The Effect of Language Proficiency and Question Type on Children's Response Accuracy

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ABSTRACT

The purpose of the present study was to examine the accuracy with which young children respond to different types of questions. Additionally, the study explored whether the children's language development affects their response accuracy. They study was conducted in two kindergartens in Neyshabur, Iran, and the sample consisted of 25 Persian-speaking young children aged 3 to 6 years, who participated in the study by listening to a short story and answering 24 questions of varying types. The analysis of the results revealed that children's language proficiency significantly influenced the accuracy of their responses, with more proficient children providing more accurate answers. Further analysis of the results showed that children provided the most accurate answers to yes/no questions. Forced-choice questions elicited more accurate responses than open-ended questions. These findings suggest that children's limited language proficiency and their restricted memory span may constrain the reliability of their responses to certain types of questions.

KEYWORDS: Language proficiency; Question type; Response accuracy; Suggestibility; Young children

1. Introduction

Recent research in the field of language development has highlighted a growing interest in the role of questions in children's lives. Many of these questions and answers occur in everyday interactions, through which children become acquainted with various vocabulary and grammatical structures, develop critical thinking skills, analyze available information, and utilize memory to formulate and respond to questions. These interactions also help children learn how to effectively communicate with others within different contexts. Numerous studies have been conducted to explore the use of questions in settings involving children, including medical (von Baeyer et al., 2009), forensic (Ceci et al., 2007), developmental (Fritzley & Lee, 2003), and educational contexts (Brubacher et al., 2016).

Research has also focused on the impact of different types of questions on children's responses. For example, studies have examined yes/no questions (Fritzley et al., 2013; Imhoff & Baker-Ward, 1999; Mehrani & Peterson, 2017a), open-ended questions (Kulkofsky & Klemfuss, 2008), tag questions (Mehrani, 2011; Rudy & Goodman, 1991), and forced-choice questions (Andrews et al., 2015). However, researchers have yet to determine which question formats yield the most accurate responses.

In addition to question type, language proficiency is another crucial factor that can influence a child's answers. Language proficiency is defined as an individual's ability to use language for specific purposes (Richards & Schmidt, 2002). It encompasses a child's capacity to apply their sociolinguistic and psycholinguistic knowledge to fulfill various language functions (Mehrani, 2011). While substantial research exists on how children's age and cognitive development affect response accuracy, there is a noticeable gap in the literature regarding the role of language proficiency and its impact on the accuracy of children's responses.

Addressing these gaps, the present study aims to enhance our understanding of the factors that influence young children's answers to questions. Specifically, this research seeks to identify which types of questions elicit the most accurate responses and to determine whether children's language proficiency affects their responses to adult questions.

2. Literature review

2.1. Question types and accuracy of responses

The accuracy of children's responses is crucial, particularly in contexts where correct answers are vital, such as forensic, medical, educational, or developmental settings. In these contexts, research studies serve various purposes: in education, questions are employed for evaluation (Brubacher et al., 2016); in developmental experiments, they function as data collection tools (Fritzley & Lee, 2003); in medical settings, they are used to assess children's pain (von Baeyer et al., 2009); and in forensic contexts, questions are central to investigative interviews (Ceci et al., 2007). Given the significance of questions, developmental researchers introduced the term "suggestibility," defined as "the tendency to report false information provided by another individual" (Kulkofsky & Klemfuss, 2008, p. 1442). More generally, suggestibility refers to the extent to which post-event information can alter an individual's memory.

Recognizing the importance of questions across various contexts, numerous studies (Ceci et al., 2007; Hünefeldt et al., 2009; Imhoff & Baker-ward, 1999; Mehrani & Peterson, 2015; 2016; Rudy & Goodman, 1991) have been conducted to identify the most effective question types for interviews. These studies have examined open-ended questions (Aldridge & Wood, 1998; Andrews et al., 2015; Lamb et al., 2003), yes/no questions (Behzadnia & Mehrani, 2020; Mehrani & Peterson, 2016; 2017a; Okanda & Itakura, 2007), tag questions (Behzadnia & Mehrani, 2017; Greenstock & Pipe, 1996; Rudy & Goodman, 1991), and forced-choice questions (Behzadnia & Mehrani, 2018; Fritzley et al., 2009; Peterson & Grant, 2001; Mehrani & Peterson, 2015; 2017b). The findings from these studies have informed the development of interview protocols for different contexts. For example, drawing on the literature, Lamb et al. (2018) proposed a model for conducting interviews in forensic settings.

The first type of question extensively studied by scholars is the open-ended question. Andrews et al. (2015) and Lamb et al. (2003) analyzed trial transcripts from the United States and the United Kingdom in which children testified about sexual abuse. These researchers identified two common types of open-ended questions: "invitations," where interviewers prompt children to tell a story (e.g., "Tell us what happened."), and "directives/cued invitations," which focus on information previously mentioned by the child (e.g., "Where were you when THAT happened?"). Their research concluded that invitation questions are more likely to elicit accurate information from children than directive/cued invitations. Consequently, interviewers are advised to prioritize invitation questions over directive ones. A common finding across studies is that both types of open-ended questions are more likely to yield accurate information than yes/no or forced-choice questions. However, some researchers, like Aldridge and Wood (1998), have argued that due to young children's linguistic immaturity, reticence, and memory limitations, open-ended questions may not be appropriate in interrogations. Given the inconsistent findings associated with open-ended questions, some researchers have recommended yes/no questions instead.

Regarding yes/no questions, researchers have proposed various hypotheses. Okanda and Itakura (2007) suggested that children exhibit an "affirmation bias" in response to yes/no questions, tending to answer "yes" to questions about both familiar and unfamiliar objects. Another hypothesis, the "compliance tendency/acquaintance tendency" (Behzadnia & Mehrani, 2020; Mehrani & Peterson, 2016), posits that children's responses often conform to the format of yes/no questions—if asked a negative question, they are likely to respond negatively, and if asked a positive question, their response is more likely to be positive. Further confounding issues come from the study by Mehrani (2011) who found that children are more influenced by negative question formats, leading to more "no" biases. However, Behzadnia and Mehrani (2020) observed that children exhibit a higher degree of compliance with positive yes/no questions. These complexities make interviewers hesitant to use yes/no questions when interviewing young children.

Although significant findings have emerged regarding open-ended and yes/no questions, there remains ongoing debate about which question format yields the most accurate responses. Proponents of open-ended questions argue that yes/no questions provide insufficient information (Behzadnia & Mehrani, 2020) and are more suggestive than open-ended questions (Ceci et al., 2007). Conversely, some researchers advocate for yes/no questions, citing children's cognitive limitations as a

reason they may struggle to respond accurately to open-ended questions. This uncertainty has led researchers to explore other types of questions in interviews.

One such type, closely related to yes/no questions, is the tag question—a declarative statement turned into a question by adding an interrogative fragment. Rudy and Goodman (1991) found that negative tag questions (e.g., "It's not a book, is it?") are particularly difficult for children to understand. Further research by Behzadnia and Mehrani (2017) suggested that due to the linguistic complexity of tag questions, children exhibit a stronger "yes-bias" in their answers. However, this study only examined positive tag questions (e.g., "It's a book, isn't it?"). According to Mehrani's (2011) findings on compliance tendency, children are likely to answer positively due to this tendency. Greenstock and Pipe (1996) also noted that younger children are more influenced by tag questions than older children, highlighting the linguistic complexity of these questions and prompting researchers to study another question type: forced-choice questions.

Forced-choice questions offer a series of options, one of which is the correct answer (e.g., "Do you like oranges, apples, or bananas?"). Although these questions can include multiple options or even be open-ended (e.g., "Do you like oranges, apples, or something else?"), most studies have focused on questions with only two options. Research on forced-choice questions has yielded contradictory results. On one hand, Behzadnia and Mehrani (2018), Fritzley et al. (2009), and Mehrani and Peterson (2015; 2017b) provided empirical evidence of a "recency tendency" in children's responses to forced-choice questions. For example, Mehrani and Peterson (2015) conducted two experiments: in the first, children were shown an animated film and were asked 16 questions, with the correct answer being the first option in eight questions and the second option in the other eight. In the second experiment, the order of options was reversed, but children consistently showed a strong preference for the second option, regardless of the correct answer. On the other hand, Peterson and Grant (2001) found that children answered questions correctly regardless of whether the first or second option was correct, showing no recency tendency. Given the limited research on forced-choice questions, the existence of a recency tendency remains inconclusive.

Despite years of research on different question types, many hypotheses and speculations remain unproven. Researchers continue to seek solutions to these challenges, aiming to determine how questions can be used in interviews to elicit accurate information from children.

2.2. Language proficiency and accuracy of responses

The next significant area of research concerns children's language proficiency and its potential impact on the accuracy of their responses. Language proficiency refers to an individual's ability to use language accurately to convey meaning, both in comprehension and production. A child's proficiency in a language is closely related to their sociolinguistic and psycholinguistic development. From a psycholinguistic perspective, to understand and respond to a question, a child must first decode the message and then, based on pragmatics and their existing schemata, formulate an answer. From a sociolinguistic perspective, the child must consider factors such as the relationship between the people involved and the purpose of the conversation, which influences the communicative goal of the questions (Mehrani, 2011). The extent to which children effectively utilize these bodies of knowledge reflects their level of linguistic proficiency.

Despite the importance of language proficiency, its role—along with age—has not been independently examined in developmental studies. Existing research has primarily considered age as a key determinant in children's responses to questions (Ceci et al., 2007; Fritzley et al., 2013; Imhoff & Baker-Ward, 1999). For example, Imhoff and Baker-Ward (1999) and Fritzley et al. (2013) found that younger children are more sensitive to question complexity and, as a result, are more suggestible in their answers. Conversely, Ceci and colleagues (2007) reported that, under certain circumstances, older children may be more suggestible than younger ones, as older children have accumulated more knowledge and attempt to align their responses with what they perceive as meaningful. The issue arises from the fact that children within the same age group can have varying levels of proficiency, leading to differences in how they respond to questions.

To the best of our knowledge, previous research has not adequately addressed children's language proficiency in their first language. However, studies on second language acquisition indicate that language proficiency significantly influences the accuracy of speakers' responses (Kim et al., 2016; Yan et al., 2015). For instance, in a systematic review, Yan and colleagues (2015) reported that more proficient speakers are better able to utilize their implicit knowledge of language, having internalized more vocabulary and syntactic structures than less proficient speakers. Less proficient speakers, on the other hand, struggle to use the implicit grammatical knowledge they possess. They often cannot repeat longer and more complex sentences, relying instead on rote repetition. Consequently, when less proficient speakers repeat a sentence mechanically, it is evident that they do not fully comprehend it, resulting in inaccurate responses. In contrast, more proficient speakers repeat sentences with awareness, making their responses more reliable.

Although extensive research has been conducted on the types of questions that elicit the most accurate responses, no conclusive outcomes have been reached. Additionally, as noted earlier, there is a scarcity of research examining the potential effect of children's language proficiency on their response accuracy. Another limitation of the existing literature is that the majority of studies have been conducted on English-speaking children, with only a few studies conducted in other linguistic

contexts. Thus, the findings cannot be generalized to other contexts where different languages are spoken. This study was specifically designed to investigate how children's language proficiency and the types of questions they are asked affect the accuracy of their answers in a Persian-speaking context.

This study aimed to address two research questions. First, we examined whether the type of question (i.e., yes-no, forced-choice, and open-ended questions) affects the responses of 3- to 6-year-old children to adult questions. As noted by Ceci et al. (2007) and Behzadnia and Mehrani (2017), because closed-ended questions are more suggestive, we predicted that children would produce the most accurate answers to open-ended questions, followed by forced-choice and yes/no questions. Second, we investigated whether language proficiency influences the responses of 3- to 6-year-old children. Due to the limited literature on the effect of language proficiency on children's response accuracy, we refrained from making a specific prediction. However, based on research on second language acquisition, we hypothesized that language proficiency might have an impact.

3. Methodology

3.1. Participants

This study involved 25 children recruited from two kindergartens in Neyshabur, Iran. The participants included one three-year-old child (a boy, aged 42 months), four four-year-olds (2 boys and 2 girls, age range = 48-57 months, M = 54.5 months, SD = 4.35), seven five-year-olds (2 boys and 5 girls, age range = 60-71 months, M = 64.85 months, SD = 4.91), and thirteen six-year-olds (8 boys and 5 girls, age range = 73-79 months, M = 75.84 months, SD = 2.19). All participants were from middle-class families and were monolingual Persian speakers. Written consent was obtained from the kindergarten staff and the children's custodians for their participation in the study. Additionally, oral consent was obtained from each child prior to their involvement in the study.

3.2. Instruments

3.2.1. Language proficiency test

A Persian Elicited Imitation Test (EIT), developed by Mehrani (2017), was used to assess the children's language proficiency levels. This test evaluates proficiency by asking children to repeat 40 sentences exactly as they hear them from the interviewer. The sentences increase in complexity in terms of morpho-syntactic features. To complete this test, participants must first understand and decode the sentence they hear, then recall it from memory, and finally reconstruct it using the grammar they have internalized. The test uses a 5-point scaling rubric to assess children's language abilities. The test's inter-rater reliability has been reported as 0.85, and it has shown satisfactory results concerning validity (Mehrani, 2017).

3.2.2. Short story

A short story was used in the study to serve as a basis for different types of questions. The story, which was about the birthday party of a character named Mr. Bear, involved seven different jungle animals as party participants. The story was 566 words long and was narrated to each child over 180-220 seconds by the second researcher. Additionally, 11 illustrated pictorial aids were shown to each child while they listened to the story. On average, it took the narrator 17-22 seconds to tell the story while progressing through each picture. These pictures were used to maintain the children's engagement during the storytelling process.

Efforts were made to ensure consistency in narration for all participants. Special attention was given to the speed of narration, the number of words and sentences, and the grammatical complexity of the sentences. To further ensure consistency, the storytelling process was recorded for all children.

3.2.3. Interview question

Before the experiment, the researchers designed several questions that included: a) eight yes/no questions, with four requiring a "yes" answer and four requiring a "no" answer; b) eight forced-choice questions, where the correct answer for four was the first choice and for the other four was the second choice. These forced-choice questions were designed to examine the children's potential "recency tendency"; and c) eight open-ended questions that required children to provide a complete answer (see Table 1). The researchers created six different answer sheets to counterbalance the order of the questions, and each child was randomly assigned to one of the six answer sheets.

Table 1. Instances of interview questions

Question type	Persian questions	English translation	Answers
Yes/no	آقا خرسه امروز ناراحت نبود؟	Wasn't Mr. Bear sad today?	No, he wasn't.
Open/ended	خانم سگه تو جشن چیکار می کرد؟	What was Mrs. Dog doing in the party?	She was sleeping.
Forced-choice	تولد کی بود، آقا خرسه یا آقا اردکه؟	Whose birthday was it, Mr. Bear's or Mr. Duck's?	Mr. Bear's.

3.3. Procedures

Before conducting the experiment, a pilot study was conducted with five children from different age groups to assess the comprehensibility of the story and the interview questions. Based on the findings of the pilot study, two out of seven characters were removed from the story, certain unclear sections were paraphrased, and six interview questions were revised. Additionally, the interviewer spent several days in the children's kindergartens, engaging in play to establish a friendly rapport with them. A quiet room free from distractions was designated for the interviews in each kindergarten.

The experiment was conducted in a single session for each child. Before starting the experiment, the interviewer engaged each child in conversation about their day to establish initial rapport. Following this, each child's language proficiency was assessed using the Persian EIT test. The interviewer then narrated the story to each child individually, showing them corresponding pictures to maintain their engagement. After a few minutes, each child was asked 24 questions, and their responses were audio-recorded for subsequent analysis.

3.4. Scoring

To evaluate the effect of different question types on children's response accuracy, we implemented various scoring methods. For yes/no and forced-choice questions, each correct answer was awarded a score of +1, while incorrect responses received a score of 0. Regarding open-ended questions, half of the questions required the respondents to name only one item (e.g., "What was Mrs. Dog doing at the party?" Answer: "She was sleeping."). For these questions, correct answers were assigned a score of +1, and incorrect answers received a score of 0.

For the remaining open-ended questions, the child was expected to name multiple items (e.g., "Who were Mr. Bear's friends?" Answer: "Mr. Duck, Mrs. Dog, Little Duck, Mrs. Sheep, Mr. Horse."). For these questions, if the child correctly identified more than half of the items, they received a score of +1; otherwise, they received a score of 0.

4. Results

An analysis was conducted to identify instances of plagiarism in master's theses using the iThenticate tool. The examination revealed that the percentage of overlapping text, which could indicate potential plagiarism, ranged from 14% to an alarming 99%. The average overlap across all these stood at 50.24%, with a standard deviation of 19.00%.

Children's language proficiency was assessed using an elicited imitation test (Mehrani, 2017). Based on the results, the 3- to 6-year-old participants were divided into two groups: 12 high-proficient children and 13 low-proficient children. Descriptive statistics, as presented in Table 2, indicated that proficiency level appeared to influence the accuracy of children's responses to different types of questions. Specifically, high-proficiency children scored higher on yes/no questions (M = 7.16, SD = 0.93) and forced-choice questions (M = 7.16, SD = 1.26) but had lower scores on open-ended questions (M = 6.00, SD = 1.12). Similarly, low-proficiency children scored highest on yes/no questions (M = 6.69, SD = 1.25), followed by forced-choice questions (M = 6.15, SD = 1.81), with the lowest scores on open-ended questions (M = 4.76, SD = 1.69). Further analysis revealed that 64% of open-ended questions, 82% of forced-choice questions, and 86% of yes/no questions were answered correctly. It is noteworthy that for open-ended questions, 14% of the responses were incomplete, 6% of the children responded with "I don't know," and 16% provided incorrect answers.

Table 2. Children's mean question scores across proficiency levels

Question type	High proficiency	Low proficiency
Open-ended	6.000	4.769
Forced-choice	7.167	6.154
Yes/No	7.167	6.692

To examine the effect of language proficiency and different question formats on children's response accuracy, a 2 (proficiency level: high and low) × 3 (question format: yes/no, forced-choice, open-ended) mixed analysis of variance (ANOVA) was conducted. The results revealed a significant main effect of question type, $F(2, 23) = 11.35$, $p < .001$, indicating that both high-proficiency and low-proficiency children responded differently to open-ended, forced-choice, and yes/no questions. Additionally, a significant effect of proficiency level was found, $F(1, 23) = 5.42$, $p = .029$, suggesting that proficiency level influences children's responses.

To further explore the effect of proficiency level on responses to each question type, a one-way ANOVA was performed on children's responses to the three question types. The analysis indicated a significant main effect for open-ended questions, $F(1, 23) = 4.50$, $p = .045$. However, the effects for forced-choice questions, $F(1, 23) = 2.56$, $p = .123$, and yes/no questions, $F(1, 23) = 1.13$, $p = .298$, were not significant. These findings suggest that high- and low-proficiency children respond differently to open-ended questions, but not to forced-choice or yes/no questions.

To determine whether children exhibited a recency bias in their responses to forced-choice questions, a one-sample t-test was conducted. The results indicated a significant recency bias, $t(24) = 2.32$, $p = .029$, showing that children were more likely to select the most recently presented option in forced-choice questions.

Finally, to assess whether age is associated with children's language proficiency, a Pearson correlation coefficient was calculated between these two variables. The analysis revealed no significant correlation, $r(23) = .56$, $p = .562$, indicating that age is not necessarily related to an increase in language proficiency, and that language proficiency does not necessarily increase with age.

5. Discussion

The present study examined the impact of different types of questions—open-ended, yes/no, and forced-choice—on preschoolers' responses to adult questions. Additionally, we explored the relationship between language proficiency and the accuracy of children's responses. The findings revealed that proficiency level significantly affects children's answers. Specifically, children with higher language proficiency provided more accurate responses, whereas those with lower proficiency performed less effectively. Moreover, the study indicated that question format influences response accuracy: children answered yes/no questions more accurately, while their responses to open-ended questions were less precise.

Previous research has generally assumed that language proficiency increases with age (Behzadnia & Mehrani, 2020; Ceci et al., 2007; Fritzley et al., 2013; Hünefeldt et al., 2009; Mehrani & Peterson, 2016). For example, Mehrani and Peterson (2016) suggested that younger children are more suggestible and exhibit stronger biases in their answers due to underdeveloped cognitive and verbal skills and limited memory capacity. As a result, their language comprehension and production are less effective compared to older children. Fritzley et al. (2013) proposed that younger children struggle with yes/no questions due to their incomplete cognitive and verbal development. Our results align with these findings, demonstrating that children with higher language proficiency provide more accurate responses to questions than those with lower proficiency.

Our results regarding proficiency are consistent with the studies by Bruck and Melnyk (2004) and Keller-Cohen (1981). Bruck and Melnyk hypothesized that children with advanced language skills are more resistant to suggestibility. Keller-Cohen (1981) argued that children decode the meaning of a sentence and then encode it based on their existing knowledge. These findings support the "regeneration hypothesis" proposed by Potter and Lombardi (1990), which posits that sentences are regenerated by activating their conceptual representation from long-term memory and using recently activated words. As children's language skills (both comprehension and production) develop, they accumulate more knowledge about their environment, allowing them to generate or regenerate sentences based on their understanding. In contrast, children with less developed language skills may lack sufficient knowledge to accurately comprehend and produce stimuli, leading to less accurate sentence repetition.

The findings of this study regarding question type contrast with those of Ceci et al. (2007), Andrews et al. (2015), and Lamb et al. (2003), which suggested that children are more likely to change their answers in response to closed-ended questions and answer open-ended questions more accurately. However, our results are consistent with the studies by Aldridge and Wood (1998) and Bruck and Ceci (1999), who recommended using more yes/no questions than open-ended questions. Our findings support Aldridge and Wood's (1998) assertion that open-ended questions can be challenging for children due to their less developed cognitive and language skills.

6. Conclusion

While it has been previously assumed that children's responses to different question formats are influenced by their age, this study introduces a new variable: language proficiency. This research utilized three primary question types commonly used in interviews—open-ended, yes/no, and forced-choice—to determine which format is most likely to elicit the most accurate

responses. The findings from this study have potential applications in various contexts, including forensic, medical, and educational settings, where accurate responses from children are critical.

The present study represents a significant advancement in our understanding of suggestibility. However, it is limited by its small sample size of monolingual participants. Future research should include a larger and more diverse group of children, encompassing various cultures and bilingual/multilingual backgrounds. Additionally, since positive and negative yes/no questions are formulated identically in Persian (Mehrani & Peterson, 2016), this study focused exclusively on this language. Future studies could explore the effects of different question formats across other languages and additional variables. Moreover, incorporating alternative methods for engaging children, such as role-play, story narration, or coloring activities, may provide further insights into the factors influencing children's suggestibility beyond question type and language proficiency.

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