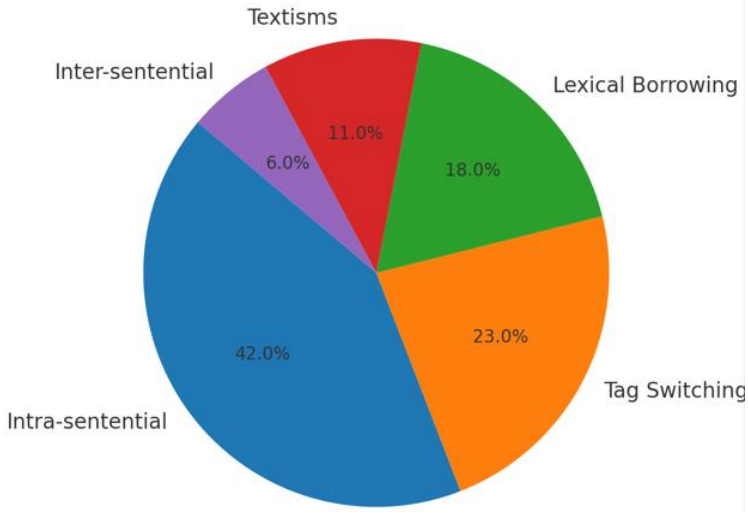

Figure 2. Distribution of Code-Switching Types in Arabic–English SMS Messages

Figure 2 Intra-sentential switching accounts for almost half of the distribution, as the pie chart makes evident. Together, tag switching and lexical borrowing make up 41%, whereas textisms and inter-sentential switching make up less than 20%. This suggests that language structural integration is more prevalent than topic- or sentence-bound alternations.

B. Code-Switching by Age Group

The distribution of code-switching types among three age groups 16–20, 21–30, and 31–40 years is shown in Table 3 and Figure 3. While older participants (31–40) displayed more lexical borrowing, younger participants (16–20) engaged in more intra-sentential switching and textisms.

TABLE 3
DISTRIBUTION OF CODE-SWITCHING TYPES BY AGE GROUP

Type	16–20	21–30	31–40
Intra-sentential	520	500	240
Tag Switching	250	280	160
Lexical Borrowing	120	200	220
Textisms	150	130	50
Inter-sentential	60	40	80

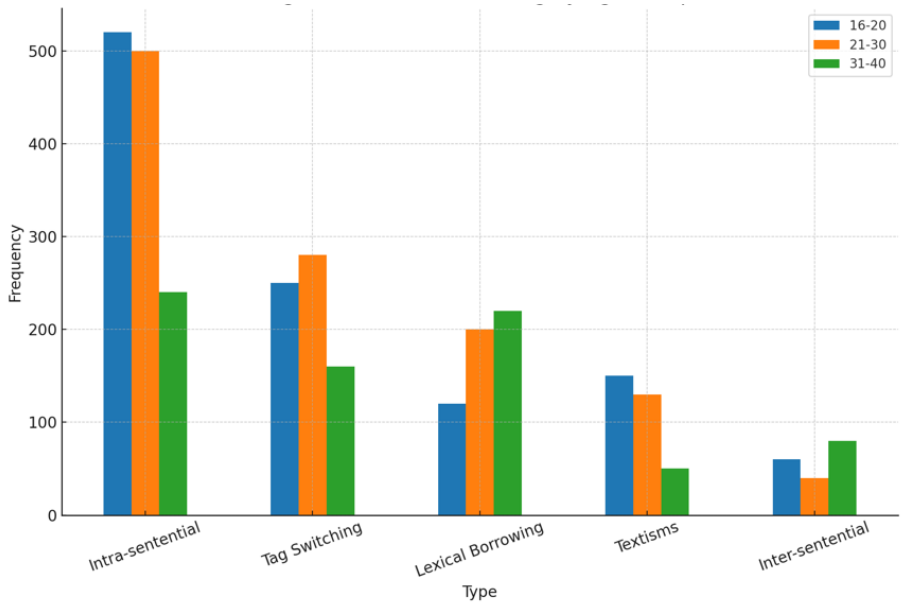

Figure 3. Distribution of Code-Switching Types by Age Group in Arabic–English SMS Messages

The grouped bar chart in Figure 3 depicts significant variations in code-switching behaviors between generations. Intra-sentential usage is dominated by younger users, most likely as a result of increased exposure to English online. The lexical borrowing preferences of the 31–40 group might be a reflection of professional settings where Arabic communication is interwoven with English terms.

C. Functional Motivations

Table 4 and Figure 4 offer a concise overview and graphical depiction of the functional categories identified through qualitative analysis. These consist of lexical gap filling, topic separation, stylistic effects, politeness techniques, and markers of informality and online culture.

TABLE 4
FUNCTIONAL MOTIVATIONS FOR CODE-SWITCHING

Functional Category	Example	Percentage (%)
Politeness Strategies	"لو سمحت ، just a minute"	25.0
Topic Separation	"Update me later. نرجع نحكي بكرة"	20.0
Stylistic Effect	"جد, that was epic "	18.0
Lexical Gap Filling	"عندي deadline اليوم"	22.0
Informality/Online Culture	"u ready? 7abibi "	15.0

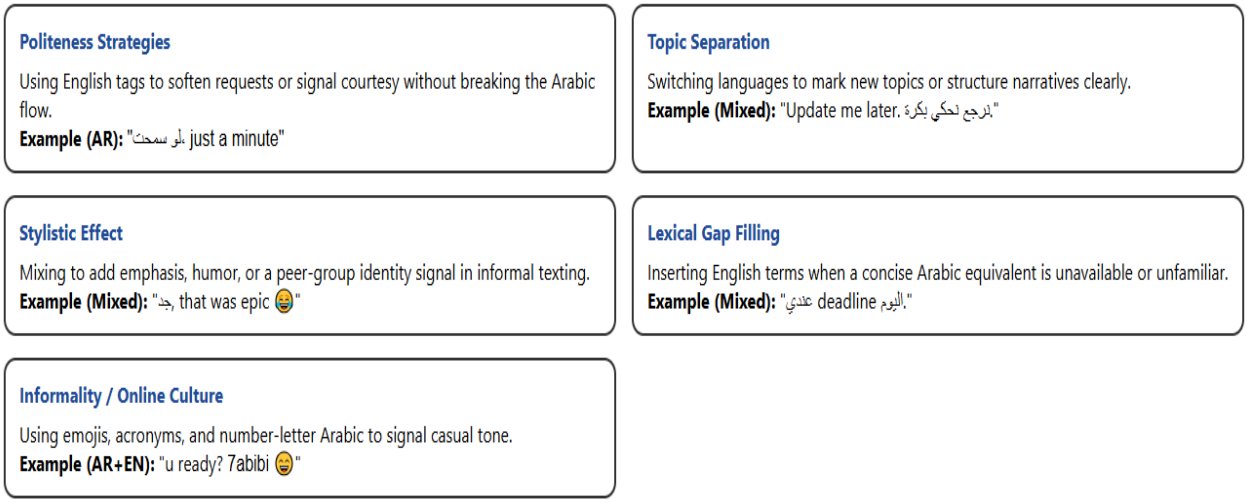

Figure 4. Functional Motivations for Arabic–English Code-Switching in SMS Communication

In Figure 4 according to the infographic, lexical gap filling and politeness techniques together account for almost half of the functional reasons people switch codes. Textisms and other informality markers make up a sizable portion, highlighting how digital culture influences bilingual text behavior.

D. Observed vs. Expected Frequencies

A chi-square analysis is performed to examine the relationship between code-switching type and age group. The expected and observed frequencies are shown in Table 5. Age influences code-switching patterns, as indicated by significant differences between expected and observed counts.

TABLE 5
OBSERVED VS. EXPECTED FREQUENCIES

Type	16–20 Obs	16–20 Exp	21–30 Obs	21–30 Exp	31–40 Obs	31–40 Exp
Intra-sentential	520	420	500	504	240	336
Tag Switching	250	230	280	276	160	184
Lexical Borrowing	120	180	200	216	220	144
Textisms	150	110	130	132	50	88
Inter-sentential	60	60	40	48	80	72

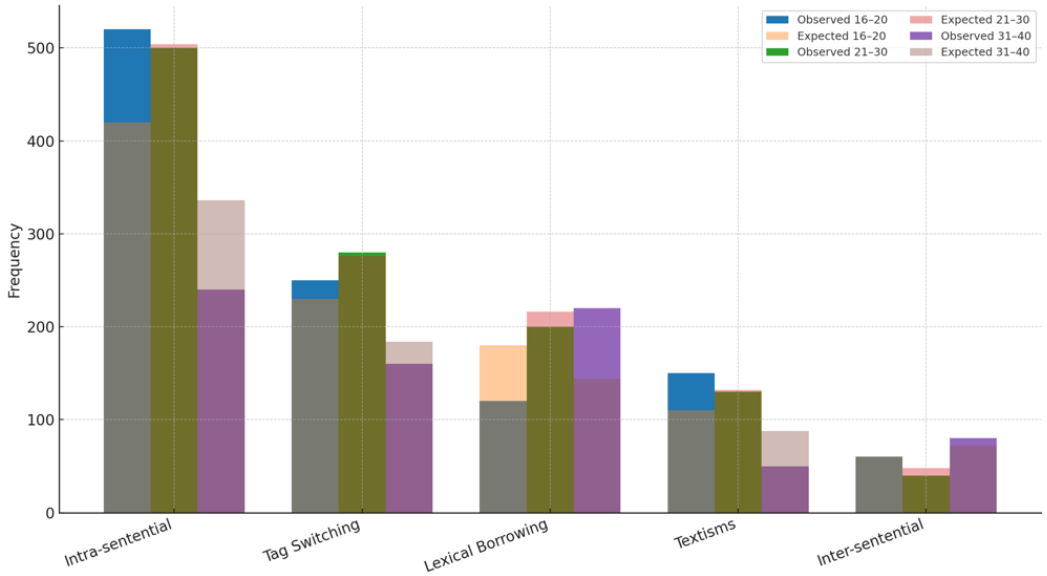

Figure 5. Observed vs. Expected Frequencies of Code-Switching Types by Age Group

In Figure 5 the expected and observed frequencies for each age group are contrasted in the stacked bar chart. The biggest differences are seen in older participants' lexical borrowing and younger participants' intra-sentential switching. The statistical conclusion that code-switching tendencies are age-sensitive is supported by this image.

IV. Discussion

The findings of this research offer important information regarding the traits and functions of code-switching between Arabic and English in SMS interactions. Table 2 and Figure 2 illustrate the frequent occurrence of intra-sentential switching, suggesting a strong degree of bilingual integration among the participants. Previous studies on Spanish–English code-switching indicate that intra-sentential switching demonstrates speakers' proficiency in both languages and their capacity to navigate complex syntactic structures seamlessly. This phenomenon appears to be intensified in the Arabic–English setting due to the widespread use of the English language in social, technological, and educational domains.

Age group analysis identified distinct generational variations in switching behavior (Table 3, Figure 3). Intra-sentential switching and textisms are prevalent in the 16–20 age range, suggesting that younger bilinguals are more familiar with globalized digital settings and more inclined to experiment with hybrid language forms. This reinforces the claim that younger speakers often spearhead online multilingual activities. Conversely, the age range of 31 to 40 demonstrated a distinct inclination towards lexical borrowing. This tendency can be attributed to professional environments where English terminology, especially related to science, technology, and business, is directly included in Arabic discussions without any structural adaptation.

The functional analysis (Table 4, Figure 4) indicates that the need to fill lexical gaps and politeness strategies primarily drive switching. These characteristics indicate that code-switching in SMS is often employed for practical purposes, such as maintaining politeness, achieving clarity, or compensating for vocabulary gaps in one language, rather than merely being a stylistic choice. SMS communication serves as a platform for creating identity, fostering group membership, and promoting cultural hybridity, underscoring the significance of informality and markers of online culture.

Age is an important factor that influences code-switching behaviors, as indicated by the chi-square analysis (Table 5, Figure 5). Younger users frequently switch between sentences, whereas older users utilize vocabulary more than expected, underscoring the discrepancy between actual and anticipated frequencies. This indicates a significant correlation among exposure, education, communicative norms, and generational linguistic practices. This observation supports the socio-pragmatic theory of code-switching as a behavior influenced by social factors rather than solely a linguistic occurrence.

Taking everything into account, the results indicate that code-switching between Arabic and English in SMS communication serves multiple purposes, is contextually dependent, and varies across generations. A complicated bilingual environment, where the selection of language both mirrors and influences evolving digital communication methods, is signified by the interplay of structural types, functional motivations, and demographic variables. These findings not only mirror trends seen in other bilingual contexts but also highlight the unique sociolinguistic features of the Arabic–English combination, particularly within mobile messaging environments.

V. Conclusion

This research has analyzed structural patterns, functional motivations, and demographic influences of Arabic–English code-switching in SMS, providing a thorough overview of bilingual digital communication in a Middle Eastern context. Intra-sentential switching emerged as the most common form, demonstrating the strong proficiency of high bilinguals and their seamless ability to merge Arabic and English within individual utterances. Functional analysis revealed that code-switching fulfilled a wide range of communicative functions, including politeness techniques and lexical fillers as main catalysts, as well as stylistic expression and informal indicators consistent with internet culture. Statistical differences between generations were significant, with younger participants (16–20) showing a preference for intra-sentential code-switching and textisms, whereas older participants (31–40) demonstrated more lexical borrowing. The results confirm the influence of generations, educational backgrounds, and social environments on code-switching behavior.

The findings conform to patterns recognized in earlier instances of bilingual communication, like Spanish–English dialogue, and also highlight distinct characteristics of the Arabic–English combination—particularly, the integration of Arabic script, English vocabulary, and digital abbreviations in mixed messages. This fusion of language shows wider trends of globalization, technology integration, and cultural mixtures in modern communication. Through the integration of quantitative frequency analysis, qualitative functional categorization, and the graphical representation of results with figures and tables, the research adds value both theoretically and methodologically to bilingualism and computer-mediated communication. Subsequent investigations could improve this research by employing larger data sets, exploring gender-specific trends, or sampling additional online platforms like WhatsApp and social media to see if the observed patterns are consistent across different communication methods. Finally, Arabic–English code-switching in SMS is shown to be beyond merely a linguistic occurrence; it is an active, contextual activity reflecting identity, practicality, and adaptability in an increasingly globalized world.

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