

Exploring the Cognitive Impact of Bilingualism: Challenges and Advantages of Dual Language Use

Nur Fadilah Zahirah M^{1*}, Puja Renita Meilani¹, Nur Asfira Suhardi¹

¹*Faculty of Languages and Literature, Universitas Negeri Makassar, Indonesia*

E-mail: nurfadilahzahirahm@gmail.com

*Corresponding author

Article Info	Abstract
Received: 12 March 2025 Reviewed: 15 March 2025 - 30 May 2025 Accepted: 1 June 2025 Published: 28 June 2025	<p>Purpose This study explores the lived experiences of bilingual individuals regarding the cognitive demands and advantages associated with the regular use of two or more languages, focusing particularly on the cognitive challenges of language switching and the cognitive benefits such as enhanced executive control and cognitive flexibility.</p> <p>Methodology A qualitative phenomenological approach was employed, utilizing semi-structured interviews with bilingual adults to capture their subjective perceptions of cognitive functioning in real-life language switching situations. The data were analyzed using thematic analysis.</p> <p>Results/Findings Thematic analysis revealed a balance between cognitive load—such as mental effort and interference—and cognitive benefits including improved problem-solving and attentional control among bilingual individuals.</p> <p>Implications These findings contribute to a comprehensive understanding of bilingual cognition and have important implications for educational practices and language policy that aim to optimize cognitive and communicative outcomes for bilingual individuals.</p>
Keywords: Bilingualism; Cognitive function; Language switching; Executive control; Phenomenology; Dual language use	

1. Introduction

In today's increasingly interconnected and multicultural societies, bilingualism the ability to use two or more languages regularly, has become a common phenomenon (Grosjean, 2010). Managing multiple languages involves complex cognitive mechanisms, such as code-switching, where bilingual speakers alternate between languages depending on social context, interlocutors, or communicative intent (Auer, 1998). This linguistic flexibility places unique demands on cognitive systems, especially executive functions that coordinate attention, inhibition, and task switching (Luk & Bialystok, 2013; Green & Abutalebi, 2013).

Although bilingualism confers cognitive advantages, including improved cognitive flexibility and enhanced executive control (Bialystok, 2017), it also poses challenges. Rapid language switching can generate cognitive interference, leading to increased mental effort, word retrieval difficulties, and attentional disruption (Prior & Gollan, 2011; Calabria et al., 2015). These challenges may impact bilinguals' real-world communication efficiency and performance in cognitively demanding tasks.

Most previous research emphasizes objective cognitive measures under controlled laboratory settings, leaving gaps in understanding bilinguals' subjective experiences of language use in everyday life (Surrain & Luk, 2019). Furthermore, the dynamic balance between cognitive costs and benefits in naturalistic bilingual contexts,

especially in societies with frequent spontaneous code-switching, remains underexplored.

This study aims to address these gaps by qualitatively investigating the lived cognitive experiences of bilingual individuals who regularly engage in dual language use. By focusing on subjective perceptions, this research seeks to elucidate how bilingualism shapes cognitive functions such as attention, memory, and problem-solving in daily linguistic practice. Insights from this study are expected to inform language education and policy, enhancing support for bilinguals in leveraging their cognitive strengths while managing associated challenges

2. Literature review

2.1. Bilingualism and dual language use

Bilingualism is defined as the ability to use two languages actively and functionally across various social contexts (Grosjean, 2010). This linguistic competence involves not only mastery of vocabulary and grammar but also the capacity to switch and adapt between languages depending on interlocutors, settings, or topics a process known as code-switching (Auer, 1998). Code-switching is not random; it reflects complex cognitive control, social norms, and communicative intentions (Poplack, 1980). As multilingualism increases globally, understanding how bilingualism shapes cognition has become a central focus in psycholinguistics and cognitive science.

Luk and Bialystok (2013) conceptualize bilingualism as a form of cognitive adaptation, wherein the brain must continuously engage in inhibitory control to activate the relevant language and suppress interference from the other. This aligns with the Adaptive Control Hypothesis (Green & Abutalebi, 2013), which posits that bilingual language control involves domain-general executive functions, such as conflict monitoring, response inhibition, and task switching. The habitual management of two language systems thus exercises and potentially strengthens these executive control processes.

2.2. Cognitive challenges in dual language use

The cognitive demands of bilingualism are particularly evident during language switching, which requires rapid and precise selection between competing linguistic representations. Blanco-Elorrieta and Pykkänen (2017) using fMRI, demonstrated that language switching activates key brain regions like the anterior cingulate cortex (ACC) and dorsolateral prefrontal cortex (DLPFC), which are crucial for attentional control and conflict resolution. These neural activations explain observed behavioral “switch costs” delays and increased errors when shifting from one language to another (Calabria et al., 2015).

Moreover, bilinguals often experience retrieval-induced forgetting, where retrieving a word in one language inhibits access to its counterpart in the other, causing temporary lexical retrieval failures (Prior & Gollan, 2011). Such interference can disrupt fluent communication and increase cognitive load during rapid language alternation. Spontaneous code-switching in informal bilingual communities, such as those in Southeast Asia, adds complexity because it often lacks rigid syntactic constraints, demanding flexible and immediate cognitive adjustments to linguistic and social cues (Zhou & Krott, 2018). This fluid switching can amplify executive control demands, leading to stress and cognitive fatigue, particularly under multitasking or high-pressure conditions.

2.3. Cognitive advantages of bilingualism

Despite these challenges, extensive research supports that bilingualism confers cognitive benefits, especially in executive functions. Bialystok (2017) found that bilinguals outperform monolinguals on tasks requiring inhibitory control, task switching, and working memory, suggesting enhanced cognitive flexibility. DeLuca et al. (2020) reported structural brain changes in bilinguals, including increased cortical thickness and more efficient neural networks in regions associated with cognitive control, highlighting neuroplasticity induced by bilingual experience.

These advantages are thought to arise from the constant practice bilinguals engage in to regulate two languages, which generalizes to non-linguistic cognitive tasks involving attention and multitasking. However, the bilingual advantage is not universal; it varies based on factors such as age, proficiency, language pair, and socioeconomic context (Paap et al., 2015). Methodological differences across studies have also led to mixed findings, emphasizing the need for more nuanced and ecologically valid research.

2.4. Subjective perspectives and real-world bilingualism

Most existing studies focus on laboratory-based cognitive assessments, often neglecting the lived experiences and subjective perceptions of bilinguals regarding how language use impacts cognition. Surrain and Luk (2019) argue that integrating subjective experiences with objective measures provides a fuller understanding of bilingual cognition.

Anderson et al. (2020) found that bilinguals often report feeling mentally agile, better at multitasking, and more adept at perspective-taking, highlighting metacognitive and social benefits of bilingualism that extend beyond

cognitive test scores. These insights underscore the importance of phenomenological approaches to capture the dynamic and contextual nature of bilingual cognitive functioning in everyday life.

3. Methods

3.1. Research design

This study employs a qualitative descriptive design with a phenomenological approach. This approach is chosen to deeply explore and understand the lived cognitive experiences of bilingual individuals related to their use of dual languages in daily life. Phenomenology allows for capturing the subjective meanings and perceptions that participants attach to language switching and its cognitive effects (Creswell, 2013).

3.2. Participants

The participants consist of 10 bilingual adults aged between 18 and 30 years. They are purposively selected based on the following criteria: (1) fluent in two languages, (2) regularly engage in active use of both languages in daily or professional settings, and (3) frequently practice code-switching. The purposive sampling ensures the participants have rich and relevant experiences to address the research objectives.

3.3. Data collection

Data were collected through semi-structured, in-depth interviews conducted via online platforms depending on participant availability. The interview guide included open-ended questions designed to elicit participants' experiences with language switching, challenges encountered (e.g., mental load, attention difficulties), and perceived cognitive advantages (e.g., enhanced flexibility, problem-solving skills). Interviews lasted between 30 to 60 minutes and were audio-recorded with participants' consent for accurate transcription.

3.4. Data analysis

All interviews were transcribed verbatim and analyzed using thematic analysis (Braun & Clarke, 2006). This method involved: (1) familiarization with the data through repeated reading, (2) initial coding to identify meaningful segments related to cognitive experiences, (3) clustering codes into themes reflecting cognitive challenges and advantages, and (4) reviewing and refining themes to ensure coherence and validity. To enhance trustworthiness, member checking was conducted by sharing preliminary findings with participants for feedback and confirmation.

3.4. Ethical considerations

This study adhered to ethical research standards. Participants were informed of the research purpose, voluntary participation, and confidentiality of their data. Written informed consent was obtained before data collection. Participants' identities were anonymized to protect their privacy.

4. Results

4.1. Cognitive challenges

4.1.1. *Mental load and stress in language switching*

Bilingual participants frequently reported experiencing significant mental load when required to switch languages quickly, especially in high-pressure or multitasking contexts.

"Sometimes, if I'm stressed and have to speak in a regional language, I get confused." (Participant 3)

"The biggest challenge is when I have to speak English quickly after chatting in a regional language." (Participant 6)

This mental strain highlights that language switching is not merely a linguistic transition but also demands complex cognitive control mechanisms. The constant monitoring and suppression of one language while activating another increase cognitive load, often resulting in stress and confusion during rapid switching.

4.1.2. *Difficulty in word retrieval*

Many participants reported difficulties in recalling words or information when switching between languages.

"Sometimes I forget words in Indonesian or English because I've been using a regional language too often." (Participant 4)

“When talking with family in Bugis, I get confused if I need to switch quickly to Indonesian.” (Participant 7)

Such difficulties illustrate the phenomenon of cross-language interference, where frequent use of one language inhibits the accessibility of the other. This retrieval-induced forgetting disrupts fluent communication and adds an additional layer of cognitive demand for bilingual individuals.

4.2. Cognitive advantages

4.2.1. *Enhanced cognitive flexibility*

Most participants felt that bilingualism improved their mental flexibility, enabling faster thinking and the ability to approach problems from multiple perspectives.

“I feel like I can think faster and see problems from different perspectives because I have two languages.” (Participant 5)

“Bilingualism provides flexibility, allowing me to adapt more easily to any situation, especially in discussions involving two languages.” (Participant 10)

This enhanced flexibility suggests that bilingual experience strengthens executive control networks, fostering creative and adaptable thinking that benefits a wide range of cognitive and social situations.

4.2.2. *Improved decision-making and problem-solving*

Bilingual participants reported that managing two languages broadened their problem-solving skills and decision-making capacity.

“Bilingualism helps me think faster and see more perspectives.” (Participant 6)

“When facing a problem, I can use two languages to find a broader solution.” (Participant 8)

Such reports indicate that bilingualism enriches cognitive resources, allowing individuals to access diverse conceptual frameworks and strategies when addressing complex issues.

4.2.3. *Adapted attention and multitasking ability*

Several participants noted that although switching languages initially disrupted their focus, with time and experience they adapted and improved their ability to maintain attention and handle multitasking.

“After getting used to it, I can focus better, but at first it was difficult because of frequent language switching.” (Participant 7)

This finding points to a dynamic process of cognitive adaptation, where bilinguals develop stronger attentional control and multitasking skills through continual practice in managing two language systems.

5. Discussions

The findings of this study illustrate a complex cognitive landscape faced by bilingual individuals, where notable challenges coexist with significant cognitive advantages. This duality aligns closely with existing theoretical frameworks and empirical research on bilingual cognition.

5.1. Cognitive challenges in language switching

The mental load and stress experienced during rapid language switching reflect the demands on executive control posited by the Adaptive Control Hypothesis (Green & Abutalebi, 2013). This model explains that bilinguals constantly engage brain mechanisms responsible for conflict monitoring, inhibition of the non-target language, and selection of the appropriate language system. The participant reports of confusion and cognitive strain under stress or multitasking conditions correspond with neuroimaging evidence showing activation of the anterior cingulate cortex and dorsolateral prefrontal cortex during switching tasks (Blanco-Elorrieta & Pylkkänen, 2017). These regions mediate attentional control and decision-making, and their heightened engagement suggests a significant cognitive load in bilingual language regulation.

The observed word retrieval difficulties resonate with findings by Prior and Gollan (2011) on retrieval-induced forgetting, where bilinguals experience interference between their two languages. This interference hampers quick lexical access and leads to momentary lapses in vocabulary retrieval, as evidenced in participants' experiences. Such retrieval conflicts underline the cognitive cost of maintaining dual language systems and confirm that lexical competition is an inherent aspect of bilingual processing.

Moreover, the attentional disruption during multitasking and switching supports Calabria et al.'s (2015) work demonstrating increased reaction times and error rates in bilinguals performing task-switching under cognitively demanding conditions. Participants' reports of disrupted focus reinforce the idea that bilingualism imposes significant executive function demands when individuals must simultaneously manage language control and other cognitive tasks.

5.2. Cognitive advantages in bilingualism

Despite these challenges, the cognitive advantages reported align with a growing body of literature supporting the bilingual advantage hypothesis. Participants perceived increases in cognitive flexibility mirror Bialystok's (2017) findings, where bilinguals outperform monolinguals in tasks requiring cognitive shifting and inhibition. This suggests that the continuous practice of language switching enhances neural plasticity and executive function efficiency.

The improvement in decision-making and problem-solving capabilities reported by participants echoes DeLuca et al. (2020), who documented structural brain changes associated with long-term bilingualism, particularly in networks responsible for multitasking and cognitive regulation. Access to two linguistic and cultural frameworks likely broadens cognitive perspectives, facilitating more creative and adaptive problem-solving strategies.

The gradual improvement in attention and multitasking after adaptation also corresponds with Zhou and Krott (2018), who found enhanced attentional control in bilinguals during non-verbal conflict tasks. This suggests that while bilingualism initially challenges attentional resources, sustained bilingual experience trains and strengthens these cognitive faculties over time.

5.3. Integrative perspective

These findings reinforce the conceptualization of bilingualism as a cognitively demanding yet beneficial experience. The interplay of challenges and advantages reflects a dynamic cognitive adaptation process, where the demands of language management lead to enhanced executive control capabilities. This supports the notion that bilingual cognitive effects are not universally beneficial or detrimental but rather context-dependent and modulated by factors such as language proficiency, switching frequency, and situational demands (Paap et al., 2015).

Understanding this balance is critical for educational and cognitive interventions aimed at bilingual populations. Supporting bilingual individuals in managing cognitive load while leveraging their enhanced executive functions can optimize their academic and professional performance. Additionally, fostering awareness of bilingualism's cognitive dynamics may help reduce misconceptions and promote more inclusive language policies.

6. Conclusion and implication

This study sheds light on the complex interplay between cognitive challenges and advantages experienced by bilinguals in naturalistic language use. By integrating subjective experiences, it complements objective cognitive research and enriches the understanding of bilingual cognition. Findings suggest the need for educational and policy interventions that acknowledge both cognitive demands and benefits of bilingualism, supporting strategies to mitigate cognitive load while fostering cognitive flexibility and executive control. Such approaches can optimize bilingual individuals' cognitive and communicative potential in increasingly multilingual societies.

Declaration of conflicting interest

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