

Monolingual and Bilingual Children's Processing of Novel Metaphors: A Comparative Study

Fatemeh Hoseini¹, Mehdi Purmohammad*²

¹ Institute for Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran.

² Department of Education, University of Alberta, Edmonton, Canada.

Abstract

Objective: This study aimed to compare the comprehension of novel metaphors by monolingual children and Persian–Arabic bilingual children, and to examine the role of creativity in metaphor understanding. The research used a fundamental experimental design. The statistical population comprised students in District 20 of Tehran, from which 80 children—40 Persian–Arabic bilinguals and 40 monolinguals—were selected through convenience sampling based on predefined inclusion and exclusion criteria.

Method: Data were collected using a newly developed computerized task based on semantic judgment to assess the comprehension of novel metaphors, along with the Torrance Test of Creative Thinking (1972) to measure creativity. Both groups completed the computerized task and the creativity assessment. Data were analyzed using independent t-tests and regression analyses in SPSS.

Results: The findings revealed a significant correlation ($p < .05$) between bilingualism and the comprehension of novel metaphors. Bilingual children performed better than monolingual children on the novel metaphor task and also obtained higher scores on the creativity test.

Discussion: These patterns indicate a positive correlation between bilingualism, creativity, and the comprehension of novel metaphors. These findings may have implications for the design of second-language education programs and for supporting the development of abstract-concept

* Corresponding author

Email addresses: m_purmohammad@yahoo.com

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comprehension in elementary-school settings.

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1. Introduction

The topic of metaphor in language has, over the centuries, attracted the attention of scholars in various fields, including literature, philosophy, and linguistics. The term "metaphor" is derived from the Greek word *metaphor*, which itself originates from *meta*, meaning "beyond," and *pherein*, meaning "to carry." It refers to those linguistic functions in which a word is transferred from one entity to another. Metaphor is one of the concepts that has recently gained attention in cognitive science, particularly since Lakoff and Johnson, in their seminal 1992 article, introduced metaphor as a cognitive concept, defining it as the understanding of one thing in terms of another. Initially, this linguistic unit was examined exclusively within the literary domain with a communicative function; however, contemporary perspectives propose that metaphor constitutes a complete linguistic unit, encompassing all linguistic functions, and is considered the most cognitive form of language expression, essentially representing the thematic dimension of language (Gelal, 2014).

Metaphors are integral to human life, deeply embedded in our cognition and daily experience. Through metaphors, we think, imagine, communicate, and even dream (Akin & Palmer, 2000). Speakers select words to convey meaning to listeners' minds; however, words are sometimes used in contexts other than their literal meanings to figuratively express the speaker's intent. There must be a relation between literal and figurative meanings for this expression to be effective. When this relation is based on "similarity," it is called a metaphor (Smith, 2003). Metaphors are pervasive in everyday language (Gelal, 2014).

Metaphors consist of a topic, i.e., the entity to which attributes are ascribed, and a vehicle, i.e., the entity from which attributes are borrowed. Comprehending a metaphor requires activating a broad and distributed range of semantic associations to enable the integration of weakly related concepts into novel and contextually appropriate figurative expressions (Baddell & Gentner, 2005). With continued use, novel metaphors may become conventionalized, familiar, or established, as their figurative meanings are integrated into the structure of semantic memory (Goldstein et al., 2012). Thus, understanding conventional metaphors relies on the retrieval of established meanings, whereas understanding novel metaphors depends on the creation of new meanings (Kent et al., 2018). According to the "career of metaphor" model, as a novel metaphor becomes more conventional, the comprehension process shifts from a comparison-based process to a classification-based process. Conventional metaphors are understood based on pre-established and salient semantic relationships in memory among the individual words forming the metaphor (Baddell & Gentner, 2005). In contrast, novel metaphors establish new connections between concepts in memory, a process also associated with creativity (Lambert, 1962).

Previous findings have highlighted the relationship between levels of creativity and efficiency in processing metaphorical expressions, as measured by reaction time and error rates. Moreover, recent studies have shown that more creative individuals exhibit relatively more flexible semantic

memory structures than less creative individuals, which may facilitate their comprehension of novel metaphors (Kent et al., 2018). According to the theory of creative engagement, researchers found that vocabulary breadth and semantic networks (which influence metaphor comprehension) are broader and more flexible in participants with higher creativity compared to those with lower creativity, indicating higher connectivity and shorter distances between concepts within their semantic networks (Kent et al., 2014; Kent et al., 2018).

In general, creativity can be conceptualized as the process of understanding new relationships and challenges, shaped through the interaction of the creative individual with the environment, which includes culture and language. Creativity is generally associated with divergent thinking, personality dimensions, intelligence, and, increasingly, executive functions (Bate et al., 2014). Creativity is a complex cognitive capacity that plays a role in productive and innovative mental processes. Notably, the linguistic environment of bilingual children differs from that of monolingual children, as bilingual children experience the customs, values, knowledge, and wisdom of two or more cultures. This enriched environment likely affects executive functions, particularly creativity (Van Dyke et al., 2018).

Bilingualism is a global phenomenon that involves the ability to use two or more languages. Approximately half of the world's population is bilingual, capable of understanding and speaking two or more languages (Grosjean, 2010). Today, we live in a world in which most people can communicate in more than one language, and some can speak more than two languages. Iran is a multilingual and multicultural country with diverse linguistic and ethnic groups, where bilingualism is prevalent. Many Iranians speak and communicate in more than one or two languages (e.g., in addition to Persian, they can speak Turkish, Arabic, Kurdish, etc.), while Persian serves as their official and cultural language. Bilingualism involves more than merely knowing two languages (Baker, 2001).

The effect of bilingualism on cognitive development has been subject to divergent perspectives. Some scholars argue that bilingualism positively influences higher cognitive functions, as managing two languages, compared to one, requires increased information processing (Purmohammad et al., 2023; Purmohammad, 2015; Irani & Purmohammad, 2022, Purmohammad, 2023; Alirezalu et al., 2023; Derakhshan et al., 2021; Mehrafshan & Purmohammad, 2026)). Bilingual individuals also require high cognitive flexibility to switch between languages according to context, which can enhance their cognitive functioning (Kharkhordin, 2010). Within the domain of cognitive processes, the relationship between creativity and second language acquisition is particularly noteworthy. Bilingual children demonstrate superior performance and earlier success in executive tasks. Research has indicated that executive functioning develops earlier in bilingual children (as early as age three) compared to monolingual children aged four to five (Bialystok, 1999).

Recent studies have also shown that bilingualism can enhance metaphor comprehension by increasing cognitive flexibility. For instance, Thibodeau and Durgin (2018) found that bilingual children exhibited a deeper understanding of creative metaphors compared to their monolingual peers. Additionally, Bialystok and Luk (2020) reported that experience with two different linguistic systems promotes the development of abstract and indirect concept comprehension.

These findings suggest that metaphor processing in bilingual children is not solely dependent on linguistic knowledge but is also a result of enhanced cognitive flexibility.

Creativity is a critical cognitive process influenced by environment and culture; thus, second language acquisition appears to have a significant impact (Bianlou et al., 2014). Walters (2014) argued that the specific flexibility required of bilinguals to frequently switch between behavioral and cultural codes enhances their creativity. Multicultural experiences may further increase creative capacity (Leung et al., 2008). Bilinguals' ability to speak two languages reflects exposure to two different cultures. They learn to activate semantic networks relevant to the contextual environment; hence, bilingualism may influence creativity in relation to the cognitive advantages of speaking a second language or the cultural dynamics encountered in daily life (Bialystok, 2001). Bilingualism has been shown to affect various domains such as creativity (particularly divergent thinking) (Bruck et al., 1976; Risardelli, 1992; Simonton, 2008), problem-solving (Levine & Thompson, 2010; Bialystok, 1999), and body perception (Duncan & D'Avila, 1979).

Based on the literature, balanced bilingual students outperform their monolingual peers on tests, creativity assessments, general flexibility, as well as in tasks evaluating concept formation (Antonio, 2019). Bialystok (2001; 2005; & 2009) similarly highlighted bilingual children's advantage in process control and processing complex stimuli in tasks requiring executive processing for conflict resolution, such as switching and updating, even when apparent inhibition is absent. Overall, prior research supports the hypothesis of a correlation between bilingualism and creativity (Van Dyke et al., 2018). For example, bilinguals scored higher than monolinguals in verbal originality, flexibility, as well as visual fluency and originality (Simonton, 2008). Kharkhordin (2009) also found significant differences between verbal and non-verbal creativity among bilinguals, showing a positive effect of bilingualism on non-verbal creative behavior, while monolinguals performed better on verbal creativity measures. These findings partly contrast with Cummings (2000), who reported that balanced bilinguals scored higher on fluency and flexibility measures of verbal divergence, and slightly higher on originality than unbalanced bilingual peers (Likin & Towley, 2014). Numerous researchers have explored the relationship between creativity and bilingualism (Gonsoli & Shoji, 2012).

In 1992, a meta-analysis of 24 studies examined this relationship, revealing a general tendency for bilinguals to outperform monolinguals in tasks assessing creativity, despite some inconsistencies (Likin & Towley, 2014).

However, findings regarding the developmental trajectory of creativity in childhood have been mixed. Some studies reported age-related declines in creativity at specific stages: 5–6 years (Urban, 1991), 6–8 years (Smith & Carlson, 1983, 1985, 1990), and 8–10 years (Lobart & Lothery, 1995). Others still reported a positive correlation between creativity and age (Besanson & Lobart, 2008). After reviewing the literature, Moulinaux and Delala (2009) concluded that, on average, children's creativity increases consistently. Two arguments help explain these discrepancies: first, creativity is the product of multiple factors, including personal characteristics (cognitive, attitudinal and emotional) as well as social, cultural, and environmental factors. While creative potential may improve with age (due to accumulated experience and knowledge), specific barriers related to motivation, self-confidence, external constraints, etc., may limit that potential.

Second, creativity is a process employing both divergent and convergent thinking, each of which contributes variably to the moment-by-moment creative process (Getzels & Jackson, 1962).

Some studies, including those by Pope et al. (2015), have questioned the cognitive benefits of bilingualism. They examined the hypothesis that managing two languages enhances overall executive functioning, noting that over 80% of bilingual advantage tests conducted after 2011 yielded null results, and those that showed significant bilingual advantages often had small sample sizes. Other researchers found no significant differences between bilinguals and monolinguals in creativity (Adzop et al., 2010; Risardelli, 1992; Simonton, 2008).

The present study

The existing discrepancies in prior research highlight the need to re-examine this relationship. Therefore, the present study aims to review and clarify these inconsistencies. Examining this issue can enrich the literature on the interaction among language, cognition, and creativity and provide a more precise picture of the development of advanced semantic abilities in childhood. Moreover, despite existing research on metaphors, few studies have investigated novel metaphor comprehension in Iranian bilingual children. This study aims to fill this gap.

Accordingly, the research questions are as follows:

1. Do bilingual children demonstrate distinct performance in comprehending novel metaphors compared to monolingual children?
2. Can creativity mediate the relationship between language experience (bilingualism vs. monolingualism) and performance on this task?

Based on these questions, the research hypotheses are:

1. Compared to monolingual children, bilingual children will demonstrate faster and more accurate processing of novel metaphors.
2. Creativity mediates the relationship between bilingualism and performance on the novel metaphor comprehension task.

To test these hypotheses, the study employed a comparative design using a semantic judgment task, in which children evaluated novel metaphors and their performance was measured through reaction time and accuracy indices. The research approach seeks to elucidate the fundamental mechanisms of novel metaphor comprehension by analyzing group differences and examining the role of creativity, as well as to clarify the contribution of linguistic and cultural experiences to the development of advanced cognitive skills in children.

2. Method

2.1. Participants

The present study employed a quantitative design with an experimental approach. Furthermore, the research is fundamental in terms of objectives and is fully experimental in methodology. The population consisted of all students aged 9 to 12 years attending Tarbiat School in District 20 of Tehran during the 2022–2023 academic year. Among these students, 40 were monolingual, and 40 were bilingual (Arabic and Persian). This age range was selected in accordance with the Ministry of Education's requirements, as permission to conduct research in primary school was granted for students aged 9 to 12. All participants had a good comprehension of both Arabic and Persian.

Convenience sampling was used, and the sample size, based on previous studies, was approximately 80 students, with 40 monolingual and 40 bilingual participants. Participants were selected based on age range and Ministry of Education permissions, ensuring a relatively homogeneous sample in terms of educational level.

2.2. Measurement Instruments

2.2.1. Torrance Creativity Test

Torrance defines creativity as a combination of four elements: flexibility, fluency, originality, and elaboration (Torrance, 1972). The shortened and standardized Persian version of the Torrance Creativity Test was developed by Abedi at the University of Tehran in 1993.

The test includes a questionnaire of 60 items. Each item has three options, and the participant selects the option that best corresponds to their characteristics. Items 1–22 assess fluency, 23–33 assess elaboration, 34–49 assess originality, and 50–60 assess flexibility. Scores for each subscale are summed to yield a total creativity score ranging from 0 to 120, with higher scores indicating greater creativity.

Abedi (1993) validated the test using factor analysis and correlations with similar tests (Torrance). The correlation coefficient between the total Torrance score and the total test score was 0.46. Reliability was reported via test-retest and Cronbach's alpha. For the subscales of fluency, originality, flexibility, and elaboration, test-retest reliability coefficients in the initial administration were 0.80, 0.82, 0.84, and 0.80, respectively (Abedi, 1993). In Spain, internal consistency using Cronbach's alpha was reported as 0.7 for fluency, 0.67 for originality, 0.61 for flexibility, and 0.61 for elaboration (Abedi, 1991). The validity and reliability of this test have also been confirmed in multiple studies, including those by Shahni et al. (2005), Sohrabi & Sohrabi (2002), Kafaei (1994), and Highlight (1998).

2.2.2. Semantic Judgment Task

Initially, 100 novel metaphorical expressions were created. Ten educated adults (not participating in the study) rated the novelty of these metaphors using a Likert scale. Each sentence contained 5–7 words (mean: 6 words) to reduce syntactic complexity and make processing suitable for primary school children. Metaphors were classified according to the conceptual metaphor framework into three main types:

1. Ontological metaphors, e.g., “Hatred is a tumor,” “Grief is molten rock of the heart,” “Addiction is the lock of captivity.”
2. Structural metaphors, where one experiential domain is interpreted through the structure of another, e.g., “Travel is the residence of the soul,” “Teacher is the author of the book of the future.”
3. Imagery-based/sensory metaphors, based on visualization and sensory attributes, e.g., “Her hair was a piece of night,” “Leaves are the hair of Mother Nature.”

No directional or spatial metaphors (e.g., up–down, in–out) were included, as most sentences were novel conceptual or imagery-based metaphors. Vocabulary control was ensured by selecting words from high-frequency Persian lexicons suitable for grades 3–5, avoiding technical, abstract, low-frequency, or adult-oriented terms. Complex and multi-layered metaphors were excluded to ensure comprehension by children aged 7–9.

For content validity, the 100 sentences were evaluated by 100 individuals (parents, teachers, and psychology/education students) on a 5-point Likert scale regarding novelty, comprehensibility, and metaphorical quality. Ultimately, 60 sentences with the highest validity and clarity scores were selected for the main task. The computerized task was programmed in PsychoPy, with items presented randomly, each displayed for 7 seconds. Participants indicated whether each metaphor made sense (“X” for Yes, “Y” for No).

2.3. Research Procedure

Initially, participants from both monolingual and bilingual groups (40 each, totaling 80) were divided into groups of four and brought to one of the classrooms allocated for this research at the school.

To control for potential effects of academic performance on the results, the school principal was asked to select students whose academic performance ranged from average to above average. This criterion served as a general indicator of learning ability to form relatively homogeneous groups in terms of educational performance.

Preliminary explanations were provided to each group of participants. Demographic information was then collected, and a paper-based version of the Torrance Creativity Test was administered. Participants were informed that: “This is a creativity questionnaire. It measures your creativity, and there are no right or wrong answers. Please select the option that best represents you. This study is not related to your school grades.” Completing the questionnaire required approximately 20–25 minutes per participant.

Next, a semantic judgment task was used to assess novel metaphor comprehension under controlled and similar conditions. For this purpose, a computerized task was specifically designed for the study, consisting of 60 novel metaphors and 40 conventional metaphors or filler sentences. Upon completing the creativity questionnaire, each child performed the computerized task.

Children were instructed to read each sentence and press "Yes" if it made sense to them or "No" if it did not. Keys "X" and "Y" were clearly labeled for "Yes" and "No" to facilitate response. Participants were asked to answer as accurately and quickly as possible, as five follow-up comprehension questions would be asked at the end.

Each item was displayed on the screen for approximately 7 seconds. The task lasted about 11 minutes, and with the five two-choice comprehension questions at the end, the total duration was roughly 15 minutes. During the task, participants were not allowed to ask questions and were required to rely solely on their linguistic knowledge to interpret the novel metaphors.

All procedures were conducted in accordance with research ethics. Parents of participating children signed informed consent forms before testing and were assured that data would be used solely for research purposes. This study was approved by the Ethics Committee of Shahid Beheshti University (approval code: IR.SBU.REC.1402.100).

2.4. Data Analysis

Data analysis focused on the effects of bilingualism and creativity on metaphor comprehension. Statistical analyses were conducted using SPSS, including independent samples t-tests, Pearson correlation, and regression analyses.

3. Results

Data analysis was performed using SPSS-27, with the significance level set at $p < 0.05$. Initially, descriptive statistics were examined, followed by testing for normality using the Kolmogorov-Smirnov test. Pearson correlation was employed to assess relationships between continuous variables. Differences between groups were analyzed using independent samples t-tests, and effect sizes were calculated using Cohen's d . According to conventional interpretation, Cohen's d values of 0–0.2 indicate a small effect, 0.2–0.5 a medium effect, and values greater than 0.5 a large effect.

The assumption of homogeneity of variances for independent t-tests was tested using Levene's test. In cases where variances were unequal, the t-test with unequal variances was applied.

Central tendency (mean) and dispersion (standard deviation) indices were computed for the study variables separately for monolingual and bilingual groups. The results are presented in Table 1.

Table 1. Descriptive Statistics for Monolingual and Bilingual Groups in Novel Metaphor Comprehension

SE	SD	Mean	N	language	variable
1/72	10/93	28/05	40	bilingual	

1/22	7/74	34/47	40	Monolingual	Novel
1/11	7/05	18/97	40	bilingual	Conventional
0/8	5/35	23/52	40	Monolingual	

As shown in Table 1, mean scores differ between groups. For instance, the bilingual group scored higher in novel metaphor comprehension ($M = 34.47$, $SD = 7.74$) than the monolingual group ($M = 28.05$, $SD = 10.93$), with a difference of 6.42 points. Similarly, bilingual participants scored higher in conventional metaphor comprehension ($M = 23.52$, $SD = 5.35$) compared to monolinguals ($M = 18.97$, $SD = 7.05$), showing a difference of 4.55 points.

To examine whether these differences were statistically significant, independent samples t -tests were conducted, with effect sizes assessed using Cohen's d . Results are presented in Table 2. The analyses revealed significant differences between groups in novel metaphor comprehension ($t(78) = -3.033$, $p = 0.003$, $d = 0.67$) and conventional metaphor comprehension ($t(78) = -3.248$, $p = 0.005$, $d = 0.72$), with bilinguals outperforming monolinguals in both measures.

Table 2. Independent Samples t -Test for Monolingual and Bilingual Groups

Cohen's d	CL 95%		Mean difference	P value	df	t	SE mean	Component
	Upper	Lower						
0/67	-2.20783	-10.64217	-6.42500	.003	78	-3.033	2.11828	Novel
0/72	-1.76129	-7.33871	-4.55000	.002	78	-3.248	1.40077	Conventional

To examine the relationship between creativity and novel metaphor comprehension in the bilingual group, Pearson correlation was calculated. Results are reported in Table 3.

Table 3. Pearson Correlation between Creativity and Metaphor Comprehension in Bilinguals

Novel Metaphor	Conventional Metaphor	Creativity subscale
.226	.283	Fluency
.384*	.398*	Elaboration
.200	.148	Originality
.351*	.272	Flexibility

.320*	.311	Total creativity
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As shown in Table 3, there is a significant positive correlation between elaboration and novel metaphor comprehension ($r = 0.38$) in the bilingual group, indicating that higher elaboration scores are associated with better comprehension of novel metaphors.

Overall, the results indicate that bilingual children outperform monolingual peers in both novel and conventional metaphor comprehension. Furthermore, significant positive correlations were observed between bilingual participants' creativity scores and metaphor comprehension. Since creativity showed a stronger association with novel metaphor comprehension, it can be concluded that understanding novel metaphors is more dependent on creativity than understanding conventional metaphors.

4. Discussion

The main aim of the present study was to compare the performance of bilingual and monolingual children in comprehending novel metaphors and to examine the role of creativity in this regard. The results indicate that bilingual children aged 9 to 12 outperform their monolingual peers in understanding novel metaphors. This finding aligns with Risardelli (1992) and Simonton (2008), who argued that bilingualism confers significant cognitive advantages compared to monolingualism. Additionally, Antonio (2019) demonstrated that bilingual children outperform monolinguals in concept formation and achieve higher scores on concept formation assessments. In line with the confirmed hypothesis of the present study, Bialystok (2001, 2005 and 2009) also highlighted the advantages of bilingual children in exerting control over cognitive processes and in processing complex stimuli, particularly in tasks requiring executive functioning for conflict resolution, such as switching and updating.

Furthermore, the present findings are consistent with Gibbs (2019), who emphasized the role of bodily and interactive experiences in metaphor comprehension. According to Gibbs, the simultaneous use of two distinct linguistic systems can enhance the mental representation of metaphors. Moreover, the consistency of these results with Bialystok and Luk (2020) suggests that bilingualism in elementary school, especially through exposure to diverse semantic systems, increases flexibility in interpreting metaphorical concepts. These findings support the importance of designing second-language education programs based on metaphorical activities at early ages.

The observed advantages can also be explained by cultural differences. Bilingual children, being immersed in two completely distinct cultural environments, each with its own rules, grammar, and linguistic contexts, develop the ability to transfer knowledge from one language to another. This transfer ability can enhance reading comprehension and communication, potentially accounting for advantages in cognitive flexibility, concept formation, creativity, and, ultimately, superior comprehension of novel metaphors.

The results also demonstrated that higher creativity in bilingual children positively affects their metaphor comprehension. This finding is consistent with the majority of previous studies in the field. For example, Simonton (2008) suggested that creativity is a mental process involving the generation of new ideas or novel connections between existing ideas or concepts. According to

Van Dijk et al. (2018), creativity is a multidimensional construct that encompasses cognitive skills, thinking styles, personality traits, and environmental and cultural elements. In general, past research supports the hypothesis that there is a correlation between bilingualism and creativity. For instance, bilinguals scored higher in verbal originality and flexibility, as well as visual originality and fluency, compared to monolinguals (Simonton, 2008). Kharkhorin (2009) also found a significant difference between verbal and non-verbal creativity in bilinguals. Leung et al. (2008) argued that multicultural experiences may enhance creativity. Therefore, bilingualism may influence an individual's creativity either through the cognitive benefits of speaking a second language or through the cultural dynamics bilinguals encounter in daily life (Bialystok, 2001). Hommel et al. (2011), who confirmed the positive effect of bilingualism on creativity, also claimed that the underlying processes and mechanisms of creativity are affected by bilingual performance.

Despite the alignment of these studies with the confirmed findings of the present research, some studies report inconsistent results. For example, Leikin and Tuvli (2014) argued that bilingualism has a positive effect on non-verbal creative behaviour, whereas monolinguals tend to perform better in verbal creativity measures. These findings contrast with Cummings (2000), who claimed that balanced bilinguals achieved higher scores on verbal divergent thinking measures and slightly higher originality scores than their unbalanced bilingual peers. In explaining these conflicting findings, it is worth noting that creativity is a product of multiple factors, including personal characteristics (cognitive, attitudinal, and emotional) as well as social, cultural, and environmental factors. Clearly, one main reason for discrepancies among studies is their inability to capture the complexity of creativity, which comprises both cognitive and emotional-personal components.

This study, like other studies, has certain limitations. Data collection for this experiment was conducted in the field, which may have introduced obstacles and constraints. Regarding the research topic, the most prominent challenge is accurately identifying and recruiting genuine bilingual participants. In contemporary societies, such as small towns and villages, Persian is the standard language, and only a few individuals communicate in their mother tongue. Moreover, accessing educational centers requires approval from higher education authorities and completing administrative procedures, which may limit the researchers' scope of action. Another limitation was the absence of an existing corpus of novel metaphors in Persian, which compelled the researcher to create and develop new metaphors for this study.

5. Conclusion

The findings of this study provide clear evidence that bilingualism in elementary school children can facilitate the comprehension of novel metaphors through higher-order cognitive mechanisms. The superior performance of bilingual children, along with significant correlations between creativity components—particularly “elaboration” and “flexibility”—and metaphor processing indices, supports the view that understanding novel metaphors relies less on the retrieval of established meanings and more on the generation and reorganization of semantic relationships. Such processes naturally overlap with skills that develop in the context of multilingual experiences.

The theoretical contributions of this study can be outlined in two areas. First, it demonstrates that the advantage of bilingualism in metaphor processing is not a direct linguistic outcome but a product of the interaction between the first and second languages and semantic network mechanisms. Second, the findings support the hypothesis that creativity may serve as a mediating factor in translating bilingual experience into semantic abilities. This offers a novel role for “novel” metaphors as a sensitive indicator of the child's integrated cognitive capacities.

These results also have important practical implications for educational program design. Enhancing multilingual experiences, even through informal exposure to a second language, can be an effective tool for developing children's semantic, literary, and metaphorical thinking skills. Moreover, combining creativity-based exercises with metaphor instruction in the classroom can improve the understanding of abstract concepts, deepen vocabulary acquisition, and enhance higher-level reading skills.

In conclusion, the findings of the present study provide clear support for the proposed research hypotheses. Consistent with Hypothesis 1, bilingual children demonstrated significantly superior performance compared to monolingual peers in both novel and conventional metaphor comprehension, as reflected in higher accuracy scores and stronger overall task performance. These results suggest that bilingualism facilitates more efficient processing of metaphorical language, particularly in novel contexts that require flexible semantic integration.

Regarding Hypothesis 2, the results indicate that creativity plays a meaningful role in bilingual children's metaphor comprehension. Significant positive correlations were observed between creativity—especially the elaboration component—and performance on the novel metaphor comprehension task, suggesting that creativity partially mediates the relationship between bilingualism and metaphor comprehension. The stronger association between creativity and novel metaphors, compared to conventional metaphors, further supports the view that novel metaphor comprehension relies more heavily on creative cognitive processes.

Taken together, these findings highlight the combined contribution of bilingual experience and creativity to the development of advanced semantic and cognitive skills in children, and they underscore the importance of linguistic and cultural diversity in fostering higher-order language comprehension.

However, interpreting these results requires attention to the study's limitations. The research sample was limited to a single school with a specific linguistic composition, and the metaphors used were specially designed for this study due to the absence of a standardized corpus of novel Persian metaphors. Therefore, future research is recommended to involve more diverse bilingual samples, compare different languages, and employ multifaceted tasks (comprehension, production, and neuroimaging). Examining causal relationships between bilingualism, creativity, and metaphor processing, as well as studying the developmental trajectory of these abilities over time, could provide a more precise understanding of the cognitive mechanisms underlying the formation of novel metaphorical concepts.

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