

English Code Switching and Mental Flexibility in Pakistani Multilingual Landscape: A  
Correlational Exploratory Study

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**ABSTRACT**

*In the multilingual environment of Pakistan, code switching is a common and purposeful communicative occurrence/strategy. The current research intends to investigate the connection between English code switching and mental flexibility among multilingual individuals in Pakistan. It aims to examine how the regularity of code switching could be linked to mental flexibility as a cognitive skill. Employing a correlational and exploratory research methodology, this study intends to enhance our understanding of the cognitive advantages relate to interact interactions in a diverse linguistic framework. A mixed method, integrating quantitative surveys on both code-switching frequency and context with cognitive flexibility tasks, will be utilized to emphasize the behavioral and cognitive dimensions of code switching. Within the South Asian context, it is anticipated that the result may contribute to the cognitive advantages linked to multilingualism. This research has the potential to offer important insight into educational methodologies and strategies for developing cognitive skills within a linguistically varied community.*

**Keywords:** English code-switching, Mental Flexibility, Multilingualism, Cognitive Flexibility, Pakistan.

**INTRODUCTION**

Language, a significant human capacity, influences our understanding of experiences at a mental level. Language provides essential assistance to humans when understanding such events and experiences in their surrounding environment by assigning meaning to occurrences. Bilingual and multilingual speakers choose code-switching as an alternative when they need to communicate but find one language insufficient. Code-switching specifically between English and local languages now dominates multilingual societies of Pakistan and other countries worldwide.

Different groups of speakers including monolinguals and multilinguals demonstrate varying levels of understanding their environment and thinking capabilities because of needing to handle multiple languages (Freeman et al., 2016). The widespread use of English in daily communication occurs throughout Pakistan alongside Urdu and three regional languages which include Punjabi, Pashto, and Sindhi mainly dominant in urban areas. The practice is linked to social standing combined with academic achievement and modern outlook thereby making English the key language for official use and learning and social interactions (Shah & Sharif, 2020).

The relationship between English and local languages creates uncertainties about whether bilingual behaviors affect mental flexibility capabilities particularly the ability to easily move between intellectual viewpoints (Diamond, 2013). The peculiar status of English in Pakistan stems from both the country's former colonial roots and present-day globalization patterns which give it prominence in academic institutions and business sectors as well as media organizations (Jabeen & Hussain, 2020). English code-switching has become an everyday practice which people regularly use during formal and informal interactions.

The Pakistani context has insufficient investigation of how code-switching affects mental flexibility despite social functions like identity expression and prestige (Anwar & Rauf, 2021). Executive functioning contains mental flexibility as an essential component based on research by Miyake et al. (2000) since adaptability helps individuals shift between multiple cognitive tasks or switching mindsets. Multiple studies indicate that frequent users of code-switching among bilingual individuals might build better cognitive flexibility since their constant language switching exercises their mental control system (Bialystok et al., 2019).

Multiple researches explored multilingual communication that code-switching patterns that have a positive connection with increased cognitive performance capabilities. According to Farooq and Rehman (2022) superior cognitive flexibility levels among frequent bilinguals' participants who frequently switched languages between English to Urdu compared to monolinguals.

Researches also conducted by Pakistani scholars Zahra and Tanveer in (2024) and they explore that Pakistani university students who frequently transferred languages between English and their local languages (Urdu, Punjabi, Potohari etc) also improved their overall performances in cognitive flexibility tests that elaborate the Stroop test and task-switching tests for languages. Results also revealed that

assessment of code-switching effects would include quantitative measures of its frequency along with qualitative analysis of its usage contexts since these aspects shape the influence on cognitive flexibility.

Numerous studies indicated that the cognitive effects on bilingual speakers who switch their languages despite showing conflicting results. Social and cultural effects of code-switching in Pakistan have been also the main focus of various studies conducted by Zaidi in 2019. Research explored those cognitive factors especially how English code-switching affects mental flexibility while showing growing academic attention. The research conducted by Ali and Hussain in 2021 demonstrated that university students from Pakistani city areas displayed better cognitive flexibility than regular code-switching language. The results revealed that language switching ability enables brain growth that learns to perform parallel cognitive tasks thereby pretty cognitive flexibility (Bialystok, 2017).

According to Aslam and Yousaf (2021) people who switched language codes frequently showed improved outcomes in cognitive flexibility examinations through the Wisconsin Card Sorting Test than monolingual persons. One study by Karim and Saeed in 2023 proved that English code-switching which arises regularly in Pakistani urban regions created improved presentation in cognitive control abilities. Researches about bilingualism and cognitive flexibility grasp significant status in Pakistan due to English being used both as a teaching language and a social progress tool according to Hassan and Ahsan (2020).

The researched relation between multimodal linguistic practices and mental flexibility happens within complex circumstances. Research by Rahman (2023) establishes that code-switching produces cognitive advantages but produces cognitive overload during specific situations which arise from excessive code-switching or purposeless code-switching events.

Research seeks to extend understanding about the relationship between English code-switching and mental flexibility within the multilingual terrain of Pakistan. The research uses a correlational approach to study whether regular code-switching in English affects cognitive flexibility while using cognitive tasks as indicators of task-switching capacity. The understanding of this relationship stands essential because it delivers crucial information about cognitive implications of multilingualism in Pakistan which adds to psycholinguistics studies.

### **Statement of the problem**

A most prevalent phenomenon among English as a second language speakers is code-switching in Pakistani multilingual context. Nonetheless, these learners encounter numerous cognitive tasks, together with comprehension snags, memory constraints, dearth of attention, restricted problem-solving capabilities, absence of metacognitive awareness, and anxiety. Cognitive flexibility, a crucial skill is effective in learning in both theoretical and professional domains. Still, the connection among code-switching and cognitive flexibility remains poorly unstated. Further investigation is required to examine the probable advantages and drawbacks of code-switching among multilingual educators and learners. The application of code-switching in the explanations provided by the daily conversation switching in the explanations provided by teachers and the daily conversations of students proves advantageous in fostering cognitive flexibility, improving language attainment, promoting cross-cultural communication, and bolstering stimulation and confidence. To improve the cognitive flexibility of teachers and students who speak English, it is advised to promote more frequent use of code-switching.

### **Gap in research**

The majority of investigations concerning code-switching in Pakistan have concentrated on sociolinguistic or pragmatic facets, often overlooking the cognitive processes engaged. There exists a scarcity of empirical studies on how code-switching impacts cognitive flexibility or executive functioning in bilingual and multilingual speakers in Pakistan. Most research emphasizes the occurrence of code-switching without examining how the frequent interchange between languages affects cognitive flexibility specifically in Pakistani environments. Additional studies could investigate whether specific bilingual or multilingual settings (e.g., rural vs. urban areas) influence mental flexibility in varied ways.

### **Implication**

In the absence of studies concentrating on cognitive aspects, it is challenging to evaluate whether and how code-switching in Pakistani languages (e.g., Urdu, Punjabi, Sindhi etc) enhances mental flexibility, as noted in bilingual research in other areas. This absence limits comprehension of the potential cognitive advantages of multilingualism in Pakistan.

### **The purpose of the study**

This study intends to investigate the importance of code-switching among English educators and learners and its possible influence in boosting their cognitive control. Moreover, the study aims to examine the effect of code-switching on the enhancement of cognitive flexibility among its users. Additionally, the study seeks

to analyse how often multilingual individuals in Pakistan partake in code-switching and whether a significant relationship exists between code-switching and cognitive flexibility. By comprehending the link between code-switching and cognitive flexibility, the study could offer valuable insights into how English language learners might simultaneously enhance their language proficiency and cognitive skills through code-switching.

### **Research Objectives**

This study seeks to concentrate on:

1. To examine prevalence trends of code-switching among multilingual speakers in Pakistan.
2. To assess the connection between the frequency of code-switching and mental flexibility.
3. To investigate the effects of aspects such as age, educational attainment, and English proficiency on the relationship between code-switching and mental flexibility.

### **Research Questions**

The present study seeks insights on

1. How frequently do multilingual speakers in Pakistan engage in code-switching?
2. Is there any significant correlation between code-switching and mental flexibility?
3. Do demographic aspects (e. g., age, educational attainment, and English-speaking proficiency) affect the relationship between code-switching and mental flexibility?

### **Hypothesis**

- It is proposed that individuals who frequently engage in code switching will show a greater degree of mental flexibility compared to those who engage in code switching less often.
- This proposal is based on existing literature that indicates cognitive advantages is linked to bilingualism.

### **LITERATURE REVIEW**

More than six thousand different languages exist worldwide and multilingualism affects many people throughout the world (Grimes, 1992). People who speak multiple languages have the ability to use code switching when context requires it because they can seamlessly switch between different languages within their conversations. The practice of code-switching goes beyond linguistic studies because research now examines how individuals use cognitive and sociocultural methods during code-switching (Grosjean, 2021). The classification of code-switching includes intra-sentential which happens within a sentence along

with inter-sentential which occurs between sentences (Milroy & Muysken, 1995). Code-switching happens automatically in places with multiple spoken languages because speakers use their available linguistic tools to handle challenging communication situations. According to Eldridge (2020) people utilize code-switching because it helps them meet three distinct communicative purposes that combine improved listening clarity with identity representation and group affiliation acknowledgment in social settings.

Code-switching functions as a cognitive adaptability technique used by multilingual individuals (Grosjean, 2021) based on current research findings. Holmes (2020) explains that code-switching forms according to contextual requirements when speakers adapt their speech patterns to meet various social and cultural and pragmatic needs. Such linguistic practice reveals how language use grows multiple sizes along with sociolinguistics fundamentals of identity and related issues and social ranked subtleties.

### **Cognitive Benefits of Bilingualism and Multilingualism**

Code-switching displays numerous cognitive rewards since it improves executive control capabilities and psychological flexibility (Abutalebi & Green, 2007; Bialystok, 2020). Code-switching helps persons develop better supervisory control together with mental flexibility abilities according to current research results. Research shows bilingual and multilingual speakers progress superior cognitive capabilities that comprise working recall together with task switching and repressive control which establish mental flexibility mechanisms (Bialystok, 2020; Abutalebi & Green, 2007). According to Bialystok & Martin (2021) bilingual persons achieve superior level of problem-solving abilities along with better mental revision skills compared to their monolingual counterparts because of their consistent language switching routines.

Several research studies found that code-switching relates to enhanced neurocognitive meanings and better control instruments. Bilingual people validate increased brain movement in their language-switching regions thus validating the perspective that active multitasking between multiple languages develops mental flexibility (Kroll et al., 2019). Green and Abutalebi (2023) demonstrated that bilingual subjects have tougher cognitive reserve skills that help avoid dementia symptoms during later life phases. Bilingual individuals who switch languages frequently develop harder neural influences in the prefrontal cortex where results and tasks are achieved.

### **Theoretical Models of Code-Switching and Mental Flexibility**

Researchers understand code-switching cognitive mechanisms best through analysis of Inhibitory Control Model (ICM) and Interactive Alignment Model (IAM). Bilingual persons need to uninterruptedly peace one language but activate the other important to enhanced control capabilities and superior mental flexibility (Bialystok, 2020; Abutalebi & Green, 2007). The fronto-parietal link in the brain shows suggestion of beginning following current lessons which have established that code-switching functions through this executive control system responsible for cognitive switch and attentional shifting and problem-solving (Abutalebi & Green, 2020).

The IAM results suggested people perform code-switching because it allows them to match their statement approaches to their listeners favoured linguistic adoptions while supervision their available linguistic possessions (Giles & Coupland, 2022). The study of Vives et al. (2023) expressions that context related needles guide reciters to choose their language selection while viewing how suppleness in the mind runs to modify linguistic routine.

### **Code-Switching and Cognitive Flexibility in Pakistan's Multilingual Context**

The linguistic diversity of Pakistan extends across its territories since multiple languages exist throughout the country. The nation possesses six official languages and exceeds sixty regional languages (Zaib, 2020). The people of Pakistan regularly interact in multiple languages. The coexistence of languages such as Urdu, English, Punjabi, Pashto, and Sindhi facilitates frequent code-switching. Rahman (2020) highlights that Pakistan's social political arrangement strongly represents language transitions which normally indicate how power works together with cultural perspectives. English functions as a status symbol in Pakistani society yet Urdu and Punjabi provide the basis for building social unity among its citizens.

Research conducted in Pakistan verifies code-switching functions as an instrumental cognitive instrument. Akhtar & Ali (2021) evaluated Pakistani bilingual children and discovered they excel at executive control and task-switching as well as their monolingual counterparts particularly during Urdu-English switches. Sultana & Rahman (2023) through their research showed that code-switching supports students' understanding and educational achievements in Pakistani classrooms which indicates that instructional language switching enhances cognitive development in educational environments.

### **METHODOLOGY**

The current research study utilizes a correlational exploratory design to investigate the connection between the frequency of English code switching and mental flexibility. A sample consisting of 7 multilingual educators and 250 students from academic background are chosen through convenient sampling.



Participants possess proficiency in at least three languages including English, Urdu, and Punjabi. Pearson's correlation coefficient computes to investigate the connection between code switching frequency and mental flexibility. Multiple regression analysis is performed to ascertain any moderating effects of age, education, and English proficiency on this connection. Thematic analysis is applied on the interview conducted with university level teachers on code-switching and mental flexibility.

## Results

**Table 1. Correlation Analysis**

Variables	1	2	3
CD	-	0.34**	-0.02
CF	-	-	-0.35**
MCF	-	-	-
M	19.94	20.71	28.68
SD	3.22	3.51	4.25
A	.38	.34	.81

Note: CD = Code Switching, CF = Mental Flexibility, MCF = Motivation for Code Switching, M = Mean, SD = Standard Deviation,  $\alpha$  = Cronbach's Alpha, \*\* $p < 0.01$ .

The results highlighted a significant positive correlation between code-switching and mental flexibility  $r = .34$  and  $p < .01$  that indicating such as frequent code-switchers tend to exhibit greater cognitive flexibility in humans. Results also revealed that significant negative correlation was found between motivation for code-switching and mental flexibility  $r = -.35$  which signifying that stronger motivation does not essentially translate into higher flexibility.

**Table 2: Multiple Regression Analysis**

Predictor Variables	B	SEB	$\beta$	t	p
Constant	10.25	2.14	-	4.67	
					< .001
Code-Switching (CD)	0.41	0.10	.31	4.01	
					< .001
Age	0.08	0.04	.10	2.12	.04



Education Level	0.22	0.09	.16	2.34	.01
English Proficiency	0.35	0.07	.27	5.12	< .001
CD × Age (Interaction)	-0.35	0.01	-.04	-1.21	.22
CD × Education	-0.01	0.01	-1.21	2.11	.35
CD × English Proficiency	0.03	0.01	2.02	2.51	.01

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$R^2 = .38, F(7, 242) = 21.23, p < .001$ . CD = Code Switching.

Table of regression analysis indicated that code-switching is significantly predictor of mental flexibility  $\beta = .32$  and  $p < .001$ . This relationship was positively moderated by the research variables such as education level and the English proficiency. Though, the variable age did not significantly moderate and have effect of code-switching on cognitive flexibility.

## Qualitative Results

### Thematic Analysis of Teacher Interviews

A thematic analysis was conducted to explore educators' perspectives on English code-switching and its impact on cognitive flexibility in multilingual classrooms. Interviews with seven university-level teachers were analyzed, and recurring themes were identified based on their experiences and views. The results are presented according to key themes and supported with synthesized observations.

#### Theme 1: Role of Experience in Code-Switching Practice

Participants across different career stages used code-switching to enhance instructional strategies. Early school teachers revealed that using code-switching to aid knowledge and build rapport. Mid career and late career teachers usually used it more intentionally and this attributing their superior use to collected experience. This theme also suggested that code-switching practices become more careful with increased teaching experience in school.

#### Theme 2: Definitions and Perceived Functions of Code-Switching

Teachers defined that code-switching is a very a facilitative linguistic strategy that help to simplify complex ideas in to easy and enhance super accessibility. It was also perceived by review that it is a essential pedagogical tool in bilingual settings reflecting both communicative utility and educational responsiveness.

### **Theme 3: Frequency and Contextual Use**

Teacher's school reported that varying frequency of code-switching from irregular to frequent use depending on student ability, lesson complication and subject matter. Code-switching was very especially employed to bridge grasp gaps during complex deliberations.

### **Theme 4: Reasons for Code-Switching**

Educationalists recognized key drives followings:

- Enhancing clarity and comprehension
- Engaging and managing the classroom
- Building rapport
- Providing contextual examples
- Managing instructional fatigue

These bring into line with both pedagogical and personal goals, highlighting code-switching's multidimensional role in learning.

### **Theme 5: Perceived Impact on Cognitive Flexibility**

Teachers experimental that code-switching enhanced students' mental agility, knowledge, memory holding and creative rational. They well-known it simplified a more passionately relaxed and comprehensive learning situation, promoting profounder cognitive appointment.

### **Theme 6: Effects on Student Learning Behavior**

Code-switching was reported to:

- Foster emotional relaxation
- Boost engagement and participation
- Support multilingual proficiency
- Support theoretical empathetic

Teachers linked these behavioural advances with enhanced executive functioning and cognitive flexibility.

### **Theme 7: Teacher Adaptability and Instructional Flexibility**

Teachers also enhanced code-switching capability to adjust to diverse student requirements. Though, several respondents emphasized moderation to avoid overdependence and maintain goal linguistic growth.

### **Theme 8: Challenges and Limitations**

Challenges included:

- Institutional constraints
- Risk of cognitive overload
- Classroom disruptions due to inconsistent switching

### **Theme 9: Recommendations and Training Needs**

Participants advocated for:

- Formal training on pedagogical code-switching
- Developing strategies for balanced use
- Awareness programs on sociolinguistic value and cognitive outcomes

These insights reflect the need for specialized expansion to optimize code-switching's profits.

## **DISCUSSION**

This study revealed that the relationship between English code-switching and cognitive flexibility among multilingual teachers and students in Pakistan that are using both quantitative and qualitative practises. The conclusions expose that code-switching, outside being a linguistic tool has important cognitive and pedagogical inferences mainly in attractive cognitive flexibility.

The thematic analysis from university teachers highlighted that code-switching is not simply a spontaneous act but a careful pedagogical strategy to enable understanding, engaging students and adapt teaching lines. These results are reliable with local studies as mentioned by Anwar and Rauf, 2021 and Farooq and Rehman, 2022 that report enhanced classroom communication and learning behaviours among both bilingual students and teachers who engage in code-switching. Teachers in this current study viewed code-switching as attractive their adaptability and enabling them to deliver teaching more successfully in multilingual classrooms. This thought is resonated by Aslam and Yousaf (2021), who confirmed the link between regular language switching and improved decision-making operational in Pakistani educational settings.

The cognitive dimension predominantly mental flexibility appeared as a key area where code-switching plays appreciated role. Participants linked code-switching with enlarged attention, their creative thinking, emotional ease and most of all problem-solving skills. These observations align with results of Zahra and Tanveer (2024) who explored that frequent bilingual code-switchers of language outperformed monolinguals in cognitive tasks such as the Stroop test and task-switching calculations. These patterns reflect a rising gratitude that language switching can care the development of administrative functions involved in cognitive flexibility.

Quantitative results of the current study further validated the perceptions of languages. Correlational analysis displayed a significant positive relationship between code-switching and mental flexibility  $r = .34$  and  $p < .01$  supporting the evidence that frequent language switching improves cognitive adaptability.

Interestingly, motivation for code-switching presented a significant negative correlation with mental flexibility  $r = -.35$  and  $p < .01$  representing that a high inspiration to switch languages does not necessarily translate into better cognitive flexibility. This may propose that while motivation may resolve usage, it is the practical application and occurrence of code-switching that are more cognitively elevating.

Multiple regression analysis results of the study showed that depth by probing the role of demographic variables as potential moderators. Code-switching endured a significant predictor of mental flexibility  $\beta = .32$  and even after controlling variables for age, education, and English proficiency. Moreover, education level  $\beta = .18$  and  $p = .015$  and English proficiency  $\beta = .28$  and  $p < .001$  were found to positively moderate this relationship. These results suggested that higher educational achievement and stronger English language skills may increase the cognitive benefits linked with code-switching. These results are consistent with the work of Farooq and Rehman (2022) that highlighted the role of academic experience in enhancing bilingual cognitive development. However, age did not significantly moderate the relationship  $\beta = -.05$  and  $p > .05$  suggested that the cognitive effects of code-switching are more thoroughly linked to linguistic experience and ability than to chronological age.

Internationally, researchers such as Bialystok (2020) and Abutalebi and Green (2020) have constantly recognized the cognitive advantages of bilingualism with improved executive control and task-switching ability. These findings of this study support those observations, representative that Pakistani bilinguals similarly benefit from reasoning flexibility when regularly engaged in code-switching. Research by Kroll et al. (2019) and Vives et al. (2023) further wires the deduction that frequent interchange between languages strengthens neural networks responsible for language control, attention, and working memory—key components of cognitive flexibility.

The use of code-switching in enlightening practice also highpoints its broader pedagogical suggestions. Teachers in this current study stressed that code-switching helps bridge linguistic gaps, endorses inclusivity and accommodates students' various learning needs. However, they also stated concerns about potential overuse which bring into line with the Interactive Alignment Model by Giles and Coupland (2022). This model warns that unnecessary reliance on code-switching may hinder mastery of the target language if not applied carefully. To address such concerns teachers suggested moderated and focused use of code-switching in daily routine. They also spoken the need for official training programs that help teachers integrate code-switching successfully into classroom practice. These submissions are consistent with recent calls for organized multilingual pedagogies in international researches including the work of Cenoz and

Gorter in 2021 who are the believer for teacher training in pedagogical translanguaging and cognitive flexibility strategies.

### **LIMITATIONS AND FUTURE DIRECTIONS**

While the study findings confirm the cognitive benefits of code-switching and the study is not without limits. The qualitative data was drawn from a small sample of university teachers that is limiting generalizability to other educational levels or in rural contexts. Moreover, the correlational design of the quantitative analysis restricts any definitive causal rights. Future research could benefit from longitudinal designs that provide a road of cognitive development over time and from broader more diverse sampling across geographic and academic contexts. Such research studies could propose more nuanced insights into how changing linguistic environments influence the relationship between code-switching and cognitive flexibility in multilingual populations.

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