YAŞAR UNIVERSITY
GRADUATE SCHOOL

MASTER THESIS

SPATIAL PERSPECTIVE-TAKING ABILITY IN CHILDREN: THE EFFECT OF PRAGMATIC CUES AND BILINGUALISM

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PRESENTATION DATE: 22.08.2022

BORNOVA / İZMİR
AUGUST 2022

ABSTRACT

SPATIAL PERSPECTIVE-TAKING ABILITY IN CHILDREN: THE EFFECT OF PRAGMATIC CUES AND BILINGUALISM

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August 2022

Spatial perspective-taking serves to understand how an external entity is positioned relative to another person. Several studies have suggested that some circumstances influence children's spatial perspective-taking ability. This thesis includes three experimental studies examining how pragmatic cues and bilingualism affect children's spatial perspective-taking ability. The data come from a sample of 217 children. Across three experiments, children were presented with photographs of a person seated at a table with two objects next to each other. The first experiment aimed to examine how pragmatic cues and bilingualism affect the implicit level of spatial perspective-taking, namely *spontaneous spatial perspective-taking*. Results showed that when children were required to describe object relations: (1) they took the person's perspective in the photograph more frequently and described object relations accordingly when gaze and action cues were present, (2) bilingual children took the person's perspective in the photograph to describe object relations more frequently than monolingual children. The second experiment aimed to examine how pragmatic cues and bilingualism affect the explicit level of spatial perspective-taking. Results showed that when children from 6 to 8 years old were explicitly required to describe object relations from the person's perspective in the photograph, bilingual children took the person's perspective more accurately when an action cue or gaze-action cue was present. Lastly, the third experiment was identical to the second experiment, but the condition of the pragmatic cues was changed to examine how the incongruity of pragmatic cues affects the spatial perspective-taking ability. Results from the third experiment showed that: (1) children were more accurate in their decision for the objects' position from the person's perspective in the photograph when gaze and action cues were incongruent than when the gaze and action cues were congruent, (2) bilingual children were more accurate than monolingual children in their decision when pragmatic cues were both congruent and incongruent, (3) monolingual children made faster judgments about the location of objects from another person's perspective than bilingual children when pragmatic cues were both congruent and incongruent. Results from the second and the third experiments showed that 8-year-old children were able to take successfully spatial perspective than 6- and 7-year-olds. Overall, the discussed experiments showed that pragmatic cues and bilingualism are two circumstances that affect the children's spatial perspective-taking ability at both explicit and implicit levels. Spatial perspective-taking performance at the explicit level differs among bilingual and monolingual children if pragmatic cues (action cue, congruent gaze-action, or incongruent gaze-action) are present. The possible explanations of the findings, limitations, and suggestions for future works were discussed.

Keywords: spatial perspective-taking, pragmatic cues, bilingualism

ÖZ

ÇOCUKLARDA UZAMSAL BAKIŞ AÇISI ALMA BECERİSİ: PRAGMATİK İPUÇLARIN VE İKİ DİLLİLİĞİN ETKİSİ

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Ağustos 2022

Bakış açısı alma boyutlarından biri olan *uzamsal bakış açısı alma*, başka bir kişinin bir nesneyi nasıl gördüğü ile ilgili çıkarımda bulunabilme becerisidir. Sınırlı sayıda araştırma çocukların uzamsal bakış açısı alma becerisini etkileyen koşullara odaklanmıştır. Bu tez, pragmatik ipuçların ve iki dilliliğin çocukların uzamsal bakış açısı alma becerisini nasıl etkilediğini incelemeyi amaçlayan üç deney içermektedir. Veriler, toplam 217 çocuktan toplanmıştır. Üç deney boyunca, çocuklara iki farklı nesnenin bulunduğu bir masada oturan kişinin yer aldığı fotoğraflar sunulmuştur. İlk deneyin amacı, pragmatik ipuçların ve iki dilliliğin uzamsal bakış açısı almanın örtük seviyesini nasıl etkilediğini araştırmaktır. Bu deneyin sonuçları: çocuklar hedef nesnenin konumunu hangi bakış açısından tanımlamaları gerektiği ile ilgili bir yönerge almadıklarında (örtük seviye), (1) bakış ve eylem pragmatik ipuçları mevcut olduğunda, çocukların fotoğraftaki kişinin bakış açısını daha sık aldıklarını ve nesnelerin konumlarını bu bakış açısına göre tanımladıklarını, (2) iki dilli çocukların, tek dilli çocuklar ile karşılaştırıldığında, fotoğraftaki kişinin bakış açısına göre nesnelerin konumlarını daha sık tanımladıklarını göstermiştir. İkinci deneyin amacı, pragmatik ipuçların ve iki dilliliğin uzamsal bakış açısı almanın açık seviyesini nasıl etkilediğini araştırmaktır. Sonuçlar, nesnelerin konumunu fotoğrafta yer alan kişinin bakış açısından tanımlamaları istendiğinde (açık seviye), iki dilli çocukların eylem ipucu veya bakış-eylem ipucu mevcut olduğunda uzamsal bakış açısını daha doğru bir şekilde aldıklarını göstermiştir. Son olarak, üçüncü deney ikinci deneyle aynıydı, ancak bu sefer pragmatik ipuçları koşulu, çelişen pragmatik ipuçlarının uzamsal bakış açısı alma becerisini nasıl etkilediğini incelemek için, değiştirildi. Üçüncü deneyden elde edilen sonuçlar (1) bakış ve eylem pragmatik ipuçlarının çeliştiği koşulda, bakış ve eylem pragmatik ipuçlarının örtüştüğü koşula göre, çocukların uzamsal bakış açısını daha doğru aldıklarını, (2) iki dilli çocukların bakış ve eylem ipuçlarının hem çeliştiği hem de örtüştüğü koşullarda tek dilli çocuklara göre uzamsal bakış açısını daha doğru aldıklarını, (3) tek dilli çocukların bakış ve eylem ipuçlarının hem çeliştiği hem de örtüştüğü koşullarda iki dilli çocuklara göre uzamsal bakış açısını daha hızlı aldıklarını göstermiştir. Ek olarak, ikinci ve üçüncü deneylerden elde edilen sonuçlar, 8 yaşındaki çocukların 6 ve 7 yaşındaki çocuklara göre uzamsal bakış açısı almada daha başarılı olduklarını göstermiştir. Genel olarak, tez boyunca yürütülen çalışmalar, pragmatik ipuçlarının ve iki dilliliğin çocuklarda bakış açısı alma becerisini hem açık hem de örtük seviyelerde etkileyen iki koşul olduğunu ortaya çıkarmıştır. Pragmatik ipuçlarının mevcut olduğu durumlarda (eylem ipucu, örtüşen bakış-eylem ipuçları, çelişik bakış-eylem ipuçları), iki dilli ve tek dilli çocukların bakış açısı alma becerilerinin farklılaştığını göstermiştir. Bu sonuçların olası açıklamaları, tez boyunca yürütülen çalışmaların sınırlılıkları ve gelecek çalışmalar için öneriler tartışılmıştır.

Anahtar Kelimeler: uzamsal bakış açısı alma, pragmatik ipuçları, iki dillilik

ACKNOWLEDGEMENTS

I would like to start by thanking my thesis advisor, Assist. Prof. Ayşe Candan Şimşek, who enriched my academic competence significantly by sharing all her knowledge, has always supported me, and patiently answered my questions. I am grateful for the opportunity to work with her.

I would like to express my gratitude to Assist. Prof. Berrin Özyurt and Assoc. Prof. Aycan Kapucu Eryar, for being on my thesis defense jury and for detailed feedback and suggestions that improved the quality of my thesis.

I thank all the students and parents who participated in my thesis. I also would like to thank Ankara Private Tevfik Fikret Schools, Izmir Private Tevfik Fikret Schools, Izmir Dokuz Eylul Primary School, and Izmir Fatih Sultan Mehmet Primary School for giving me the opportunity to conduct my study. Special thanks to the administrator and teachers at those schools: Ayşe Oytun Özgür, Deniz Atalay, Süeyla Yıldırım, Cahit Soylu, Buket Ulaş, Oktay Taşdemir, Aslıhan Çavuş. Without their permission and supportive approach, this study would not have been completed.

I also want to thank all of my instructors at Yaşar University Psychology Department, especially Prof. Emre Özgen, Assist. Prof. Ilgın Başaran, and Assist. Prof. Berrin Özyurt, for enriching my academic competence with their knowledge and support throughout my undergraduate and graduate education.

I would like to thank my dear friends Benan Ayazoğlu Yassı and Tuğçenaz Elcil for always being there for me, supporting and encouraging me. I am incredibly fortunate to have them.

I also would like to express my gratitude to Rukiye Kurum and Umut Kurum for all their support during the formation of the study stimuli and also to Kamil Kurban for helping me reach bilingual children during the data collection phase.

Last but not least, I would like to express my endless thanks and gratitude to my lovely mother, Sevim Kurum, my lovely father, Ali Kurum, and my brothers, Umut Kurum and Ufuk Kurum, who have always been by my side with their unconditional love and invaluable support throughout my life, and who made me who I am today. Without them, I couldn't have done it! This thesis is dedicated to them.

Elif Kurum
İzmir, 2022

TEXT OF OATH

I declare and honestly confirm that my study, titled "SPATIAL PERSPECTIVE-TAKING ABILITY IN CHILDREN: THE EFFECT OF PRAGMATIC CUES AND BILINGUALISM" and presented as a Master's Thesis, has been written without applying to any assistance inconsistent with scientific ethics and traditions. I declare, to the best of my knowledge and belief, that all content and ideas drawn directly or indirectly from external sources are indicated in the text and listed in the list of references.

Elif Kurum
August 2022

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LIST OF ABBREVIATIONS

DCCS Dimensional Change Card Sorting

ToM Theory of Mind

VPT Visuospatial Perspective-Taking

CHAPTER 1
INTRODUCTION

Perspective-taking is the ability to comprehend and adopt that another person may have a distinctive perception, cognition, and emotion than own (Kurdek & Rodgon, 1975; Surtees et al., 2012). This ability has been researched broadly in social and cognitive development, using different methodologies. Research conducted with children have provided an effect of perspective-taking on various processes, from the formation of self-concept to the reduction of aggressive behaviors (Hinnant & O'Brien, 2007; Ittyerah & Mahindra, 1990; Ogelman et al., 2013; Ogelman et al., 2016). However, perspective-taking is a broad domain that encompasses different dimensions such as perceptual, cognition, or affective. One of the perspective-taking dimensions is *spatial perspective-taking* (Level-2 perspective-taking). This dimension is used to understand how objects are positioned relative to another person (Flavell et al., 1981; Michelon & Zacks, 2006). Through this ability, one can form a spatial representation of space with respect to another person. This ability has advantages in many aspects of daily life. More specifically, communicating about space and solving spatial problems are all related to spatial perspective-taking.

In our globalizing world, many children grow up getting exposed to an additional language, besides their native languages. Even, the number of bilingual children is higher than monolingual children, and the number of bilingual children continues to increase daily (Associated Press, 2016; Shin & Kominski, 2010). Most recently, bilinguals and monolinguals have been compared in many contexts to examine developmental differences (Blom et al., 2014; Goetz, 2003; Kovács, 2008; Sebastian-Galles, 2010). Studies have shown that bilingualism plays a crucial role in cognitive development, from executive functions (Bialystok, 1999; Martin-Rhee & Bialystok, 2008) to working memory (Blom et al., 2014). Also, there is some research showing that the advantage of bilingualism extends to spatial perspective-taking ability (Goetz, 2003; Greenberg et al., 2013).

From the first years of life, children are competent to use and interpret different pragmatic cues, like pointing and gaze (Aureli et al., 2009; Butler et al., 2000; Moll & Tomasello, 2004). These emerging competencies play an essential role in children's healthy communication with others and understanding that pragmatic cues convey information about their communicative partner's intention, desire, goal, etc. regarding external entities. Children's competency in using and interpreting various pragmatic cues has been researched, from language development, such as vocabulary (Iverson & Goldin-Meadow, 2005) to cognitive development, such as executive functioning (O'Neil & Miller, 2013). However, studies have not yet disclosed how pragmatic cues influence spatial perspective-taking ability in children.

As mentioned above, the number of bilingual children in the world is increasing, and studies have shown that bilingualism affects the sensitivity of children to pragmatic cues (Brojde et al., 2012; Yow & Markman, 2011; Verhagen et al., 2017). In detail, compared to monolingual children, bilingual children are more aware of pragmatic cues. Nevertheless, as far as I am concerned, no research compared the monolingual and bilingual children's awareness towards pragmatic cues under another challenging context, namely spatial perspective-taking task.

To sum it up, the most of studies focused on perspective-taking ability in children, but perspective-taking is a broad domain and there is relatively little research that examine the spatial perspective-taking ability, one of the dimensions of perspective-taking, in children. Therefore, the main purpose of the thesis was to examine the children's spatial perspective-taking ability using left-right judgment. More specifically, the circumstances that affect children's spatial perspective-taking ability are largely unclear. Therefore, the thesis aimed to investigate how pragmatic cues and bilingualism affect children's spatial perspective-taking ability. Also, evidence that bilingualism affects children's sensitivity to pragmatic cues, especially in challenging situations, is provided by recent studies. Therefore, another purpose of the thesis was to study how bilingual and monolingual children differ in spatial perspective judgments when the presence of pragmatic cues. Last, the aim of the thesis was to study how the age group affects the children's spatial perspective-taking ability. Three experimental studies were carried out for this thesis.

CHAPTER 2
LITERATURE REVIEW

It is not possible to think that children are independent of their environment. As social beings, they interact with others. In order to establish successful and healthy social interactions, children need to understand that others may have different interests, feelings, thoughts, or perceptions. The perspective-taking ability is necessary for such an understanding. Being able to understand another person's mental state, like beliefs, intentions, or perceptions, is defined as perspective-taking (Surtees et al., 2012). Zhao et al. (2010) stated that perspective-taking involves realizing that the viewpoint of another person might be different from our own and making inferences about that person's viewpoint. For Kurdek and Rodgon (1975), perspective-taking encompasses three dimensions. One of the dimensions, *perceptual perspective-taking*, is being able to understand how another individual sees. *Cognitive perspective-taking* is being able to make inferences about another individual's intentions, desires, and thoughts. Another dimension, *emotional perspective-taking*, involves recognizing the emotional states of others. Since perspective-taking is a broad domain that encompasses different dimensions, authors have identified perspective-taking in a number of ways. Despite the various definitions of perspective-taking, the general opinion has been that perspective-taking is being able to understand and adopt mentally that another person may have the same or different perception, cognition, and emotion than own. Through this ability, one can make inferences about what one perceives, thinks, or feels about external entities or events.

2.1. Visuospatial Perspective Taking

One of the perspective-taking dimensions, *visuospatial perspective-taking (VPT)*, is being able to make inferences about what and how other person sees (Flavell et al., 1981; Michelon & Zacks, 2006). It has been extensively studied under the disciplines of developmental and cognitive psychology (Frick et al., 2014; Michelon & Zacks, 2006; Tversky & Hard, 2009). Based on developmental stages and underlying processes, VPT can be divided into *spatial perspective-taking* and *visual perspective-taking.*

Visual perspective-taking, or Level-1 perspective taking, requires comprehending *what* other person can or cannot see and is usually tested using dot perspective tasks (Cole et al., 2015; Santiesteban et al., 2014). For the task, subjects are presented with photographs showing an avatar standing in a room with circles on the walls. After each photograph, a digit also appears. In *self-perspective* trials, subjects are instructed to indicate whether the number of circles they see and the digit are the same. In *other-perspective* trials, subjects are instructed to indicate whether the number of circles the avatar can see and the digit are the same. In these trials, the number of circles that the avatar and the participant may be same or different. The primary result from the dot perspective task demonstrates that people have difficulties in visual-perspective taking when the number of circles that participants see is different from the number of circles that avatar sees (Samson et al., 2010).

Spatial perspective taking, or Level-2 perspective taking, involves understanding *how* an external entity is located relative to another person and is usually tested using left-right tasks (Michelon & Zacks, 2006; Tversky & Hard, 2009). In this task, people are presented with photographs showing a person seat at a table. Two objects are next to each other on this table. In *self-perspective* trials, participants are instructed to define the objects' location with respect to their own perspective. In *other-perspective* trials, participants are instructed to define the objects' location with respect to the person in the photograph. In the task, the participant and the individual in the photograph see the identical object (s) differently. The primary result from the left-right task demonstrates that people perform better when responding by taking self-perspective than when responding by taking other-perspective. However, it has been suggested that some circumstances affect spatial perspective-taking, which will be explained further in this chapter.

Spatial perspective-taking has also been examined using the ambiguous number paradigm (Surtees et al., 2012). In this paradigm, subjects are presented with a scene in which a person seating at a table with a number. In unambiguous condition, the number is the same regardless of orientation. For example, the number "*8*". This unambiguous number is the same from the self-perspective and the other-perspective. In ambiguous condition, a number differs according to its orientation. For example, the number "*6*". It can be "*6"* from the self-perspective but "*9*" from the other perspective.

Researchers have examined spatial perspective-taking ability using the left-right tasks or the ambiguous number paradigm at both *implicit level* and *explicit level*. While subjects are required to adopt their own perspective or another individual's perspective at the explicit level, they do not receive instruction on which perspective to take at the implicit level. The implicit nature of perspective-taking tasks is used to investigate whether the spatial perspective-taking is automatic, namely *spontaneous spatial perspective-taking*.

Overall, visual perspective-taking is an understanding that people can see different things, while spatial perspective-taking involves comprehending that individuals can see things differently. Moreover, two levels of visuospatial perspective-taking require different processes. According to the *remapping hypothesis*, spatial perspective-taking requires making a mental transformation. Specifically, people rotate the scene mentally and place themselves in other individual's point of view. In contrast, visual perspective-taking requires using another person's line of sight. In addition, compared to visual perspective-taking, people take more time when taking another person's spatial perspective to describe an object's location (Michelon & Zacks, 2006). This thesis will primarily focus on spatial perspective-taking.

2.1.1. Spatial Perspective Taking

Spatial perspective-taking is necessary to produce a spatial description of an object in space. Through this dimension of perspective-taking, one can communicate about the object or solve spatial problems. First, a reference frame (i.e., another person) must be decided to represent the object's location (i.e., an apple) and the spatial representation of the object (i.e., left, right, above, below) is defined relative to that reference frame. Thus, this spatial perspective-taking process indicates how the reference frame and the object are related (i.e., to another person's left).

People often use themselves as a reference frame and tend to represent an object's location in space from their own perspective, *egocentric perspective (*Johnston & Hayes, 2000; Shelton & McNamara, 2004). They typically use their own body to describe spatial relations of objects ("to my right", "to the right"). However, there might be a situation where people need to take a spatial perspective different from their own; for example, when your friend asks where his/her coffee mug is, it might be essential to spatially represent its position according to his/her perspective.

It has been suggested that in some circumstances, people spontaneously take another person's perspective more to identify an object's location. For instance, Tversky and Hard (2009) presented visual images showing two objects and asked subjects to describe object relations. When the images did not contain a person, subjects described the object relations more frequently from their own perspective, namely *self-perspective* ("to my right"). However, when a person could be seen in the images reaching for or looking at the object, subjects took the person's perspective more frequently, namely *other-perspective* ("to his left", "the man's left") and described the object relations accordingly. Thus, Tversky and Hard (2009) concluded that some circumstances such that the presence of an individual in an image induces spontaneous spatial-perspective taking. Also, the tendency to take other-perspective increased, specifically when the action verb in the question was emphasized (Lozano et al., 2007; Tversky & Hard, 2009). Furthermore, it has been shown that not only verbally emphasizing the action but perceiving another person's action also influences the choice of perspective. For example, Furlanetto et al. (2013) presented subjects with videos depicting two objects and asked them to describe the object relations. When subjects perceived a person reaching for the target object in the video, they took that person's perspective more frequently and described the object relations accordingly. The findings about the effect of nonverbal communication components, such as action, on choosing other-perspective will be explained further in this chapter.

Tosi et al. (2020) also examined the circumstances that lead people to take the spatial perspective of another individual. Researchers asked subjects to identify objects' spatial relations. People took the other-perspective more often and described the object relations accordingly when the visual image included a person compared to an external entity such as a plant. Furthermore, they are inclined to take other-perspective if they saw an individual facing them who could act on and see objects. These results have shown that perceiving an individual who has the intention to act influenced the people's tendency to choose other-perspective. Moreover, people tended to take other-perspective more frequently when their own position and another person's position were mismatched compared to when their positions matched. In other words, the frequency of taking the spatial perspective of another person increased when the person was on the opposite side of the screen. Therefore, we can conclude that another factor that leads people to choose other-perspective might be an angular difference between the two viewpoints. Michelon and Zacks (2006) also examined how angular difference affects spatial perspective-taking. In the study, subjects made a judgment about an object's location relative to another person. The angular difference between the participant and another person was 0º, 90º, 180º, or 270º. Researchers found that people's reaction times were longer as the angular difference increased. In other words, people were slower to adopt other person's spatial perspective when the difference between the person's and participant's viewpoints increased. The findings have shown that time to adopt other person's perspective might be affected by the angular difference.

Cavallo et al. (2016) also focused on the circumstances that influence spatial perspective-taking performance. Researchers presented pictures depicting an object (an apple) on a table. Subjects were asked to describe the object's position from their own perspective (egocentric judgment) and people were faster in their spatial description if the object was presented closer and at the right of them. However, when they took the avatar's perspective, they were faster in their description if the object was presented close to and at the right of the avatar. The findings have shown that the object's location and distance relative to the person to be taken perspective influence spatial perspective taking. Also, the findings provided evidence that people make a mental transformation to describe spatial relations from another individual's perspective. Furthermore, researchers found that when an empty chair took the place of the avatar, reaction times were faster if the object was close to and at the right of the chair. However, when two bookcases surrounded the table, and there was no place for a person, participants had difficulty taking other-perspective. Overall, Cavallo et al. (2016) showed that a place designed for human action leads to describing spatial relations from other-perspective.

In sum, people choose a particular perspective when describing the position of the objects in space. Although inhibiting self-perspective and taking other-perspective can be an effortful process (Carlson & Moses, 2001; Epley et al., 2004), there are some circumstances that trigger people to take another individual's spatial perspective to identify an object's location, such as the mere presence of another person, angular disparity, or potential action of others.

2.1.2. Spatial Perspective Taking Ability in Children

The ability to take perspective is a critical milestone in the social-cognitive development of children. Researchers have demonstrated that this ability is crucial to their formation of self-concept, their development of moral reasoning skills, prosocial and empathic behaviors, and the reduction of aggressive behaviors (Ittyerah & Mahindra, 1990; Marsh & Serafica, 1977; Marsh et al., 1980; Ogelman et al., 2013). More specifically, for instance, Ogelman et al. (2016) suggested that the cognitive perspective-taking ability of children influences their social competencies, such as ease of participation in peer group (Ogelman et al., 2016). Also, recent research have shown the relationship between perspective-taking ability and language development (Guajardo & Carwrigt, 2016; Milligan et al., 2007).

To date, the development of perspective-taking ability has been the subject of many studies (Frick et al., 2014; Greenberg et al., 2013; Piaget & Inhelder, 1967). However, the age at which perspective-taking develops is still a debate. Wimmer and Perner (1983) examined perspective-taking ability through the assessment of false belief and indicated that this ability does not develop until five years old. A meta-analysis of 178 studies was conducted to address the age debate (Wellman et al., 2001). In contrast to Wimmer and Perner (1983), they indicated that children at 3-4 years old can understand that another person may have a different mental state. Based on the findings, the consensus is that children under the age of three are not aware of another individual's perspective, and therefore this ability is not completely developed.

As mentioned above, perspective-taking is a broad domain that encompasses different dimensions such as intentions, desires, visual perspective, etc. Spatial perspective-taking, one dimension of perspective-taking, is this thesis's main subject, and the age at which spatial perspective-taking develops is also unclear. Surtees and Apperly (2012) suggested that spatial perspective-taking develops after the emergence of visual perspective-taking (Level-1 perspective taking). Piaget and Inhelder (1967) were the first to conduct a study on children's spatial perspective-taking ability. In this study, a model with three mountains was presented to the children, and they were asked how a doll sees this model. Then, they were instructed to choose the photograph that represented the doll's perspective. Children under the age of 7 were more likely to choose photographs representing their own perspectives. In other words, children had failed to understand that others might have a different spatial perspective. Using the three mountains task, they indicated that it is not possible for children to successfully take another's spatial perspective until the age of 7-8. Following Piaget's study, many studies have examined spatial perspective-taking ability, and these studies have indicated different age groups for spatial perspective-taking ability. For instance, Borke (1975) indicated that children acquire the ability in spatial perspective-taking as young as 4 years old when a toy was used instead of the mountain model. In another study, children were presented with scenes containing a toy figure, and then they were asked to select the option corresponding to the figure's perspective (Frick et al., 2014). There was no difference in the spatial perspective-taking ability of children younger than 8 years old, but this ability increased significantly at 8 years old. Based on the previous studies, we can say that spatial perspective-taking ability first appears at 4 years old but improves at 8 years old.

Furthermore, perspective-taking ability has been a subject of many studies in social-cognitive development. However, only a few studies have focused on the circumstances that affect which perspective children take to describe object relations. Frick et al. (2014), for instance, have shown that the number of objects influences the spatial perspective-taking performance. In detail, children were presented with pictures including one, two, or four objects. It was found that they took another person's perspective more accurately when the number of objects in the scene was low. These results indicate that spatial complexity is one of the factors that influences which perspective children take to describe object relations. Researchers also showed that the angular difference between a child and another person affects which perspective children adopt. With increasing angular difference, children took other-perspective less, which led to more spatial descriptions from their own perspectives. Moreover, recent studies have focused on how children's language background affects their spatial perspective-taking ability (Goetz, 2003; Greenberg et al., 2013). The findings about the effect of language background on choosing other-perspective will be explained further in this chapter.

In sum, the studies so far have shown that age, language background, spatial complexity, and angular difference influence children's spatial perspective-taking ability. However, as stated above, previous studies conducted with adults have focused on the various circumstances that lead them to take another individual's spatial perspective. Given that perspective-taking is an important milestone in social-cognitive development, further investigations with children focusing on different circumstances that might affect their spatial perspective-taking ability might be essential.

2.2. Bilingualism

The number of children who speak one more language (in addition to their native language) is higher than monolingual children, and the number of bilingual children continues to increase day by day (Associated Press, 2016; Shin & Kominski, 2010). However, there is no consensus among linguists on what bilingualism is. For example, Lambert (1955) stated that bilinguals can be characterized in two ways as *balanced bilingual* and *dominant bilingual*. Balanced bilingualism has been described as equal proficiency in both languages, whereas dominant bilingualism is a greater proficiency in one of the languages, usually in the native language. For Macnamara (1967), a minimum level of proficiency in a second language can be considered as the criterion for bilingualism. Kohnert (2010) stated that bilinguals can be described as individuals who acquire two languages regularly between birth and adolescence. Bilingualism is also divided into *simultaneous bilingualism* and *sequential bilingualism*. A person who acquired two languages together after birth is called simultaneous bilingual, whereas a person who acquired the second language after his/her native language has begun to develop is called sequential bilingual (Karahan, 2005).

As can be understood from the definitions of types of bilingualism, there might be differences between the two languages' proficiency levels because each language can be acquired under different circumstances. Despite these expected differences, previous studies showed that bilingual children are more advantageous in various domains than monolingual children. Peal and Lambert (1962) were pioneers to show bilingualism advantage in verbal and nonverbal tasks. They suggested that bilinguals' high performance in these tasks depended on increased cognitive flexibility.

It is well established that compared to monolinguals, bilingual children show better performance on various tests of executive function (Bialystok, 1999; Bialystok & Martin, 2004). Executive function encompasses processes such as attention, inhibition, selection, and flexibility. Using the Dimensional Change Card Sorting task (DCCS task), Bialystok (1999) investigated the effect of bilingualism on executive function in four and five year olds children. In the DCCS task, children are instructed to match the cards according to one dimension, such as color, then to match the identical cards according to a different dimension, such as shape. Since children have to inhibit previous dimension and focus on the relevant ones, inhibitory control and cognitive flexibility are required. The results showed that bilingual children performed better than monolingual children on the DCCS task, showing enhanced level of executive function.

Furthermore, bilingual children are more advanced in metalinguistic awareness tasks (Ben-Zeev, 1977; Bialystok, 1988; Diaz, 1983). For example, researchers examined the performance of Ukrainian-English bilingual and English monolingual children on various metalinguistic tasks (Cummins & Mulcahy, 1978). Bilingual children showed advantages in detecting ambiguities.

Also, Blom et al. (2014) investigated whether there is a difference between 5- and 6-year-old Dutch-speaking children and Turkish-Dutch-speaking children in verbal working memory. Their verbal working memory was measured using forward digit span and backward digit span tasks. For the forward digit span task, children are instructed to remember the array of the number in the same order. For the backward digit span task, they are instructed to remember the array of the number in reverse order. While the forward digit span task requires only storage, the backward digit span task requires both storage and information processing. The results showed that bilingual children were better at memory tasks that especially required information processing. Also, a meta-analysis study evaluating the data of 63 studies indicated that there is a positive relationship across bilingualism and working memory, attention, and metalinguistic awareness (Adesope et al., 2010).

In sum, studies have demonstrated that bilingualism influences children's cognitive development. Over monolinguals, bilinguals are more advantageous in dealing with various cognitive functions such as executive functions, metalinguistic awareness, and working memory.

More recently, studies have begun to focus on children's linguistic knowledge, which may be a precursor to a theory of mind development (ToM). ToM helps children detect that others might have different mental states. ToM development is most widely assessed using the false belief task. In the "unexpected transfer" false-belief task, children are informed that one character places an item in the box. Another character changes the item's location after the character is gone. Children are asked where the character would look for the item when he/she turns. In the "unexpected contents" false-belief task, the child is presented with a box containing an item and asked what could be in the box. After the child answers and is shown the item, the child is needed to answer what an individual who does not see the item will say in the box. Findings from a number of studies have supported that bilingual children are more advantageous than monolingual children in ToM. Goetz (2003) also investigated whether bilingualism affects ToM development using false belief tasks, appearance reality task, and spatial perspective-taking task. The findings revealed that both monolingual children groups performed similarly on ToM tasks. However, the Mandarin-English bilingual children's performance on ToM tasks was more successful than both groups of monolingual children. In a study by Kovács (2009), a false-belief task, slightly different version of theory of mind task, and a control task were administered on two and three years old children. The findings showed that Romanian-Hungarian speaking bilingual children showed significantly better performance than monolingual Romanian children in understanding others' mental states. Similar, advantages in reality questions of appearance-reality task (the task to assess ToM) was found in four and five years old bilingual children (Bialystok & Senman, 2004). Also, a meta-analysis of 16 studies that compared bilingual and monolingual children on the theory of mind-related tasks and provided support for the bilingualism advantage on ToM development (Schroeder, 2018).

Furthermore, three possible explanations have been suggested for why bilinguals are more advantageous compared to monolinguals; executive functioning, socio-pragmatic and metalinguistic awareness (Goetz, 2003; Kovács, 2008; Diaz & Farrar, 2017; Fan et al., 2015). Regarding the executive function, to understand other's mental states, children first need to inhibit the mental state of their own, then focus on the mental states of others, so the components of executive function, particularly inhibitory control, are required. As mentioned above, since bilingual children use components of executive functioning more efficiently, they could understand another person's mental state more successfully than monolingual children. Therefore, the level of executive functions could underlie the advantage of bilingualism in the theory of mind. Regarding the possible explanation of socio-pragmatic, bilingual children's awareness that another person can speak a different language could trigger the awareness that another person may have a different perspective. Regarding the possible explanation of metalinguistic awareness, it has been suggested that metalinguistic awareness and ToM development are related, and bilingual children have greater metalinguistic awareness. Therefore, the bilingual's metalinguistic awareness might influence the bilingualism advantage in the ToM development.

2.2.1. Bilingualism and Spatial Perspective Taking

As stated above, ToM tasks (i.e., false belief tasks and appearance-reality) showed that bilingual children better understand that another person can represent one event or object in different ways, compared to monolingual children. Spatial perspective-taking tasks show similarly that people can see the same things differently. Recent research have studied the role of bilingualism on children's spatial perspective-taking ability and suggested that another cognitive function that bilinguals are more advantageous than monolinguals is spatial perspective-taking (Goetz, 2003; Greenberg et al., 2013).

In a study by Greenberg et al. (2013), 8-year-old bilingual and monolingual children were instructed to answer how an avatar sees a four-block array. Bilinguals adopted more avatar's perspective than monolinguals when the angular difference between child and avatar is 180° and 270°. In other words, bilingual children have a cognitive advantage in even the typically most difficult positions of spatial perspective-taking. Shahini and Bialystok (2018) presented a model to monolingual and bilingual children, and they were asked to show how a toy figure sees this model by choosing from the images presented to them, as in Greenberg et al. (2013). Bilingual children were more prone to inhibit their perspective and take the toy figure's perspective than monolingual children. Goetz (2003) presented a picture of an elephant or a turtle to monolingual and bilingual children. When they were asked whether an elephant or a turtle lying on its back or standing on its feet when the experimenter looked to it, Mandarin-English speaking bilingual children more accurately represented the animal's position from the experimenter's perspective compared to monolingual children.

In sum, these findings have shown that bilingualism influences children's spatial perspective-taking ability. More specifically, bilingual children outperform monolinguals on spatial perspective-taking tasks. Therefore, we can say that another important factor affecting the spatial perspective-taking ability is the difference in language background.

2.3. Pragmatic Cues

From the first years of life, children become proficient in using and interpreting the pragmatic cues that are nonverbal components of communication (Butler et al., 2000; Moll & Tomasello, 2004). These emerging proficiencies play an essential role in children's healthy communication with others and understanding that pragmatic cues convey information about their communicative partner's intention, desire, goal, etc. (Ateş & Küntay, 2018; Baron-Cohen, 1995; Liszkowski et al., 2006). For example, eye gaze, a crucial pragmatic cue, is important in human interaction as it allows one to determine where and what another person is attending to and establish joint attention (Moll & Tomasello, 2004; Fischer et al., 2008). Likewise, pointing is another important pragmatic cue that allows a child to understand another person's intentions or requirements for external entities (Aureli et al., 2009; Behne et al., 2005; Liebal et al., 2009). Overall, children's competency in using and interpreting various pragmatic cues enables a child to establish effective communication with another person by correctly understanding the mental states of the person (Bakeman & Adamson, 1984).

Most of the previous studies examined the role of pragmatic cues on children's language development (Grassmann &Tomasello, 2010; Iverson & Goldin-Meadow, 2005). For example, when learning a new word, young children attend to pragmatic cues the speaker provides, like pointing and eye gaze (Baldwin et al., 1996). Moreover, children tend to use especially the pointing to express words that they cannot yet express verbally in the first year of life. Iverson and Goldin-Meadow (2005) suggested that the early gesture used to refer to objects is related to later vocabulary development. In other words, pragmatic cues seem a way to help children's language acquisition. In addition, children show a preference for pragmatic cues when there is a conflict in their referential interactions (Grassmann & Tomasello, 2010; Jaswal & Hansen, 2006). For example, in a study conducted by Grassmann and Tomasello (2010), the referential conflict was created by pointing to one object while labeling another object. It has been found that children preferred pointing cue more rather than labeling. In other words, children resolved the conflict by choosing the pragmatic cue.

Pragmatic cues are also crucial for the cognitive development (O'Neil & Miller, 2013; Sauter et al., 2012). O'Neil and Miller (2013) examined the role of pragmatic cues on executive function using the DCSS task. It has been found that children who produce pragmatic cues more (high gesture group) outperformed those who produce less (low gesture group). The role of pragmatic cues is also seen in spatial tasks. Sauter et al. (2012) examined the relations between the use of pragmatic cues and spatial ability. Children were asked to describe the spatial relations of a space to a person. The results showed that children who used pragmatic cues expressed more spatial information than those who did not. Austin and Sweller (2014) also examined the role of pragmatic cues on spatial layout perception. Children aged 3 to 4 recalled more spatial information when the pragmatic cues were used in the learning phase of the spatial array. The findings provide evidence for the role of pragmatic cues on cognitive development.

In sum, children use and interpret different pragmatic cues from the first years of life (Aureli et al., 2009; Butler et al., 2000; Moll & Tomasello, 2004). Children's competency in using and interpreting various pragmatic cues was researched in different domains. These studies have shown that pragmatic cues influence language and cognitive development of children.

2.3.1. Pragmatic Cues and Bilingualism

To date, most of the research focused on sensitivity of children to pragmatic cues in linguistic and cognitive contexts. However, as mentioned above, the number of bilingual children in the world is increasing (Associated Press, 2016; Shin & Kominski, 2010), and the role of pragmatic cues on linguistic and cognitive processes might be different between bilingual and monolingual children. This can be attributed to the fact that the environment each child grows up differs. All children attend to and integrate both verbal and nonverbal communication tools such as feedback and pragmatic cues to communicate successfully. However, bilingual children need to attend more these cues to avoid a communication breakdown. In other words, since bilingual children have to check which language their communicative partner is speaking or whether they are responding in an appropriate language, they might attend more to these cues. Researchers have suggested that the need to pay attention more to the speaker might increase sensitivity of bilingual children to pragmatic cues (Verhagen et al., 2017; Yow & Markman, 2011). For example, in a study by Yow and Markman (2011), children were instructed to find the toy hidden in one of the boxes. Monolingual and bilingual children showed similar performance when the experimenter seated at the midpoint of the two boxes and gazed at or pointed to the correct box. However, bilingual children showed better performance than monolingual children in a challenging situation where the experimenter was behind another box, but pointing or gazing at the correct box. The results showed that bilingual children are more aware of pragmatic cues compared to monolingual children, particularly in a challenging situation, and therefore benefit more from pragmatic cues. Furthermore, Brojde et al. (2012) indicated that bilingual children prefer pragmatic cues more than monolingual children when learning new words. More specifically, children were taught a new word in four different situations. Bilingual children relied more on pragmatic cues in only a challenging situation where property (shape, color, and texture) and pragmatic (eye gaze) cues were incongruent. Moreover, as mentioned above, Grassmann and Tomasello (2010) have shown that children show a preference for pragmatic cues when there is a referential conflict. Verhagen et al. (2017) examined the preferences of monolingual and bilingual children for pragmatic cues using the procedure of Grassmann and Tomasello (2010). It has been found that bilingual children preferred pragmatic cues over labeling and chose more objects pointed in a challenging situation where the cues are in conflict. Overall, these findings show that bilingualism affects children's sensitivity to pragmatic cues, especially in challenging situations.

2.3.2. Pragmatic Cues and Spatial Perspective Taking

Recent studies provided that the presence of an individual in a visual scene induces spatial-perspective taking (Tversky and Hard, 2009; Zwickel, 2009; Zwickel and Müller, 2010). Besides the mere presence of an individual, how does the individual using pragmatic cues influence spatial perspective-taking? As mentioned above, one's pragmatic cues reflect that person's goals, intentions, or desires regarding external entities or events (Ateş & Küntay, 2018; Baron-Cohen, 1995; Liszkowski et al., 2006). In other words, pragmatic cues open a way to make inferences about what the person is attending, is doing, or will do. To better understand the person's feelings, thoughts, and goals, it may be necessary to evaluate the pragmatic cues of that person from his/her point of view. Thus, perceiving a person's pragmatic cues might trigger taking that person's perspective. However, only a few studies have examined the role of pragmatic cues, such as action and eye gaze, on spatial perspective-taking. In the task of Tversky and Hard (2009), there was no difference between the effects of gaze cue and action cue on spontaneous spatial perspective-taking. Subjects took other-perspective more frequently, regardless of which one of the pragmatic cues (*gaze* and *gaze-action*) is present. However, Furlanetto et al. (2013) showed that some pragmatic cues have more effect on spontaneous spatial perspective-taking. More specifically, the presence of gaze-action cues induced spontaneous perspective-taking more compared to the gaze cue and a person who displayed no pragmatic cue. Specifically, if the video included an individual who reached and looked the object, subjects took the individual's perspective more frequently and described the object relations accordingly. Moreover, researchers indicated that the tendency to take the spatial perspective was triggered by the incongruity of pragmatic cues. Spontaneous spatial perspective-taking was more frequent when the gaze and action cues were incongruent (i.e., grasping the target object but looking elsewhere) than when both cues were congruent (i.e., both grasping and looking at the target object). Another study by Mazzarella et al. (2012) showed the effect of pragmatic cues not only on spontaneous spatial-perspective taking but also when explicitly required to take other-perspective. It has been found that people took another person's perspective more accurately when the person's action was observed. However, the mere presence of a person or person's eye gaze did not influence the spatial perspective-taking performance. In addition, the inconsistent results about which one of the pragmatic cues has more effect on spatial perspective-taking can stem from task variations. For example, Furlanetto et al. (2013) examined the effect of pragmatic cues on spatial perspective-taking using videos instead of photographs. The usage of the dynamic scene (i.e., video) instead of a static scene (i.e., photograph) might have made some pragmatic cues more realistic and effective.

In sum, pragmatic cues reflect a person's intention, desire, goal, etc. towards an external entity, and therefore perceiving these cues enables one to understand that communicative partner as a separate person who might have a different mental state than own (Liszkowski et al., 2006). In other words, pragmatic cues allow us to evaluate what another person is attending to or is doing from his/her perspective. Thus, in line with the presented findings above, perceiving pragmatic cues could trigger taking another's perspective (Furlanetto et al., 2013; Mazzarella et al., 2012). However, since research so far has examined the effect of pragmatic cues on the explicit and implicit nature of spatial perspective-taking tasks within a sample of adults, further investigation with children is essential.

2.4. Overview of the Thesis

2.4.1. Aim and Research Questions of the Thesis

Authors have identified *spatial perspective-taking* as the ability to understand how an object (s) is positioned relative to another person and indicated some circumstances that affect spatial perspective-taking ability. For instance, it has been suggested that when a pragmatic cue, such as action, is present, people take another's perspective more accurately and describe the object's location accordingly (Furlanetto et al., 2013; Mazzarella et al., 2012). However, the focus of spatial perspective-taking has mostly been towards adults. To the best of my knowledge, no research investigated how pragmatic cues affect children's spatial perspective-taking ability.

Furthermore, given that bilingual children are more advantageous than monolinguals in various domains, from executive functioning (Bialystok, 1999; Martin-Rhee & Bialystok, 2008) to perspective-taking (Goetz, 2003; Greenberg et al., 2013), research investigating the effect of bilingualism on the explicit and implicit nature of spatial-perspective-taking ability, as another domain, might be significant. Moreover, as was stated in Chapter 1, bilingualism affects sensitivity to socio-pragmatic cues, and especially in challenging situations, bilingual children are more sensitive to pragmatic cues than monolingual children (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011). However, to the best of my knowledge, no research investigated how bilingual and monolingual children differ in spatial perspective judgments when the presence of pragmatic cues.

Taken together, the main aim of this thesis is to provide a better understanding of the children's spatial perspective-taking ability. Specifically, the first aim is to investigate the effect of pragmatic cues and bilingualism on the implicit level of spatial perspective-taking, namely *spontaneous spatial perspective-taking*. The second aim is to investigate the effect of pragmatic cues and bilingualism on the explicit level of spatial perspective-taking. The third aim is to investigate the effect of incongruent pragmatic cues and bilingualism on the explicit level of spatial perspective-taking. Last, the aim is to investigate the effect of age group on the children's spatial perspective-taking ability. Three experimental studies were carried out for the thesis.

The thesis focused on four main questions:

Research Question 1: How would pragmatic cues and bilingualism affect which perspective children take to describe object relations, namely *spontaneous spatial perspective-taking*? Do bilingual and monolingual children differ in spontaneous perspective judgments when the presence of pragmatic cues?

Research Question 2: How would pragmatic cues and bilingualism affect children's spatial perspective-taking performance? Do bilingual and monolingual children differ in spatial perspective judgments when the presence of pragmatic cues?

Research Question 3: How would incongruity of pragmatic cues and bilingualism affect children's spatial perspective-taking performance? Do bilingual and monolingual children differ in spatial perspective judgments when the incongruity of pragmatic cues?

Research Question 4: How would the age group affect the children's spatial perspective-taking ability?

2.4.2. Hypotheses of the Experiments in Thesis

Hypotheses of Experiment 1

People tend to represent the location of an object in space with respect to self, but in some circumstances, they spontaneously take another person's perspective more to describe the location of an object (Michelon & Zacks, 2006; Tosi et al., 2020; Tversky & Hard, 2009). Studies conducted with adult samples suggested that the presence of pragmatic cues is one of the circumstances that lead people to choose another person's perspective (Furlanetto et al., 2013; Mazzarella et al., 2012; Tversky & Hard, 2009). Since pragmatic cues increase the frequency of spontaneous spatial perspective-taking, it was expected that when the pragmatic cue is present, children would also describe the object's location more frequently with respect to another person. Therefore, hypothesis 1 of the thesis was:

Hypothesis 1. When asked to describe object relations, children would take other-perspective more frequently and describe object relations accordingly when the visual scene (i.e., photograph) includes a pragmatic cue than when the scene does not include a pragmatic cue.

Due to limited and mixed findings in the literature about which one of the pragmatic cues has more effect on spontaneous spatial perspective-taking, in the current experiment, which one of the pragmatic cues (*gaze, action,* and *gaze-action*) would trigger the children's spontaneous spatial perspective-taking performance is exploratory. Therefore, hypothesis 2 of the thesis was:

Hypothesis 2. When asked to describe object relations, which one of the pragmatic cues (*gaze, action,* and *gaze-action*) would induce spontaneous spatial perspective-taking is exploratory.

From the first years of life, children use and interpret various pragmatic cues, such as eye gaze, to communicate with another person (Aureli et al., 2009; Butler et al., 2000; Moll & Tomasello, 2004). However, monolingual and bilingual children's sensitivity to pragmatic cues differs (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011). Since bilingual children show more preference for pragmatic cues than monolingual children, it was expected that when pragmatic cues are provided, bilingual children would describe the object's location more frequently with respect to another person than monolingual children. Therefore, hypothesis 3 of the thesis was:

Hypothesis 3. When asked to describe object relations, bilingual children would take other-perspective more frequently and describe object relations accordingly compared to monolingual children when pragmatic cues are provided.

Hypotheses of Experiment 2

Studies conducted with adults have provided the effect of pragmatic cues on spatial perspective-taking performance (Furlanetto et al., 2013; Mazzarella et al., 2012; Tversky & Hard, 2009). Since people take the person's perspective more accurately when they observe a person with pragmatic cues, it was expected that children would make more accurate and faster judgments about the location of objects from another person's perspective when the visual scene includes a pragmatic cue than when the scene does not include a pragmatic cue. Therefore, hypothesis 4 of the thesis was:

Hypothesis 4. When they are explicitly required to describe object relations from another person's perspective (other-perspective), children would be more accurate and faster in scenes with a pragmatic cue compared to scenes without a pragmatic cue.

Due to limited and mixed findings in the literature about which one of the pragmatic cues has more effect on spatial perspective-taking, in the current experiment, which one of the pragmatic cues (*gaze, action,* and *gaze-action*) would enhance the children's spatial perspective-taking performance is exploratory. Therefore, hypothesis 5 of the thesis was:

Hypothesis 5. When required to describe object relations from another person's perspective (other-perspective), which one of the pragmatic cues (*gaze, action,* and *gaze-action*) would enhance the children's spatial perspective-taking performance is exploratory.

Given that pragmatic cues facilitate taking another person's perspective and also bilingual children are more sensitive to pragmatic cues than monolingual children, especially in challenging situations (Brojde et al., 2012; Furlanetto et al., 2013; Mazzarella et al., 2012; Tversky & Hard, 2009; Verhagen et al., 2017; Yow & Markman, 2011), it was expected that bilinguals' sensitivity to socio-pragmatic cues would contribute to performing better in the spatial perspective-taking task where pragmatic cues are present. Therefore, hypothesis 6 of the thesis was:

Hypothesis 6. When they are required to describe object relations from other-perspective, bilingual children would be more accurate and faster in their description than monolingual children when pragmatic cues are provided.

Despite a large body of research about the development of perspective-taking ability, the age at which spatial perspective-taking ability develops is still a debate. However, based on the findings, it is meaningful to say that spatial perspective-taking ability has begun to acquire around 4- or 5-year-olds and improves especially at 6-8 years old. Therefore, it was expected that children would take another person's perspective more accurately with increasing age. Thus, hypothesis 7 of the thesis was:

Hypothesis 7. When they are explicitly required to describe object relations from other-perspective, children would take other-perspective more accurately as age increases.

Hypotheses of Experiment 3

Besides the specific effect of congruent gaze and action cues, researchers also suggested that incongruent pragmatic cues enhance spatial perspective-taking performance more because it is possible that incongruity of pragmatic cues produces ambiguity and attracts observers' attention more (Furlanetto et al., 2013). Therefore, it was expected that children would make more accurate and faster judgments about the location of objects from another person's perspective when gaze and action cues are incongruent compared to when the gaze and action cues are congruent. Therefore, hypothesis 8 of the thesis was:

Hypothesis 8. Children would be more accurate and faster in their decision for the position of objects from another person's perspective when gaze and action cues were incongruent than when the gaze and action cues were congruent.

Since bilingual children show a preference for pragmatic cues than monolingual children (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011) and pragmatic cues provide a way to adopt another person's perspective more accurately (Furlanetto et al., 2013; Mazzarella et al., 2012; Tversky & Hard, 2009), it was expected that bilingual children would take another person's perspective more accurately and quicker than monolingual children when pragmatic cues are both congruent and incongruent. Therefore, hypothesis 9 of the thesis was:

Hypothesis 9. Bilingual children would make more accurate and faster judgments about the location of objects from another person's perspective than monolingual children when pragmatic cues are both congruent and incongruent.

Hypothesis 10. When children are explicitly required to describe object relations from other-perspective, children would take other-perspective more accurately as age increases.

2.5 Ethical Approval

This thesis was in accordance with the ethical standards of Yaşar University, Turkey (February 09, 2021; No: 383) and was approved by the İzmir Provincial Directorate of National Education (See Appendix H).

CHAPTER 3
EXPERIMENT 1

As was outlined in Chapter 1, people tend to describe the object's location more often from their perspective (self-perspective). However, in some circumstances, people tend to spontaneously take another individual's perspective (other-perspective) and describe the location of an object accordingly. More specifically, some studies have suggested that the presence of an individual induces the spontaneous spatial perspective-taking, whereas some studies have suggested that the presence of pragmatic cues, such as action and eye gaze, trigger taking another individual's perspective spontaneously (Furlanetto et al., 2013; Mazzarella et al., 2012; Tversky & Hard, 2009). However, the focus of spontaneous spatial perspective-taking has mostly been towards adults. Do children, like adults, take a spontaneous spatial perspective? Do pragmatic cues affect which perspective children take when describing object relations?

Furthermore, the number of bilingual children in our globalizing world is increasing (Associated Press, 2016; Shin & Kominski, 2010), and studies have provided the advantage of bilingual children in various domains, from executive functioning (Bialystok, 1999; Martin-Rhee & Bialystok, 2008) to perspective-taking (Goetz, 2003; Greenberg et al., 2013). Moreover, environments in which bilingual and monolingual children grow up differ. For example, in a bilingual environment, bilingual children must attend more to their communicative partner, for instance, which language their communicative partner is using, to avoid communication breakdown. Therefore, researchers have suggested that the increased need to attend more to the communicative partner might increase the sensitivity of bilingual children to pragmatic cues. It has been found that bilingualism affects the sensitivity to pragmatic cues, and especially in challenging situations, bilingual children show more preference for pragmatic cues than monolingual children (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011). Nevertheless, as far as I am concerned, no research compared bilingual and monolingual children's sensitivity to pragmatic cues under another context, namely spontaneous spatial perspective-taking tasks. How does bilingualism affect spontaneous spatial perspective judgments? Do bilingual and monolingual children differ in spontaneous spatial perspective judgments when the presence of pragmatic cues?

Taken together, Experiment 1 investigated the effect of pragmatic cues and bilingualism on spontaneous spatial perspective-taking ability. It is hypothesized that when asked to describe object relations, children would take other-perspective more frequently and describe object relations accordingly when the visual scene (i.e., photograph) includes a pragmatic cue than when the scene does not include a pragmatic cue. Due to limited and mixed findings in the literature about which pragmatic cue has more effect on spontaneous perspective-taking, in Experiment 1, which one of the pragmatic cues (*gaze, action,* and *gaze-action*) would induce spontaneous spatial perspective-taking is exploratory. Also, it is hypothesized that when asked to describe object relations, bilingual children would take other-perspective more frequently to describe object relations than monolingual children when pragmatic cues are provided.

METHOD

3.1. Participants

G*Power Software (version 3.1.9.4, Faul et al., 2007) was used to carry out an a priori power analysis, selecting an effect size of 0.25, alpha of .05, and power of .80. According to the power analysis, at least 24 participants required to get a medium effect with an 80% statistical power for the mixed design analysis of variance with two independent variables of pragmatic cues which is a within-subjects variable, and language group which is between-subjects variable.

Participants were recruited from two public schools (Dokuz Eylül Primary School and Fatih Sultan Mehmet Primary School) and one private school (İzmir Private Tevfik Fikret Schools) in Izmir, and one private school (Ankara Private Tevfik Fikret Schools) in Ankara. 59 parents in total allowed their children to participate in this study; however, 8 of them were excluded because they have any health problems (sight/hearing/language difficulties/learning difficulties). The final sample consisted of 51 children, 8-year-olds (25 girls, 26 boys). The demographic information of children and their parents can be seen in Table 3.1.

Table 3. 1. Demographic Information for Experiment 1

		Monolinguals		Bilinguals	
		N	%	*N*	%
Gender	Girl	8	36.36%	17	58.62%
	Boy	14	63.64%	12	41.38%
Parent's education level	High school degree	7	31.82%	3	10.34%
	Bachelor's degree	9	40.91%	18	62.07%
	Master's degree or higher	6	27.27%	8	27.59%

Children were classified as *bilingual* if they speak one more language (in addition to their native language), have regularly used both languages for most of their lives (on average), and have an adequate level of comprehension, reading, and speaking in both languages. They were classified as *monolingual* if they have little or no knowledge of a language other than their native language.

Based on these criteria, 22 children were monolingual Turkish speakers (8 girls, 14 boys), and 29 were bilingual, whose native language is Turkish and speak another second language (17 girls, 12 boys). For bilingual children, the mean age of second language acquisition was *M*= 3.42 (Median = 4). The majority of bilingual children began to acquire their second language from 3 years old (27.59%) and 4 years old (37.93%), and others began to acquire it from 5 years old (17.24%) and 2 years old (10.34%) and with birth (6.90%). There were 3 different second languages represented in the bilingual group: French (26), English (2), and Russian (1). The bilingual children speak and hear both Turkish (66%) and their second language (33%) daily. In addition, they speak and hear both Turkish (72%) and their second language (28%) at school. People who speak to bilingual children at home have spoken Turkish 89% of the time and a second language 11% of the time.

Parents indicated their child's level of proficiency in speaking, understanding, and reading in both native and second language. For the native language, the bilingual children's level of proficiency in speaking, understanding, and reading was 9.38, 9.48, and 9.26, respectively. For the second language, the bilingual children's level of proficiency in speaking, understanding, and reading was 6.17, 6.76, and 6.59, respectively.

For 5 of the bilingual children, additional language was also reported. The mean age of acquisition of the reported additional language was *M*= 6.20 (Median = 7). For reported additional language, their level of proficiency in speaking, understanding, and reading was 2.8, 2.8, and 2.75, respectively, indicating that they had little or no knowledge of the additional language. The description of bilingual children's language background can be seen in Table 3.2.

Table 3. 2. Language Background and Proficiency of the Bilingual Children in Experiment 1

Language background	*M*	*SD*	Frequency
AoA L1	.00	.00	
AoA L2	3.41	1.30	
Speaks an L3	6.20	2.17	17%
L1 usage (on average)	65.86	7.33	
L2 usage (on average)	33.28	7.11	
L3 usage (on average)	0.86	2.34	
L1 usage at home	89.29	14.97	
L2 usage at home	10.71	14.97	
L1 usage at school	71.59	5.93	
L2 usage at school	28.41	5.93	

Language proficiency	L1			L2		
	M	SD	Range	*M*	SD	Range
Speaking	9.38	1.208	5-10	6.17	2.221	2-10
Understanding spoken language	9.48	.871	7-10	6.76	2.149	2-10
Reading	9.28	1.032	7-10	6.59	2.130	3-10

L1: native language; L2: second language; L3: reported additional language; AoA: age of acquisition; Language proficiency was from 0 to 10 for speaking, understanding and reading.

3.2. Materials

3.2.1. Personal Information Form

The Personal Information Form consists of four questions inquiring about children's month and year of birth, gender, the parent's education level, and whether the child has any health problems (sight/hearing/language difficulties/learning difficulties) (see Appendix B). The form was filled out by the parents of the children.

3.2.2. Language Background Questionnaire

Child Language Experience and Proficiency Questionnaire (Child LEAP-Q) is used to assess children's language background. It was adapted by Marian et al. (2007). Turkish translation of the Child Language Experience and Proficiency Questionnaire does not exist. Therefore, Language Background Questionnaire was prepared by the experimenter based on the questions of Child LEAP-Q. The questionnaire is answered by the child's parent and provides information about the language (s) the child knows in order of dominance and order of acquisition, age of first exposure to a language (s), the percentage of time the child speaks and hears each language at school and at home, and child's level of proficiency in the language (s) (see in Appendix C).

3.2.3. Peabody Picture Vocabulary Test

The Peabody Picture Vocabulary Test (Dunn & Dunn, 1997) is used to measure receptive vocabulary for children two years and older. Katz et al. adapted the Peabody Picture Vocabulary Test into Turkish at Ankara Guidance Research Center in 1972.

Peabody Picture Vocabulary Test is an individually administered test. There are two separate instructions for children over 8 and under 8 years old. The test consists of three training sheets and 100 test sheets (see Appendix D). The child is instructed to choose the picture that matches the word the experimenter said. The test sheets increase in difficulty, and the test is terminated when the child makes six errors in a row or six errors out of eight consecutive answers.

3.2.4. Spatial Perspective-Taking Task

The spatial perspective-taking task was programmed in Psytoolkit software (Stoet, 2010; Stoet, 2017) and administered on a Samsung Galaxy Tab A7 tablet with a 10.4-inch touchscreen monitor and 2000 x 1200 display resolution. Children were presented with photographs showing a person seated at a table (see Appendix E). Two objects were next to each other on this table. The presented photographs were 1350 x 759 pixels in size, with a resolution of 2000 x 1200. Photographs were manipulated by varying the person's gaze and action (Figure 3.1). In the *Actor condition*, the person looked straight ahead and did not grasp the target object. In the *Gaze condition*, the person looked at the target object but did not grasp it. In the *Action condition*, the person looked straight ahead but grasped the target object. In the *Gaze-Action condition*, the person looked at the target object and grasped it. To avoid any bias for the person's gender and the answer about the location of the target object, I constructed four sets of photographs (i.e., candle on the left and pineapple on the right for both woman and man actor; bottle on the left and glass on the right for both woman and man actor). There were 16 trials consisting of 4 trials for each of the four experimental conditions. 16 photographs were presented in random order, and children were asked the question, *"Where is the target object in relation to another?"* (i.e., Where is the candle in relation to pineapple?). In these photographs, the target objects were the candle and the glass. In each trial, the photographs remained on the screen until the children gave their responses. The experimenter wrote down their responses. There were no time limits for children to respond.

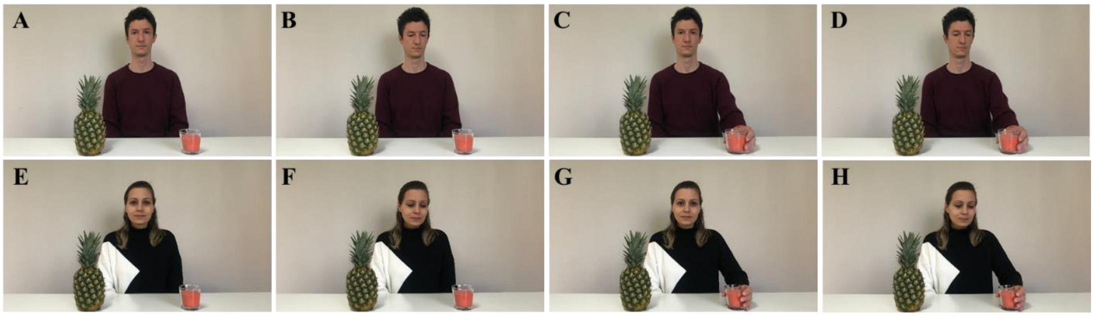

Figure 3. 1. Examples for Photographs Presented in Experiment 1. For photographs with a male actor: **(A)** Actor condition **(B)** Gaze condition **(C)** Action condition **(D)** Gaze-Action condition. For photographs with a female actor: **(E)** Actor condition **(F)** Gaze condition **(G)** Action condition **(H)** Gaze-Action condition

3.3. Procedure

All parents were asked to fill out the written informed consent (see Appendix A), the Personal Information Form and Language Background Questionnaire to determine which language group the children belong to. After all forms were returned to the children's school and collected, the experimenter tested all children individually in a classroom or library at their school. Children were tested in a fixed order: PPVT and spatial perspective-taking task.

3.3.1. Statistical Procedure

In order to investigate the effects of pragmatic cues and bilingualism on spontaneous spatial perspective-taking (Hypothesis 1, 2, and 3), 4x2 mixed design analysis of variance was conducted by using IBM SPSS Statistics software (Version 22). Analysis was conducted with within-subjects variable of pragmatic cues (*actor condition, gaze condition, action condition,* and *gaze-action condition*), between-subjects variable of language group (*monolingual and bilingual*), and the outcome variable of mean proportion of other-perspective responses.

RESULTS

3.4. Descriptive Statistics

The mean scores and standard deviations for variables of parent's education level and PPVT scores are reported in Table 3.3. In order to examine whether there are language group differences for parents' education level and for PPVT scores, independent samples t-test analysis was done. The difference between monolingual and bilingual children was not statistically significant in parent's education level, $t(49) = -1.122$, $p = .267$, showing no language group differences for parent's education level. The difference between monolingual and bilingual children was not statistically significant in PPVT scores, $t(49) = -0.172$, $p = .864$, showing no language group differences for receptive vocabulary.

Table 3. 3. Descriptive Statistics for Variables in Experiment 1

	Language Group	*M*	*SD*
PPVT score	Monolingual	67.18	3.527
	Bilingual	67.34	3.199
Parent's education level	Monolingual	1.95	.785
	Bilingual	2.17	.602

Note. *N* = 51.

3.5. Primary Analyses

3.5.1. Normality of Distribution

It was checked whether the data met the normality of distribution using IBM SPSS software (Version 22).

For bilingual children, the mean proportion of other-perspective for actor condition was not normally distributed with Kolmogorov-Smirnov (29) = 0.233, $p < .001$. However, the mean proportion of other-perspective for actor condition was normally distributed, with a skewness of -0.291 ($SE = 0.434$) and kurtosis of -1.420 ($SE = 0.845$). The mean proportion of other-perspective for gaze condition was not normally distributed with Kolmogorov-Smirnov (29) = 0.173, $p = .027$. However, the mean proportion of other-perspective for gaze condition was normally distributed, with a skewness of -0.432 ($SE = 0.434$) and kurtosis of -0.905 ($SE = 0.845$). The mean proportion of other-perspective for action condition was not normally distributed with

Kolmogorov-Smirnov (29) = 0.210, $p = .002$. However, the mean proportion of other-perspective for action condition was normally distributed, with a skewness of -0.505 (SE = 0.434) and kurtosis of -1.181 (SE = 0.845). The mean proportion of other-perspective for the gaze-action condition was not normally distributed with Kolmogorov-Smirnov (29) = 0.285, $p < .001$. However, the mean proportion of other-perspective for gaze-action condition was normally distributed, with a skewness of -0.930 (SE = 0.434) and kurtosis of -0.811 (SE = 0.845).

For monolingual children, the mean proportion of other-perspective for actor condition was not normally distributed with Kolmogorov-Smirnov (22) = 0.277, $p < .001$. However, the mean proportion of other-perspective for actor condition was normally distributed, with a skewness of 1.260 (SE = 0.491) and kurtosis of 0.661 (SE = 0.953). The mean proportion of other-perspective for gaze condition was not normally distributed with Kolmogorov-Smirnov (22) = 0.274, $p < .001$. However, the mean proportion of other-perspective for gaze condition was normally distributed, with a skewness of 0.478 (SE = 0.491) and kurtosis of -1.530 (SE = 0.953). The mean proportion of other-perspective for action condition was not normally distributed with Kolmogorov-Smirnov (22) = 0.277, $p < .001$. However, the mean proportion of other-perspective for action condition was normally distributed, with a skewness of 1.045 (SE = 0.491) and kurtosis of -0.329 (SE = 0.953). The mean proportion of other-perspective for gaze-action condition was not normally distributed with Kolmogorov-Smirnov (22) = 0.298, $p < .001$. However, the mean proportion of other-perspective for gaze-action condition was normally distributed, with a skewness of 0.433 (SE = 0.491) and kurtosis of -1.393 (SE = 0.953).

Since the data were not normally distributed according to the Kolmogorov-Smirnov test, the logarithmic and square root transformations were done. However, these analyses did not correct the issue; therefore, the original data was used in Experiment 1. Also, since the data were not normally distributed according to the Kolmogorov-Smirnov test, it is necessary to use non-parametric tests. However, there is no appropriate non-parametric test for the experimental design; therefore, it was thought that using parametric tests as the main analysis would be a better option.

3.5.2. Test of Homogeneity of Variance

According to the Levene's Test of Equality of Error Variances, mean proportion of other perspective for actor condition (F (1, 49) = 2.474, $p = .122$), for gaze condition

($F(1, 49) = 2.323$, $p = .134$), for action condition ($F(1, 49) = 0.352$, $p = .556$) and for gaze-action condition ($F(1,49) = 0.005$, $p = .942$) met the assumption of homogeneity of variances. It can be seen in Table 3.4.

Table 3. 4. Levene's Test of Equality of Error Variances in Experiment 1

	F	*df1*	*df2*	*Sig.*
Actor condition	2.474	1	49	.122
Gaze condition	2.323	1	49	.134
Action condition	.352	1	49	.556
Gaze-Action condition	.005	1	49	.942

3.6. Main Analyses

The responses were coded as *self-perspective* if the child describes the object relations from their own perspective and *other-perspective* if the child describes the object relations from the person's perspective in the photograph. Examples of responses coded as other-perspective include the word *right*, which refers to the glass's location ("right", "on the right", and "on the right of the bottle from his perspective"), and the word *left*, which refers to the candle's location ("left", "on the left" and "on the left of the pineapple from her perspective"). Examples of responses coded as self-perspective include the word *left*, which refers to the glass's location ("left", "on the left", and "on the left of the bottle from my perspective"), and the word *right,* which refers to the candle's location ("right", "on the right" and "on the right of the pineapple from my perspective").

The responses were converted into two binary variables by scoring as 1 if the response was self-perspective and 0 if it was not; by scoring as 1 if the response was other-perspective and 0 if it was not.

For the analyses, mean proportion of other-perspective responses was considered as the dependent variable. The responses scored as other-perspective for each pragmatic cue condition were calculated as the mean proportion of other-perspective by dividing the number of other-perspective responses by the maximum of 4. Table 3.5 shows the percentage of self-perspective and other-perspective responses by language group and pragmatic cues.

Table 3. 5. Percentage of Self-Perspective and Other-Perspective Responses by Language Group and Pragmatic Cues (N = 51)

Language Group	Pragmatic Cues	Perspective Responses	
		Self-perspective	Other-perspective
Monolingual children	Actor condition	0.75	0.25
	Gaze condition	0.64	0.36
	Action condition	0.70	0.30
	Gaze-action condition	0.55	0.45
Bilingual children	Actor condition	0.42	0.58
	Gaze condition	0.42	0.58
	Action condition	0.41	0.59
	Gaze-action condition	0.31	0.69

In order to examine the effect of pragmatic cues and bilingualism on spontaneous spatial perspective-taking ability, two-way repeated measures analysis of variance with a between-subjects factor of *language group* (2 levels: *monolingual* and *bilingual*) and a within-subjects factor of *pragmatic cues* (4 levels: *actor condition, gaze condition, action condition,* and *gaze-action condition*) was conducted.

3.6.1. The Effect of Pragmatic Cues on Spontaneous Spatial Perspective Taking

As a result of the two-way mixed analysis of variance, it was shown that the main effect of pragmatic cues on proportion of other-perspective responses was statistically significant (F (3, 147) = 7.967, p < .001, η^2_p = .140) (see Table 3.6). Post-hoc analyses with Bonferroni correction indicated that the difference between actor condition and gaze-action condition was significant (p = .003) and the difference between gaze condition and gaze-action condition was significant (p = .007) and the difference between action condition and gaze-action condition was significant (p = .001) while the difference between actor condition and gaze condition was not significant (p = .520) and the difference between actor condition and action condition was not significant (p = 1.000) and the difference between gaze condition and action condition was not significant (p = 1.000). This finding indicated that the proportion of other-perspective responses was significantly higher in the gaze-action condition than in all other conditions (see Figure 3.2).

Table 3. 6. Results of the Repeated Measure Analysis of Variance for Pragmatic Cues and Bilingualism

Source	SS	*df*	Mean Square	*F*	*p*	η_p^2
Within-Subjects Effects						
PragmaticCues	.705	3	.235	7.967	.000	.140
PragmaticCues*LanguageGroup	.107	3	.036	1.207	.309	.024
Error(PragmaticCues)	4.335	147	.029			
Between-Subjects Effects						
Intercept	45.239	1	45.239	98.195	.000	.667
LanguageGroup	3.621	1	3.621	7.860	.007	.138
Error	22.574	49	.461			

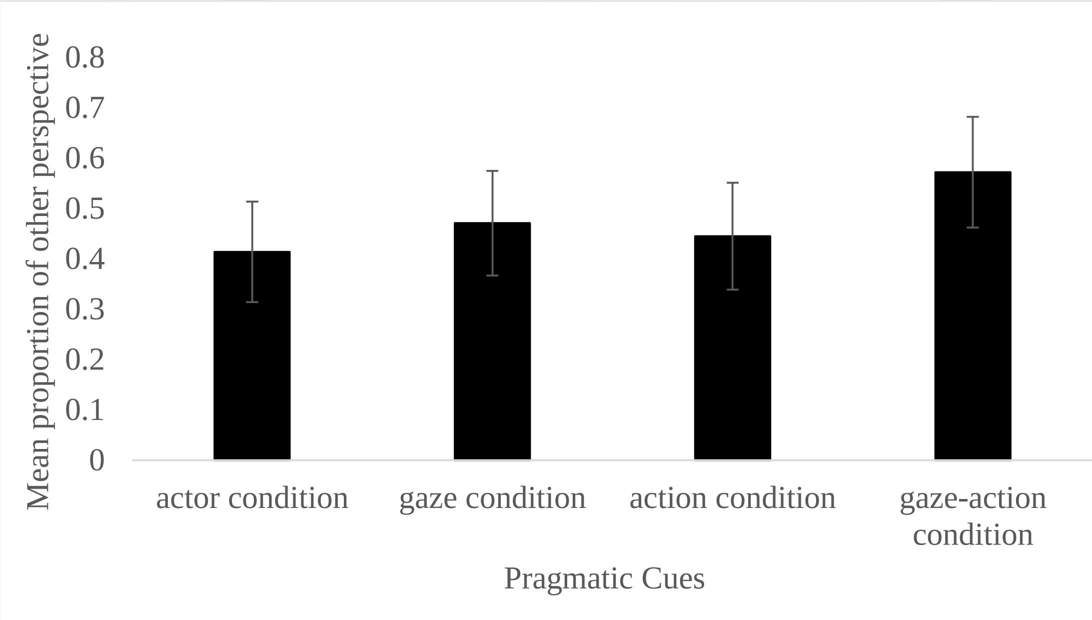

Figure 3. 2. Mean Proportion of Other-Perspective Responses for Actor, Gaze, Action and Gaze-Action Conditions. Error bars show ±2 Standard Errors.

3.6.2. The Effect of Bilingualism on Spontaneous Spatial Perspective Taking

As a result of the two-way mixed analysis of variance, it was shown that the main effect of language group on proportion of other-perspective responses was statistically significant (F (1, 49) = 7.860, p = .007, η^2_p = .138) (see Table 3.6). This finding indicated that bilingual children (M = .610, SE = 0.063) statistically significantly took other-perspective more often than monolingual children (M = .341, SE = 0.077) (see Figure 3.3).

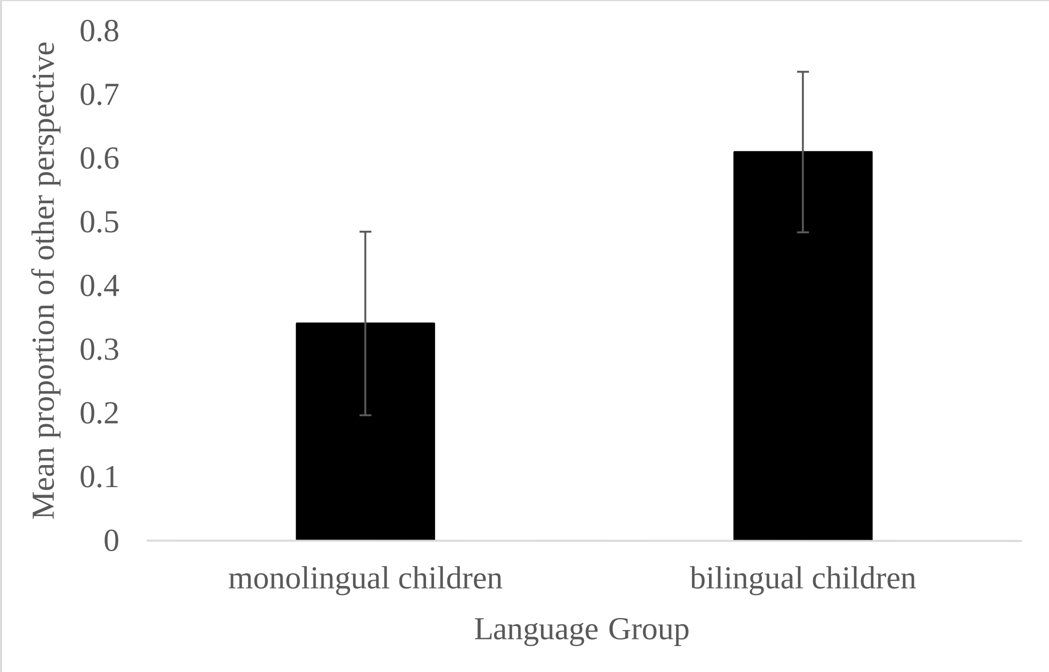

Figure 3. 3. Mean Proportion of Other-Perspective Responses for Monolingual and Bilingual Children. Error bars show ±2 Standard Errors.

3.6.3. The Interaction Effect of Pragmatic Cues and Bilingualism on Spontaneous Spatial Perspective Taking

A two-way mixed analysis of variance with a between-subjects factor of *language group* (2 levels: *monolingual* and *bilingual*) and a within-subjects factor of *pragmatic cues* (4 levels: *actor condition, gaze condition, action condition,* and *gaze-action condition*) indicated that the interaction between language group and pragmatic cues on the proportion of other-perspective responses was not statistically significant F (3, 147) = 1.207, p = .309, η^2_p = .024) (see Table 3.6). This finding indicated that the proportion of other-perspective responses across pragmatic cues was not statistically significantly different for monolingual and bilingual children (Figure 3.4).

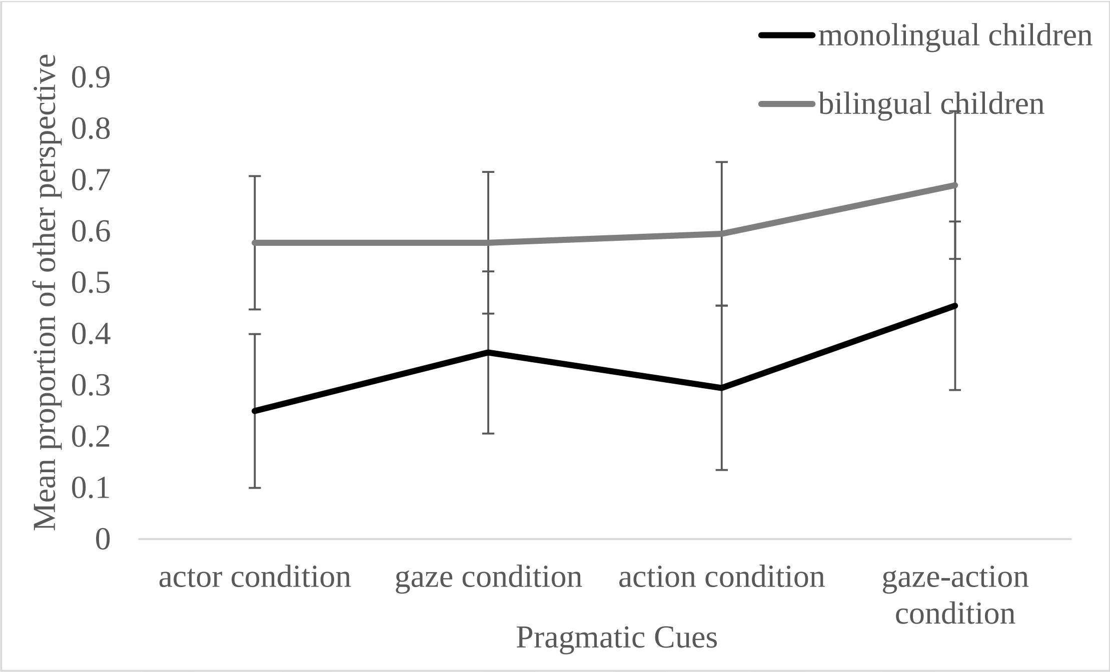

Figure 3. 4. Mean Proportion of Other-Perspective Responses for Monolingual and Bilingual Children across Pragmatic Cues. Error bars show ±2 Standard Errors.

DISCUSSION

The present results confirmed that children's spontaneous spatial perspective-taking ability was affected by pragmatic cues. More specifically, when they did not receive instruction to describe the object relations from other-perspective or self-perspective, children took other-perspective more frequently when gaze-action cue pair was provided. In other words, the perceiving gaze-action cue pair increased the frequency of taking another person's perspective more than in all other conditions. Moreover, bilingualism had a main effect on the tendency to represent the objects' location from other-perspective. More specifically, bilingual children adopted another person's perspective more frequently than monolingual children, regardless of whether pragmatic cues are present.

The findings of Experiment 1 were consistent with previous studies suggesting that pragmatic cues influence which perspective people take to describe object relations (Furlanetto et al., 2013; Mazzarella et al., 2012). More specifically, the finding was in line with the study (Furlanetto et al., 2013), suggesting that spontaneous spatial perspective-taking is triggered more by the presence of gaze-action cues pair. In this way, the finding of Experiment 1 verified that the effect of gaze-action cue pair on spontaneous spatial perspective-taking can also be seen in children. Moreover, another finding of Experiment 1 was consistent with previous studies suggesting that compared to monolingual children, bilingual children better understand others' mental states (Bialystok & Senman, 2004; Goetz, 2003; Kovács, 2009). More specifically, the finding was in line with the study (Greenberg et al., 2013), suggesting that bilingual children were more accurate in taking another person's spatial perspective than monolingual children. In this way, the finding of Experiment 1 showed that bilingualism also influences the implicit level of spatial perspective-taking.

However, the finding of Experiment 1 was inconsistent with previous studies suggesting that compared to monolingual children, bilingual children are more aware of pragmatic cues, especially in challenging situations (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011). In Experiment 1, bilingual children tended to take another person's perspective more frequently through all experimental conditions, not only when pragmatic cues were provided. This finding could be accounted for by the implicit nature of spatial perspective-taking or another underlying mechanism for the advantage of bilingualism, as was argued in the General Discussion.

CHAPTER 4
EXPERIMENT 2

Experiment 2 aimed to investigate whether the effect of pragmatic cues and bilingualism on spatial perspective-taking can be found at the explicit level as well as at the implicit level. Since pragmatic cues enable one to make inferences about a person’s intention, desire, goal, etc. towards external entities and therefore trigger taking the person’s perspective (Aureli et al., 2009; Behne et al., 2005; Furlanetto et al., 2013; Mazzarella et al., 2012), it was expected that children would make more accurate and faster judgments about the objects’ location from another individual’s perspective (other-perspective) when the visual scene (i.e., photograph) includes a pragmatic cue than when the scene does not include a pragmatic cue. Due to limited and mixed findings in the literature about which pragmatic cue has more effect on spatial perspective-taking, in experiment 2, which one of the pragmatic cues (*gaze, action,* and *gaze-action*) would enhance the children’s spatial perspective-taking performance is exploratory. Moreover, since compared to monolingual children, bilingual children are more aware of pragmatic cues, especially in challenging situations (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011), it was expected that when the visual scene (i.e., photograph) includes a pragmatic cue, bilingual children would be more accurate and faster in taking another person’s perspective and describing objects’ location accordingly, which is another challenging situation.

As was outlined in Chapter 1, although some studies provide evidence that at the age of 6 to 8 years spatial perspective-taking ability improves, the age of acquisition for spatial perspective-taking ability in children is still debatable. Therefore, experiment 2 also examined the effect of age group on the children’s spatial perspective-taking ability. It is hypothesized that children take another person’s spatial perspective more accurately with increasing age.

METHOD

4.1. Participants

G*Power Software (version 3.1.9.4, Faul et al., 2007) was used to carry out an a priori power analysis, selecting an effect size of 0.25, alpha of .05, and power of .80. According to the power analysis, at least 24 participants required to get a medium effect with an 80% statistical power for the mixed design analysis of variance with two independent variables of pragmatic cues which is a within-subjects variable, and language group which is between-subjects variable.

Participants were recruited from two public schools (Dokuz Eylül Primary School and Fatih Sultan Mehmet Primary School) and one private school (İzmir Private Tevfik Fikret Schools) in Izmir, and one private school (Ankara Private Tevfik Fikret Schools) in Ankara. 83 parents in total allowed their children to participate in this study; however, 17 of them were excluded because they have any health problems (sight/hearing/language difficulties/learning difficulties). The final sample consisted of 66 children (34 girls, 32 boys). The age range of participants was between 6 and 8 (M_{age} = 6.91). As reported in Table 4.1, 24 of the children (36%) were 6 years old, 24 of the children (36%) were 7 years old, and 18 of the children (27%) were 8 years old. The number of bilingual and monolingual children in each age group was equal.

Table 4. 1. Demographic Information for Experiment 2

		Monolinguals		Bilinguals	
		N	%	*N*	%
Gender	Girl	20	61%	14	42%
	Boy	13	39%	19	58%
Age	6 years old	12	36%	12	36%
	7 years old	12	36%	12	36%
	8 years old	9	27%	9	27%
Parent's education level	High school degree	5	15%		
	Bachelor's degree	20	61%	21	63%
	Master's degree or higher	8	24%	12	36%

Children were classified as *bilingual* if they speak one more language (in addition to their native language), have regularly used both languages for most of their lives (on average), and have an adequate level of comprehension, reading and speaking in both languages. They were classified as *monolingual* if they have little or no knowledge of a language other than their native language.

Based on these criteria, 33 were monolingual Turkish speakers and 33 were bilingual, whose native language is Turkish and speak another second language. For bilingual children, the mean age of the second language acquisition was *M*= 2.88 (Median = 3). The majority of bilingual children began to acquire their second language from 4 years old (42.42%) and 3 years old (30.30%), and others began to acquire it from 2 years old (12.12%) and with birth (15.15%). There were 5 different second languages represented in the bilingual group: French (85%), English (6%), Korean (3%), Russian (3%), and Azeri (3%). The bilingual children speak and hear both Turkish (64%) and their second language (36%) daily. They speak and hear Turkish (%71) and their second language (29%) at school. People who speak to bilingual child at home have spoken Turkish 80.53% of the time and the second language 19.47% of the time.

Parents indicated their child's level of proficiency in speaking, understanding, and reading in both native and second language. For the native language, the bilingual children's level of proficiency in speaking, understanding, and reading was 9.58, 9.55, and 8.97, respectively. For the second language, the bilingual children's level of proficiency in speaking, understanding, and reading was 6.58, 7.12, and 5.97, respectively.

For 9 of the bilingual children, additional language was also reported. The mean age of acquisition of the reported additional language was *M*= 6.10 (Median = 6). For reported additional language, their level of proficiency in speaking, understanding, and reading was 2.56, 2.56, and 2.22, respectively, indicating that they had little or no knowledge of the additional language. The description of bilinguals' language background can be seen in Table 4.2.

Table 4. 2. Language Background and Proficiency of the Bilingual Children in Experiment 2

Language background						
	M			*SD*		Frequency
AoA L1	.00			.00		
AoA L2	2.88			1.34		
Speaks an L3	6.10			.88		27%
L1 usage (on average)	63.68			9.74		
L2 usage (on average)	35.86			8.91		
L3 usage (on average)	0.46			1.46		
L1 usage at home	80.53			23.90		
L2 usage at home	19.47			23.90		
L1 usage at school	71.39			5.57		
L2 usage at school	28.61			5.57		
Language proficiency						
	L1			L2		
	M	SD	Range	*M*	SD	Range
Speaking	9.58	.663	8-10	6.58	1.678	2-10
Understanding spoken language	9.55	.711	8-10	7.12	1.654	3-10
Reading	8.97	1.104	6-10	5.97	2.039	1-10

L1: native language; L2: second language; L3: reported additional language; AoA: age of acquisition; Language proficiency was from 0 to 10 for speaking, understanding and reading.

4.2. Materials

4.2.1. Personal Information Form

The Personal Information Form consists of four questions inquiring about children's month and year of birth, gender, the parent's education level, and whether the child has any health problems (sight/hearing/language difficulties/learning difficulties) (see in Appendix B). The form was filled out by the parents of the children.

4.2.2. Language Background Questionnaire

Child Language Experience and Proficiency Questionnaire (Child LEAP-Q) is used to assess children's language background. It was adapted by Marian et al. (2007). Turkish translation of the Child Language Experience and Proficiency Questionnaire does not exist. Therefore, Language Background Questionnaire was prepared by the experimenter based on the questions of Child LEAP-Q. The questionnaire is answered by the child's caregiver and provides information about the language (s) the child knows in order of dominance and order of acquisition, age of first exposure to a language (s), the percentage of time the child speaks, and hears each language at school and at home, and child's level of proficiency in the language (s) (see in Appendix C).

4.2.3. Peabody Picture Vocabulary Test

The Peabody Picture Vocabulary Test (Dunn & Dunn, 1997) is used to measure receptive vocabulary for children two years and older. Katz et al. adapted the Peabody Picture Vocabulary Test into Turkish at Ankara Guidance Research Center in 1972.

Peabody Picture Vocabulary Test is an individually administered test. There are two separate instructions for children over 8 and under 8 years old. The test consists of three training sheets and 100 test sheets (see Appendix D). The child is instructed to choose the picture that matches the word the experimenter said. The test sheets increase in difficulty, and the test is terminated when the child makes six errors in a row or six errors out of eight consecutive answers.

4.2.4. Spatial Perspective Taking Task

The perspective-taking task was programmed in Psytoolkit software (Stoet, 2010; Stoet, 2017) and administered on a Samsung Galaxy Tab A7 tablet with a 10.4-inch touchscreen monitor and 2000 x 1200 display resolution. Children were presented with photographs showing a person seated at a table (see Appendix F). Two objects were next to each other on this table. The presented photographs were 500 x 500 pixels in size, with a resolution of 2000 x 1200 pixels. Photographs were manipulated by varying the actor's gaze and action (Figure 4.1). In the *Actor condition*, the person looked straight ahead and did not grasp the target object. In the *Gaze condition*, the person looked at the target but did not grasp it. In the *Action condition*, the person looked straight ahead but grasped the target object. In the *Gaze-Action condition*, the person looked at the target object and grasped it. To avoid any bias for the person's gender and the answer about the location of the object, I constructed four sets of photographs (i.e., candle on the left and pineapple on the right for both woman and man actor; bottle on the left and glass on the right for both woman and man actor). There were 16 trials consisting of 4 trials for each of the four experimental conditions. On each trial, children were asked to answer the following question: *"How does the person in the photograph see the objects* (i.e., a candle and a pineapple)?" Two choices appeared at the bottom of the photographs (see Figure 4.2). One of the choices showed the correct view (person's perspective), and another choice was incorrect (child's perspective). Children were asked to select the option that corresponded to the person's perspective by touching that choice. The position of the options and the order of trials were randomized across children.

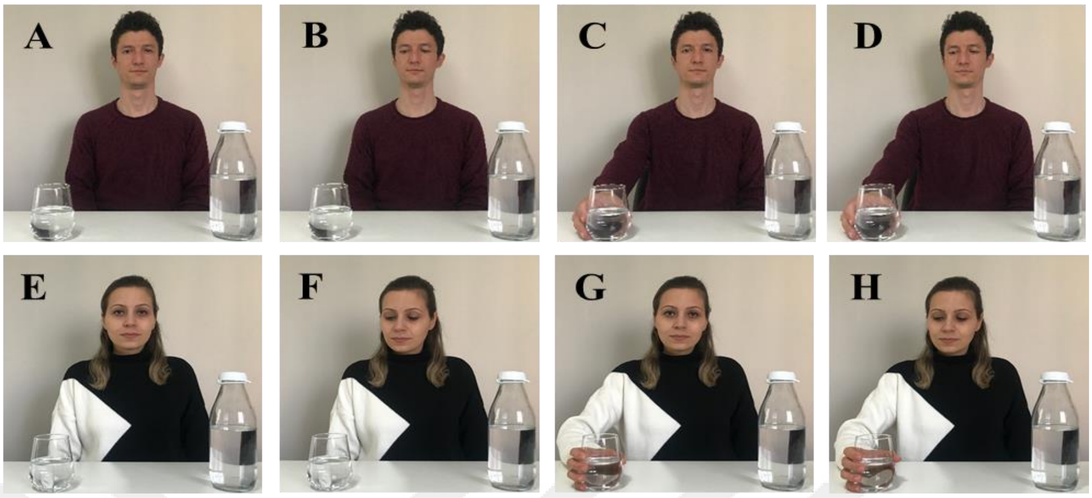

Figure 4. 1. Examples for Photographs Presented in Experiment 2. For photographs with a male actor: **(A)** Actor condition **(B)** Gaze condition **(C)** Action condition **(D)** Gaze-Action condition. For photograph with a female actor: **(E)** Actor condition **(F)** Gaze condition **(G)** Action condition **(H)** Gaze-Action condition

Figure 4. 2. Examples of the Spatial Perspective-Taking Task in Experiment 2.

4.3. Procedure

All parents were asked to fill out the written informed consent (see Appendix A), the Personal Information Form, and Language Background Questionnaire to determine which language group the children belong to. After all forms were returned to the children's school and collected, the experimenter tested all children individually in a classroom or library at their school. Children were tested in a fixed order: PPVT and spatial perspective-taking task.

4.3.1. Statistical Procedure

In order to investigate the effect of pragmatic cues and bilingualism on spatial perspective-taking ability (Hypothesis 4, 5, and 6), 4x2 mixed design analysis of variance was conducted by using IBM SPSS Statistics software (Version 22). Analysis was conducted with within-subjects variable of pragmatic cues (*actor condition, gaze condition, action condition,* and *gaze-action condition*), between-subjects variable of language group (*monolingual and bilingual*), and outcome variables of mean accuracy and reaction time.

In order to investigate the effect of age group on the spatial perspective-taking ability (Hypothesis 7), a one way analysis of variance was conducted by using IBM SPSS Statistics software (Version 22). Analysis was conducted with between-subjects variable of age group (*6, 7,* and *8-year-olds*) and the outcome variable of mean accuracy.

4.4. Descriptive Statistics

The mean scores and standard deviations for variables of parent's education level and PPVT scores are reported in Table 4.3. In order to examine whether there are language group differences for parents' education level and for PPVT scores, independent samples t-test analysis was done. The difference between monolingual and bilingual children was not statistically significant in parent's education level, $t(64) = -1.964$, $p = .054$, showing no language group differences for parent's education level. The difference between monolingual and bilingual children was not statistically significant in PPVT scores, $t(64) = -0.124$, $p = .902$, showing no language group differences for receptive vocabulary.

Table 4. 3. Descriptive Statistics for Variables in Experiment 2

	Language Group	*M*	*SD*
PPVT score	Monolingual	58.45	7.276
	Bilingual	58.67	6.584
Parent's education level	Monolingual	2.09	.631
	Bilingual	2.36	.489

Note. $N = 66$.

4.5. Primary Analyses I

4.5.1. Normality of Distribution

It was checked whether the data met the normality of distribution using IBM SPSS software (Version 22).

For bilingual children, the accuracy for actor condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.247, $p < .001$. However, the accuracy for actor condition was normally distributed, with a skewness of 0.923 ($SE = 0.409$) and kurtosis of -0.269 ($SE = 0.798$). The accuracy for gaze condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.234, $p < .001$. However, the accuracy for gaze condition was normally distributed, with a skewness of 0.545 ($SE = 0.409$) and kurtosis of -0.974 ($SE = 0.798$). The accuracy for action condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.321, $p < .001$. However, the accuracy for action condition was normally distributed, with a skewness of -1.165 ($SE = 0.409$) and kurtosis of 0.544 (*SE* = 0.798). The accuracy for gaze-action condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.375 , $p < .001$. However, the accuracy for gaze-action condition was normally distributed, with a skewness of -1.032 (*SE* = 0.409) and kurtosis of 0.140 (*SE* = 0.798).

For monolingual children, the accuracy for actor condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.315, $p < .001$. However, the accuracy for actor condition was normally distributed, with a skewness of 1.235 (*SE* = 0.409) and kurtosis of 0.576 (*SE* = 0.798). The accuracy for gaze condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.229, $p < .001$. However, the accuracy for gaze condition was normally distributed, with a skewness of 0.803 (*SE* = 0.409) and kurtosis of 0.077 (*SE* = 0.798). The accuracy for action condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.207, $p = .001$. However, the accuracy for action condition was normally distributed, with a skewness of -0.176 (*SE* = 0.409) and kurtosis of -1.159 (*SE* = 0.798). The accuracy for gaze-action condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.173, $p = .013$. However, the accuracy for gaze-action condition was normally distributed, with a skewness of -0.441 (*SE* = 0.409) and kurtosis of -0.946 (*SE* = 0.798).

4.5.2. Test of Homogeneity of Variance

According to the Levene's Test of Equality of Error Variances, mean accuracy for actor condition met the assumption of homogeneity ($F(1, 64) = 0.004$, $p = .949$) and mean accuracy for action condition met the assumption of homogeneity ($F(1, 64) = 1.650$, $p = .204$), however, mean accuracy for gaze condition did not meet the assumption of homogeneity of variances ($F(1, 64) = 5.452$, $p = .023$) and mean accuracy for gaze-action condition did not meet the assumption of homogeneity of variances ($F(1, 64) = 23.212$, $p < .001$). It can be seen in Table 4.4.

Table 4. 4. Levene's Test of Equality of Error Variances in Experiment 2

	F	*df1*	*df2*	*Sig.*
Actor condition	.004	1	64	.949
Gaze condition	5.452	1	64	.023
Action condition	1.650	1	64	.204
Gaze-Action condition	23.212	1	64	.000

Since the data were not normally distributed according to the Kolmogorov-Smirnov test and partially met the assumption of homogeneity, the logarithmic and square root transformations were done. However, these analyzes did not correct the issue; therefore, the original data was used in Experiment 2. Also, since the data were not normally distributed according to the Kolmogorov-Smirnov test, it is necessary to use non-parametric tests. However, there is no appropriate non-parametric test for the experimental design; therefore, it was thought that using parametric tests as the main analysis would be a better option.

4.6. Main Analyses I

In order to examine the effect of bilingualism and pragmatic cues on spatial perspective-taking performance, two-way repeated measures analysis of variance with a between-subjects factor of *language group* (2 levels: *monolingual* and *bilingual*) and a within-subjects factor of *pragmatic cues* (4 levels: *actor condition, gaze condition, action condition,* and *gaze-action condition*) was conducted.

For the analyses, mean accuracy was considered as the dependent variable. The correct responses for each pragmatic cue condition were calculated as mean accuracy by dividing the number correct by the maximum of 4.

As a result of the two-way mixed analysis of variance, it was shown that the main effect of pragmatic cues on accuracy was statistically significant (F (3, 192) = 64.791, p < .001, η^2_p = .503) (see Table 4.5). Post-hoc analyses with Bonferroni correction indicated that the difference between actor condition and action condition was significant (p < .001) and the difference between actor condition and gaze-action condition was significant (p < .001) and the difference between gaze condition and action condition was significant (p < .001) and the difference between gaze condition and gaze-action condition was significant (p < .001) while the difference between actor condition and gaze condition was not significant (p = .572) and the difference between action condition and gaze-action condition was not significant (p =.086). These findings indicated that accuracy for selecting the option that shows the correct position of objects with respect to another person's perspective was high in the gaze-action condition (M = .75, SE = 0.033) and action condition (M = .66, SE = 0.038) than in actor condition (M = .24, SE = 0.036). Moreover, mean accuracy was higher for the action condition (M = .66, SE = 0.038) compared to gaze condition (M = .31, SE =

0.04) and also mean accuracy was higher for gaze-action condition (*M* = .75, *SE* = 0.033) compared to gaze condition (*M* = .31, *SE* = 0.04) (see Figure 4.3)

Table 4. 5. Results of the Repeated Measure Analysis of Variance for Pragmatic Cues and Bilingualism

Source	SS	*df*	Mean Square	*F*	*p*	η_p^2
Within-Subjects Effects						
PragmaticCues	12.470	3	4.157	64.791	.000	.503
PragmaticCues*LanguageGroup	.633	3	.211	3.290	.022	.049
Error(PragmaticCues)	12.318	192	.064			
Between-Subjects Effects						
Intercept	63.279	1	63.279	389.350	.000	.859
LanguageGroup	1.960	1	1.960	12.063	.001	.159
Error	10.402	64	.163			

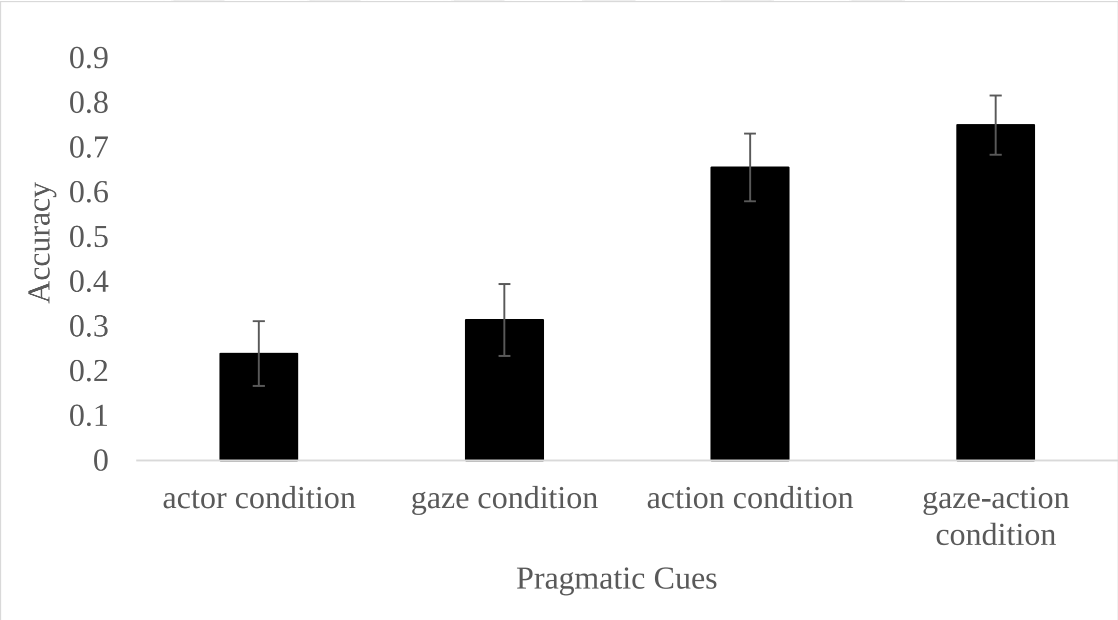

Figure 4. 3. Mean Correct Responses for Actor, Gaze, Action and Gaze-Action Conditions. Error bars show ±2 Standard Errors.

As a result of the two-way mixed analysis of variance, it was shown that the main effect of bilingualism on mean accuracy was statistically significant (*F* (1, 64) = 12.063, *p* = .001, η^2_p = .159). This finding indicated that that bilingual children (*M* = .576, *SE* = 0.035) was statistically significantly more accurate than monolingual children (*M* = .403, *SE* = 0.035) in taking another person's perspective (see Figure 4.4).

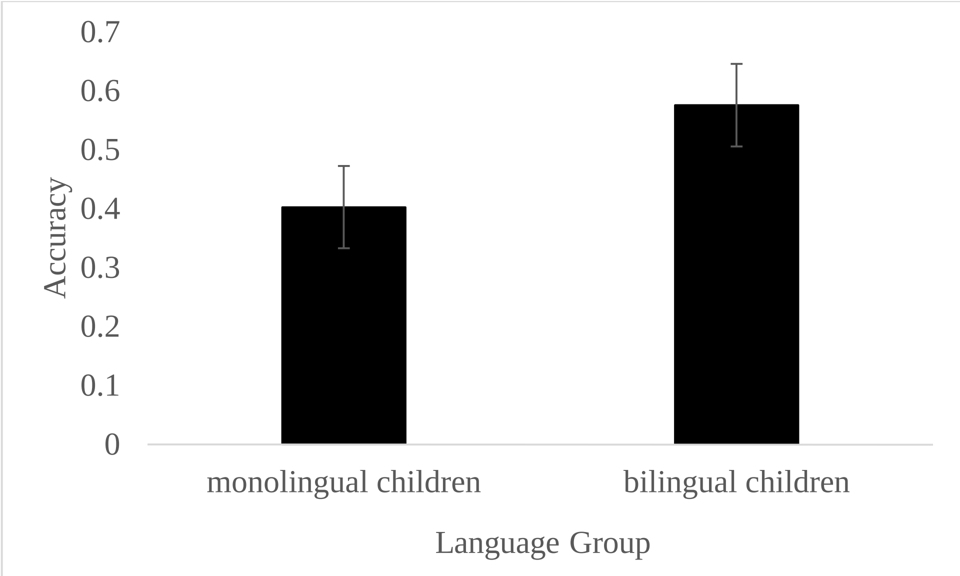

Figure 4. 4. Mean Correct Responses for Monolingual and Bilingual Children in Experiment 2. Error bars show ±2 Standard Errors.

As a result of the two-way mixed analysis of variance, it was shown that the interaction between language group and pragmatic cues on mean accuracy was statistically significant (F (3, 192) = 3.290, p = .022, η^2_p = .049) (see Table 4.5). This finding indicated that the mean accuracy for selecting the option that shows the correct position of objects with respect to a person's perspective was statistically significantly different across pragmatic cues for monolingual and bilingual children (Figure 4.5).

In order to determine the nature of this interaction, independent samples t-test analysis was done. The difference between monolingual and bilingual children was not statistically significant in actor condition, $t(64) = -.734$, $p = .465$ and gaze condition, $t(64) = -1.243$, $p = .218$. However, the difference between monolingual and bilingual children was statistically significant in action condition, $t(64) = -3.500$, $p = .001$, and in gaze-action condition, $t(64) = -4.167$, $p < .001$. This finding indicated that bilingual and monolingual children performed similarly in gaze condition or actor condition while bilingual children performed better than monolingual children in action condition or gaze-action condition.

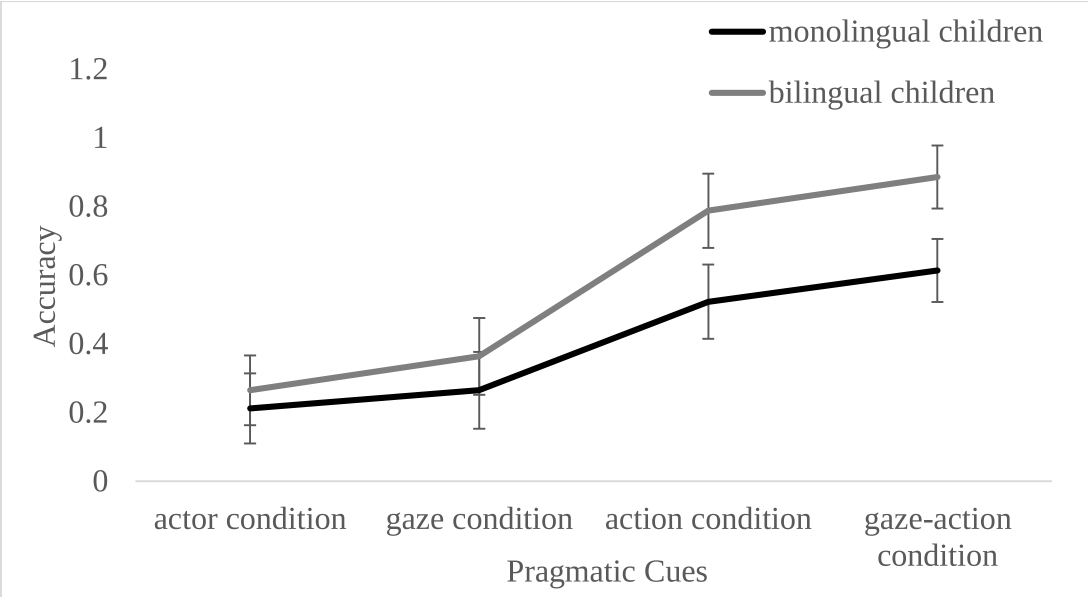

Figure 4. 5. Mean Correct Responses for Monolingual and Bilingual Children across Pragmatic Cues in Experiment 2. Error bars show ±2 Standard Errors.

4.7. Primary Analyses II

Looking at the reaction time measure, outlier analysis was first conducted to check whether there univariate or multivariate outliers in the data. Three participants with high z scores on both actor condition and gaze-action condition, one participant with high z scores on gaze-action condition were found to be univariate outliers. All four outliers were deleted, leaving 62 participants for analysis.

4.7.1. Normality of Distribution

It was checked whether the data met the normality of distribution using IBM SPSS software (Version 22).

For bilingual children, the reaction time measure for actor condition was normally distributed with Kolmogorov-Smirnov (29) = 0.145, p = .123, with a skewness of 1.137 (SE = 0.434) and kurtosis of 1.334 (SE = 0.845). The reaction time measure for action condition was normally distributed with Kolmogorov-Smirnov (29) = 0.114, p = .200, with a skewness of 0.627 (SE = 0.434) and kurtosis of -0.038 (SE = 0.845). The reaction time measure for gaze-action condition was normally distributed with Kolmogorov-Smirnov (29) = 0.148, p = .105, with a skewness of 0.935 (SE = 0.434) and kurtosis of -0.018 (SE = 0.845). The reaction time measure for gaze condition was not normally distributed with Kolmogorov-Smirnov (29) = 0.217, p = .001. However, the reaction time measure for gaze condition was normally distributed, with a skewness of 1.096 (*SE* = 0.434) and kurtosis of 0.231(*SE* = 0.845).

For monolingual children, the reaction time measure for actor condition was normally distributed with Kolmogorov-Smirnov (33) = 0.129, *p* = .177. However, the reaction time measure for actor condition was not normally distributed, with a skewness of 1.977 (*SE* = 0.409) and kurtosis of 5.475 (*SE* = 0.798). The reaction time measure for action condition was normally distributed with Kolmogorov-Smirnov (33) = 0.105, *p* = .200, with a skewness of 0.741 (*SE* = 0.409) and kurtosis of 0.990 (*SE* = 0.798). The reaction time measure for gaze condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.177, *p* = .001. However, the reaction time measure for gaze condition was normally distributed, with a skewness of 0.956 (*SE* = 0.409) and kurtosis of 0.061 (*SE* = 0.798). The reaction time measure for gaze-action condition was not normally distributed with Kolmogorov-Smirnov (33) = 0.235 , *p* < .001, with a skewness of 2.128 (*SE* = 0.409) and kurtosis of 5.738 (*SE* = 0.798).

Since the data were partially normally distributed, the logarithmic and square root transformations were done. However, these analyzes did not correct the issue. Also, since the data were not normally distributed, it is necessary to use non-parametric tests. However, there is no appropriate non-parametric test for the experimental design; therefore, it was thought that using parametric tests as the main analysis would be a better option.

4.7.2. Test of Homogeneity of Variance

According to the Levene's Test of Equality of Error Variances, reaction time measure for actor condition (*F*(1, 60) = 0.485, *p* = .489), for gaze condition (*F*(1, 60) = 2.484, *p* = .120), for action condition (*F*(1, 60) = 0.382, *p* = .539) and for gaze-action condition (*F*(1, 60) = 0.055, *p* = .815) met the assumption of homogeneity. It can be seen in Table 4.6.

Table 4. 6. Levene's Test of Equality of Error Variances in Experiment 2

	F	*df1*	*df2*	*Sig.*
Actor condition	.485	1	60	.489
Gaze condition	2.484	1	60	.120
Action condition	.382	1	60	.539
Gaze-Action condition	.055	1	60	.815

4.8. Main Analyses II

In order to examine the effect of bilingualism and pragmatic cues on spatial perspective-taking performance, two-way repeated measures analysis of variance with a between-subjects factor of *language group* (2 levels: *monolingual* and *bilingual*) and a within-subjects factor of *pragmatic cues* (4 levels: *actor condition, gaze condition, action condition,* and *gaze-action condition*) was conducted. For the analyses, reaction time was considered as the dependent variable.

As a result of the two-way mixed analysis of variance, it was shown that the main effect of pragmatic cues (F (3, 180) = 1.371, p = .253, η^2_p = .022) and bilingualism (F (1, 60) = 0.838, p = .364, η^2_p = .014) on reaction time were not statistically significant (see Table 4.7). Moreover, the interaction between language group and pragmatic cues on reaction time was not statistically significant (F (3, 180) = 0.619, p = .603, η^2_p = .010) (see Table 4.7). This finding indicated that reaction time across pragmatic cues was not statistically significantly different for monolingual and bilingual children (Figure 4.6).

Table 4. 7. Results of the Repeated Measure Analysis of Variance for Pragmatic Cues and Bilingualism

Source	SS	*df*	Mean Square	*F*	*p*	η_p^2
Within-Subjects Effects						
PragmaticCues	14.635	3	4.878	1.371	.253	.022
PragmaticCues*LanguageGroup	6.610	3	2.203	.619	.603	.010
Error(PragmaticCues)	640.654	180	3.559			
Between-Subjects Effects						
Intercept	7623.766	1	7623.766	478.957	.000	.889
LanguageGroup	13.343	1	13.343	.838	.364	.014
Error	955.047	60	15.917			

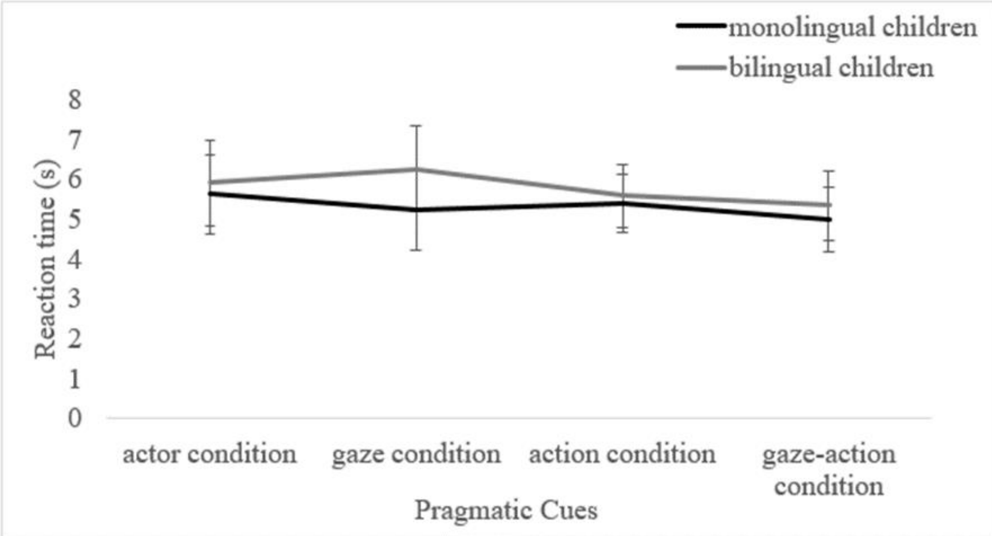

Figure 4. 6. Mean Reaction Time for Monolingual and Bilingual Children across Pragmatic Cues in Experiment 2. Error bars show ±2 Standard Errors.

4.9. Primary Analyses III

4.9.1. Normality of Distribution

It was checked whether the data met the normality of distribution using IBM SPSS software (Version 22). Mean accuracy for 6-year-olds was normally distributed with Kolmogorov-Smirnov (24) = 0.203, p = .057 with a skewness of -0.650 (SE = 0.472) and kurtosis of -0.411 (SE = 0.918). Mean accuracy for 7-year-olds was normally distributed with Kolmogorov-Smirnov (24) = 0.156, p = .133, with a skewness of -0.530 (SE = 0.472) and kurtosis of 0.700 (SE = 0.918). Mean accuracy for 8-year-olds was normally distributed with Kolmogorov-Smirnov (18) = 0.202, p = .050 with a skewness of 0.144 (SE = 0.536) and kurtosis of -1.287 (SE = 1.038).

4.9.2. Test of Homogeneity of Variance

The assumption of homogeneity of variance was met, $F(2, 63) = 0.878$, p = .421. It can be seen in Table 4.8.

Table 4. 8. Test of Homogeneity of Variance in Experiment 2

Levene Statistics	*df1*	*df2*	*Sig.*
.878	2	63	.421

4.10. Main Analyses III

In order to examine the effect of age group on spatial perspective-taking ability, a one-way analysis of variance with a between-subjects factor of *age group* (3 levels: *6, 7,* and *8-year-olds*) was conducted.

For the analyses, mean accuracy was considered as the dependent variable. The correct responses for each pragmatic cue were calculated as mean accuracy by dividing the number correct by the maximum of 4.

The relationship between age group and spatial perspective-taking ability was statistically significant, F (2, 65) = 8.994, $p < .001$, $\eta^2_p = .222$ (see Table 4.9). Post-hoc analyses with Bonferroni correction indicated that the difference between 6-year-olds and 8-year-olds was significant, ($p < .001$) and the difference between 7-year-olds and 8-year-olds was significant, ($p = .01$) while the difference between 6-year-olds and 7-year-olds was not significant ($p = .703$) (see Figure 4.7)

Table 4. 9. Results of the One Way Analysis of Variance

	SS	*df*	Mean Square	*F*	*p*	η^2_p
Between Groups	.686	2	.343	8.994	.000	.222
Within Groups	2.404	63	.038			
Total	3.090	65				

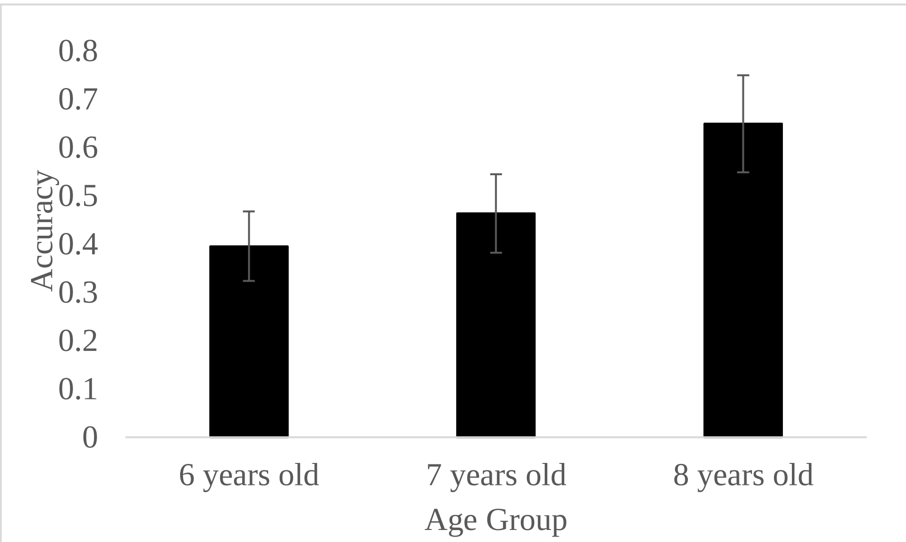

Figure 4. 7. Mean Correct Responses for 6, 7, And 8 Years Old in Experiment 2. Error bars show ±2 Standard Errors.

DISCUSSION

The present results confirmed that children's spatial perspective-taking ability was affected by pragmatic cues. More specifically, when the visual scene included the gaze-action cues or action cue, children were more accurate in spatially representing the objects' location from another individual's perspective compared to when the scene included the gaze action or no pragmatic cue. This suggests that the observation of action cue or gaze-action cues influenced the children's spatial perspective-taking performance. This finding was in line with the study suggesting that when people observe an action cue, they adopt another person's perspective more accurately and describe object relations accordingly (Mazzarella et al., 2012). In this way, Experiment 2 verified that the effect of pragmatic cues can also be seen on the explicit level of spatial perspective-taking and in children.

Furthermore, bilingualism had a main effect on spatial perspective-taking ability. Bilingual children made more accurate spatial judgments with respect to another person's perspective compared to monolingual children. The finding of Experiment 2 was consistent with previous studies indicating that bilingual children are more advantageous in various domains (Bialystok, 1999; Blom et al., 2014; Martin-Rhee & Bialystok, 2008). More specifically, the finding was in line with the study suggesting that the advantage of bilingualism also extends to the spatial perspective-taking ability of children (Greenberg et al., 2013).

Also, monolingual and bilingual children differed in spatial perspective judgments when the presence of pragmatic cues. More specifically, whereas bilingual children and monolingual children performed similarly when the scene contained a gaze cue or no pragmatic cue, bilingual children showed significantly better performance than monolingual children when the scene contained an action cue or gaze-action cues pair. We could interpret the interaction as that sensitivity of bilingual children to pragmatic cues influenced their spatial perspective-taking performance. The findings of Experiment 2 were consistent with previous studies suggesting that compared to monolingual children, bilingual children are more aware of pragmatic cues, for instance, when there is a conflict in their referential interactions (Yow & Markman, 2011; Brojde et al., 2012; Verhagen et al., 2017). In this way, the finding of Experiment 2 verified bilinguals' sensitivity to pragmatic cues under another challenging context, namely the spatial perspective-taking.

In the experiment, the effect of pragmatic cues and bilingualism on reaction time was not found, which shows that time to adopt another person's perspective did not change depending on the language background or the presence of pragmatic cues. Also, the interaction effect of pragmatic cues and bilingualism on reaction time was not found, indicating that time to adopt another's perspective across pragmatic cues conditions did not differ among monolingual and bilingual children. Although bilingual children adopt another person's perspective more accurately than monolingual children when an action cue or gaze-action cue pair was present, all children took a similar time to decide how the person sees objects. As a possible explanation, there might be a different mechanism affecting the reaction time for spatial perspective-taking. Studies indicated that since bilingual children's enhanced level of executive function, they perform better than monolingual children in perspective-taking tasks (Goetz, 2003; Kovács, 2008). Thus, it might be possible that monolingual and bilingual children's executive function levels affect their time to adopt another's perspective. In Experiment 2, it was not controlled whether there is a difference between language groups for executive function, and as far as I am concerned, no other study with children samples has yet investigated factors that affect the time to adopt another person's perspective. Therefore, future studies might investigate whether there is a difference between bilingual and monolingual children in the time to construct another's spatial perspective and possible mechanisms that might affect the time of spatial perspective-taking, such as executive function.

Also, 6- and 7-year-olds performed similarly on the spatial perspective-taking task, but the 8-year-olds performed better than all other age groups. This suggests that with increasing age, children take another person's perspective more accurately. Especially at the age of 8, there was a significant improvement in the spatial perspective-taking ability. The finding was in line with the studies suggesting that spatial perspective taking ability improves especially between 7 and 8 years old (Frick et al., 2014; Salatas & Flavell, 1976).

CHAPTER 5
EXPERIMENT 3

Experiment 3 aimed to examine how incongruity of pragmatic cues and bilingualism influence children's spatial perspective-taking ability. Some researchers have suggested that congruent gaze and action cues facilitate taking another person's perspective, as also verified by Experiment 2 (Mazzarella et al., 2012; Tversky and Hard, 2009), whereas Furlanetto et al. (2013) also suggested that incongruent pragmatic cues enhance more spatial perspective-taking compared to congruent pragmatic cues as a result of the possibility that incongruity of pragmatic cues produces ambiguity and attracts observers' attention more. Therefore, it was expected that children would be more accurate and faster in their decision for the objects' position from another individual's perspective when gaze and action cues were incongruent compared to when the gaze and action cues were congruent. Moreover, compared to monolingual children, bilingual children are more aware of pragmatic cues (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011). Therefore, it was expected that bilingual children would make more accurate and faster judgments about the location of objects from another person's perspective than monolingual children when pragmatic cues are both congruent and incongruent.

Experiment 3 also aimed to verify the effect of age group on spatial perspective-taking ability, as observed in Experiment 2. It was expected that with increasing age, children would take another person's perspective more accurately.

METHOD

5.1. Participants

G*Power Software (version 3.1.9.4, Faul et al., 2007) was used to carry out an a priori power analysis, selecting an effect size of 0.25, alpha of .05, and power of .80. According to the power analysis, at least 34 participants required to get a medium effect with an 80% statistical power for the mixed design analysis of variance with two independent variables of pragmatic cues which is a within-subjects variable, and language group which is between-subjects variable.

Participants were recruited from two public schools (Dokuz Eylül Primary School and Fatih Sultan Mehmet Primary School) and one private school (İzmir Private Tevfik Fikret Schools) in Izmir, and one private school (Ankara Private Tevfik Fikret Schools) in Ankara. 114 parents in total allowed their children to participate in this study, however, 14 of them were excluded because they have any health problems (sight/hearing/language difficulties/learning difficulties). The final sample consisted of 100 children (56 girls, 44 boys). The age range of participants was between 6 and 8 (M_{age} = 7.08). As reported in Table 5.1, 26 of the children (26%) were 6 years old, 40 of the children (40%) were 7 years old, and 34 of the children (34%) were 8 years old. The number of bilingual and monolingual children in each age group was equal.

Table 5. 1. Demographic Information for Experiment 3

		Monolinguals		Bilinguals	
		N	%	*N*	%
Gender	Girl	28	56%	28	56%
	Boy	22	44%	22	44%
Age	6 years old	13	26%	13	26%
	7 years old	20	40%	20	40%
	8 years old	17	34%	17	34%
Parent's education level	Middle school degree	1	2%	1	2%
	High school degree	9	18%	6	12%
	Bachelor's degree	28	56%	27	54%
	Master's degree or higher	12	24%	16	32%

Children were classified as *bilingual* if they speak one more language (in addition to their native language), have regularly used both languages for most of their lives (on average), and have an adequate level of comprehension, reading and speaking in both languages. They were classified as *monolingual* if they have little or no knowledge of a language other than their native language.

Based on these criteria, 50 children were monolingual Turkish speakers and 50 were bilingual, whose native language is Turkish and speak another second language. For bilingual children, the mean age of acquisition of the second language was M= 3.9 (Median = 4). The majority of bilingual children began to acquire their second language from 4 years old (64%) and 5 years old (24%), and others began to acquire it from 3 years old (2%) and 2 years old (4%) and with birth (6%). There were 2 different second languages represented in the bilingual group: French (92%) and English (8%). The bilingual children speak and hear both Turkish (68%) and their second language (32%) daily. They speak and hear Turkish (%71) and their second language (29%) at school. People who speak to bilingual child at home have spoken Turkish 81% of the time and second language 19% of the time.

Parents indicated their child's level of proficiency in speaking, understanding, and reading in both native and second language. For the native language, the bilingual children's level of proficiency in speaking, understanding, and reading was 9.34, 9.36, and 8.16, respectively. For the second language, the bilingual children's level of proficiency in speaking, understanding, and reading was 5.92, 6.38, and 5.54, respectively. The description of bilingual children's language background can be seen in Table 5.2.

Table 5. 2. Language Background and Proficiency of the Bilingual Children in Experiment 3

Language background							
	M			*SD*			Frequency
AoA L1	.00			.00			
AoA L2	3.90			1.18			
L1 usage (on average)	67.50			6.28			
L2 usage (on average)	32.50			6.28			
L1 usage at home	81.07			14.12			
L2 usage at home	18.93			14.12			
L1 usage at school	70.92			4.55			
L2 usage at school	29.08			4.55			
Language proficiency							
	L1			L2			
	M	SD	Range	*M*	SD	Range	
Speaking	9.34	1.002	7-10	5.92	1.700	3-10	
Understanding spoken language	9.36	.985	7-10	6.38	1.861	4-10	
Reading	8.16	2.093	3-10	5.54	1.992	3-10	

L1: native language; L2: second language; AoA: age of acquisition; Language proficiency was from 0 to 10 for speaking, understanding and reading.

5.2. Materials

5.2.1. Personal Information Form

The Personal Information Form consists of four questions inquiring about children’s month and year of birth, gender, the parent’s education level, and whether the child has any health problems (sight/hearing/language difficulties/learning difficulties) (see in Appendix B). The form was filled out by the parents of the children.

5.2.2. Language Background Questionnaire

Child Language Experience and Proficiency Questionnaire (LEAP-Q) is used to assess children’s language background. It was adapted by Marian et al. (2007). Turkish translation of the Child Language Experience and Proficiency Questionnaire does not exist. Therefore, Language Background Questionnaire was prepared by the experimenter based on the questions of Child LEAP-Q. The questionnaire is answered by the child’s caregiver and provides information about the language (s) the child knows in order of dominance and order of acquisition, age of first exposure to a language (s), the percentage of time the child speaks and hears each language at school and at home, and child’s level of proficiency in the language (s) (see in Appendix C).

5.2.3. Peabody Picture Vocabulary Test

The Peabody Picture Vocabulary Test (Dunn & Dunn, 1997) is used to measure receptive vocabulary for children two years and older. Katz et al. adapted the Peabody Picture Vocabulary Test into Turkish at Ankara Guidance Research Center in 1972.

Peabody Picture Vocabulary Test is an individually administered test. There are two separate instructions for children over 8 and under 8 years old. The test consists of three training sheets and 100 test sheets (see Appendix D). The child is instructed to choose the picture that matches the word the experimenter said. The test sheets increase in difficulty, and the test is terminated when the child makes six errors in a row or six errors out of eight consecutive answers.

5.2.4. Spatial Perspective Taking Task

The spatial perspective-taking task was programmed in Psytoolkit software (Stoet, 2010; Stoet, 2017) and administered on a Samsung Galaxy Tab A7 tablet with a 10.4-inch touchscreen monitor and 2000 x 1200 display resolution. Children were presented with photographs showing a person seated at a table (see Appendix G). Two objects were next to each other on this table. The presented photographs were 500 x 500 pixels in size, with a resolution of 2000 x 1200. Photographs were manipulated by varying the actor's gaze and action (Figure 5.1). In the *Gaze Action condition*, the person looked at the target object and grasped it. In the *Incongruent Gaze Action condition*, the person looked down and grasped the target object without looking toward it. To avoid any bias for the person's gender and the answer about the location of the object, I constructed four sets of photographs (i.e., candle on the left and pineapple on the right for both woman and man actor; bottle on the left and glass on the right for both woman and man actor). There were 8 trials consisting of 4 trials for each of the two experimental conditions. On each trial, children were asked to answer the following question: "*How does the person in the photograph see the objects* (i.e., a candle and a pineapple)?" Two choices appeared at the bottom of the photographs (see Figure 5.2). One of the choices showed the correct view (person's perspective) and another choice was incorrect (child's perspective). Children were asked to select the option that corresponded to the person's perspective by touching that choice. The position of the options and the order of trials were randomized across children.

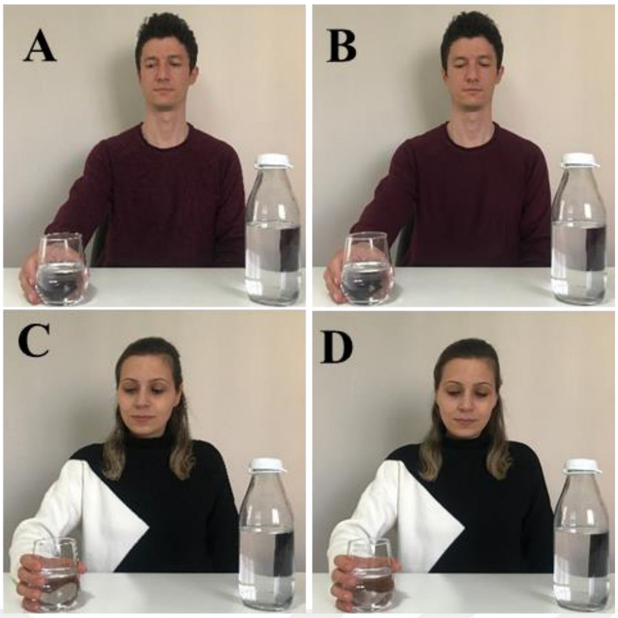

Figure 5. 1. Examples for Photographs Presented in Experiment 3. For photographs with a male actor: **(A)** Gaze-Action condition **(B)** Incongruent Gaze-Action condition. For photographs with a female actor: **(C)** Gaze-Action condition **(D)** Incongruent Gaze-Action condition

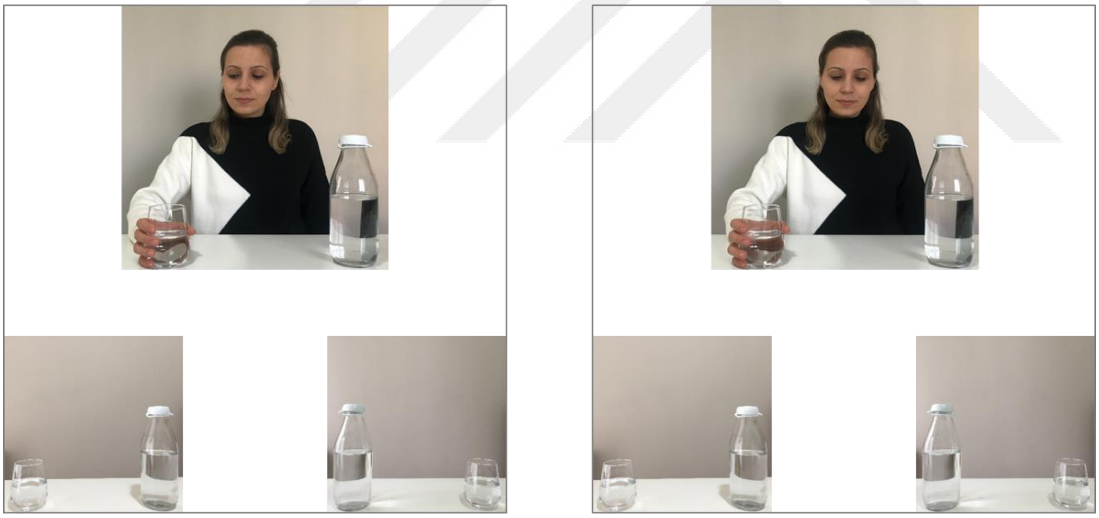

Figure 5. 2. Examples of Spatial Perspective-Taking Task in Experiment 3.

5.3. Procedure

All parents were asked to fill out the written informed consent (see Appendix A), the Personal Information Form, and Language Background Questionnaire to determine which language group the children belong to. After all forms were returned to the children's school and collected, the experimenter tested all children individually in a classroom or library at their school. Children were tested in a fixed order: PPVT and spatial perspective-taking task.

5.3.1. Statistical Procedure

In order to investigate the effect of incongruent pragmatic cues and bilingualism on spatial perspective-taking ability (Hypothesis 8 and 9), 2x2 mixed design analysis of variance was conducted by using IBM SPSS Statistics software (Version 22). Analysis was conducted with within-subjects variable of pragmatic cues (*gaze-action condition* and *incongruent gaze-action condition*), between-subjects variable of language (*monolingual* and *bilingual*), and outcome variables of mean accuracy and reaction time.

In order to investigate the effect of age group on the spatial perspective-taking ability (Hypothesis 10), a one way analysis of variance was conducted by using IBM SPSS Statistics software (Version 22). Analysis was conducted with between-subjects variable of age group (*6, 7,* and *8-year-olds*) and the outcome variable of mean accuracy.

RESULTS

5.4. Descriptive Statistics

The mean scores and standard deviations for variables of parents' education level and PPVT scores are reported in Table 5.3. In order to examine whether there are language group differences for parent's education level and for PPVT scores, independent samples t-test analysis was done. The difference between monolingual and bilingual children was not statistically significant in parent's education level, $t(98) = -0.983$, $p = .328$, showing no language group differences for parent's education level. The difference between monolingual and bilingual children was not statistically significant in PPVT scores, $t(98) = -0.450$, $p = .654$, showing no language group differences for receptive vocabulary.

Table 5. 3. Descriptive Statistics for Variables in Experiment 3

	Language Group	*M*	*SD*
PPVT score	Monolingual	60.64	6.877
	Bilingual	61.22	5.987
Parent's education level	Monolingual	3.02	0.714
	Bilingual	3.16	0.710

Note. $N = 100$.

5.6. Primary Analyses I

5.6.1. Normality of Distribution

It was checked whether the data met the normality of distribution using IBM SPSS software (Version 22).

For bilingual children, the accuracy for gaze-action condition was not normally distributed with Kolmogorov-Smirnov (50) = 0.246, $p < .001$. However, the accuracy for gaze-action condition was normally distributed, with a skewness of -0.529 (SE = 0.337) and kurtosis of -1.386 (SE = 0.662). The accuracy for incongruent gaze-action condition was not normally distributed with Kolmogorov-Smirnov (50) = 0.319 , $p < .001$. However, the accuracy for incongruent gaze-action condition was normally distributed, with a skewness of -0.662 (SE = 0.337) and kurtosis of -1.219 (SE = 0.662).

For monolingual children, the accuracy for gaze-action condition was not normally distributed with Kolmogorov-Smirnov (50) = 0.339, $p < .001$. However, the accuracy for gaze-action condition was normally distributed, with a skewness of 01.182 (*SE* = 0.337) and kurtosis of 0.038 (*SE* = 0.662). The accuracy for incongruent gaze-action condition was not normally distributed with Kolmogorov-Smirnov (50) = 0.252 , $p < .001$. However, the accuracy for incongruent gaze-action condition was normally distributed, with a skewness of 1.146 (*SE* = 0.337) and kurtosis of 0.463 (*SE* = 0.662).

5.6.2. Test of Homogeneity of Variance

According to Levene's Test of Equality of Error Variances, mean accuracy for incongruent gaze-action condition met the assumption of homogeneity ($F(1, 98) = 1.533$, $p = .219$), however, mean accuracy for gaze-action condition did not meet the assumption of homogeneity of variances ($F(1, 98) = 7.561$, $p = .007$). It can be seen in Table 5.4.

Table 5. 4. Levene's Test of Equality of Error Variances in Experiment 3

	F	*df1*	*df2*	*Sig.*
Gaze-Action condition	7.561	1	98	.007
Incongruent Gaze-Action condition	1.533	1	9864	.219

Since the data were not normally distributed according to the Kolmogorov-Smirnov test and partially met the assumption of homogeneity, the logarithmic and square root transformations were done. However, these analyses did not correct the issue; therefore, the original data was used in Experiment 3. Also, since the data were not normally distributed the Kolmogorov-Smirnov test, it is necessary to use non-parametric tests. However, there is no appropriate non-parametric test for the experimental design; therefore, it was thought that using parametric tests as the main analysis would be a better option.

5.7. Main Analyses I

In order to examine the effect of bilingualism and pragmatic cues on spatial perspective taking performance, two-way repeated measures analysis of variance with a between-subjects factor of *language group* (2 levels: *monolingual* and *bilingual*) and a within-subjects factor of *pragmatic cues* (2 levels: *gaze-action condition* and *incongruent gaze-action condition*) was conducted.

For the analyses, mean accuracy was considered as the dependent variable. The correct responses for each pragmatic cue condition were calculated as mean accuracy by dividing the number correct by the maximum of 4.

As a result of the two-way mixed analysis of variance, it was shown that the main effect of pragmatic cues on accuracy was statistically significant (F (1, 98) = 5.542, p = .021, η^2_p = .054) (see Table 5.5). This finding indicated that children performed better when gaze and action cues were incongruent (M = .490, SE = 0.04) than when gaze and action cues were congruent (M = .423, SE = 0.37) (see Figure 5.3)

Table 5. 5. Results of the Repeated Measure Analysis of Variance for Pragmatic Cues and Bilingualism

Source	SS	*df*	Mean Square	*F*	*p*	η_p^2
Within-Subjects Effects						
PragmaticCues	.228	1	.228	5.542	.021	.054
PragmaticCues*LanguageGroup	.025	1	.025	.616	.434	.006
Error(PragmaticCues)	4.028	98	.041			
Between-Subjects Effects						
Intercept	41.633	1	41.633	163.507	.000	.625
LanguageGroup	6.570	1	6.570	25.804	.00	.208
Error	24.953	98	.255			

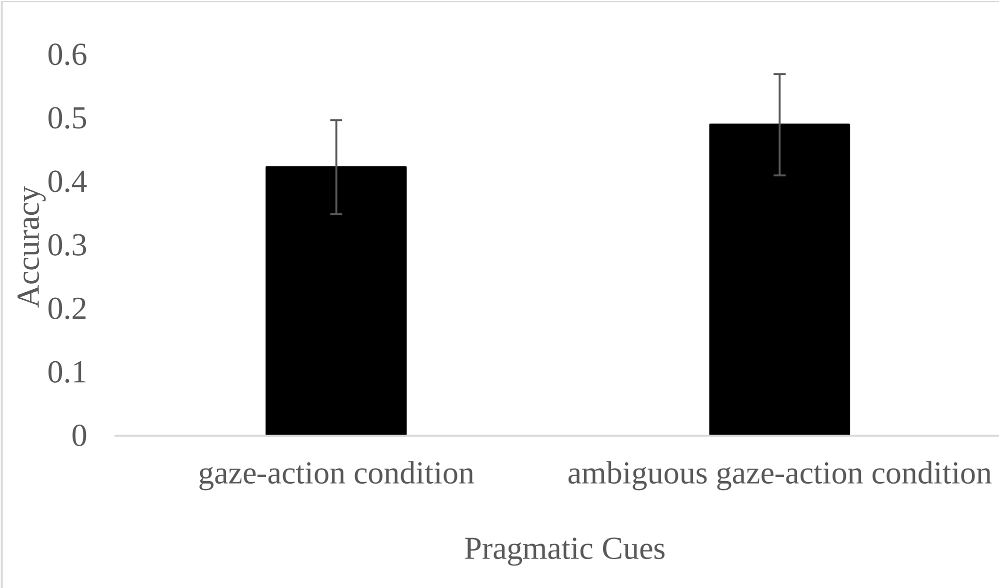

Figure 5. 3. Mean Correct Responses for Gaze-Action Condition and Incongruent Gaze-Action Condition. Error bars show ±2 Standard Errors.

As a result of the two-way mixed analysis of variance, it was shown that the main effect of the language group on mean accuracy was statistically significant (F (1, 98) = 25.804, p < .001, η^2_p = .208). This finding indicated that that bilingual children (M = .638, SE = 0.05) was statistically significantly more accurate than monolingual children (M = .275, SE = 0.05) in taking another's perspective (see Figure 5.4).

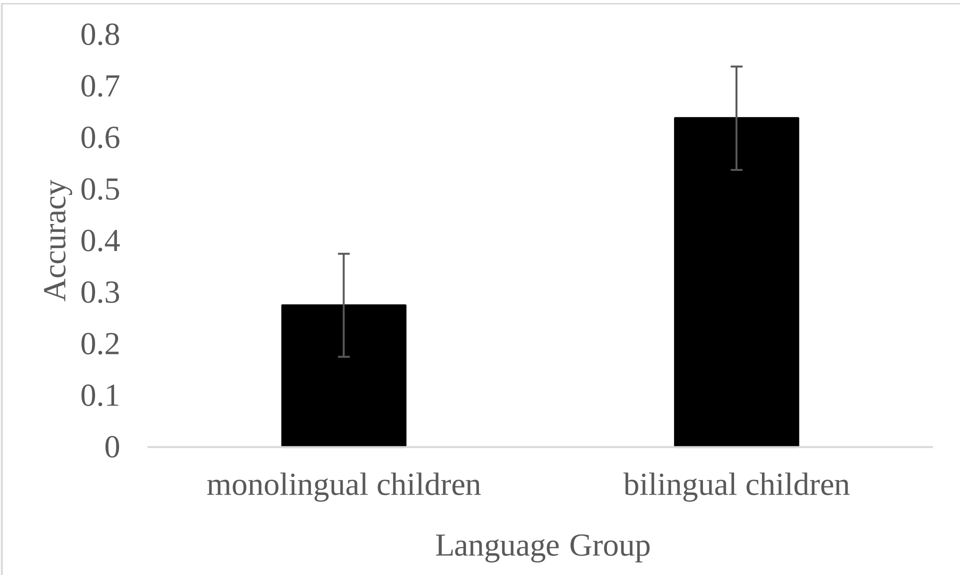

Figure 5. 4. Mean Correct Responses for Monolingual Children and Bilingual Children in Experiment 3. Error bars show ±2 Standard Errors.

As a result of the two-way mixed analysis of variance, it was shown that the interaction between language group and pragmatic cues on mean accuracy was not statistically significant (F (1, 98) = .616, p = .434, η^2_p = .006) (see Table 5.5). This finding indicated that mean accuracy across pragmatic cues was not statistically significantly different for monolingual and bilingual children (Figure 5.5).

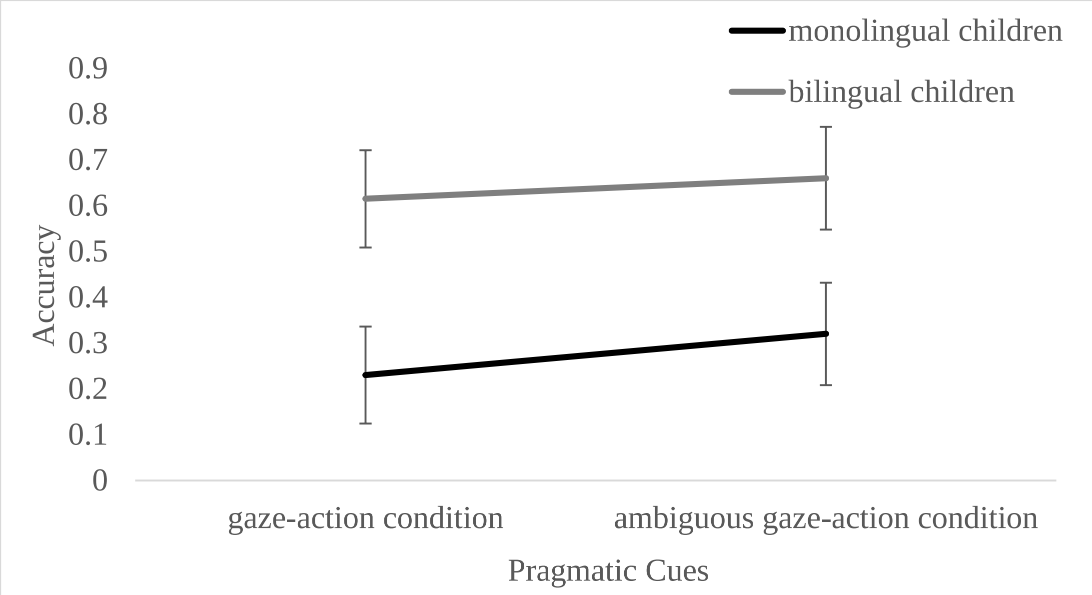

Figure 5. 5. Mean Correct Responses for Monolingual and Bilingual Children across Pragmatic Cues in Experiment 3. Error bars show ±2 Standard Errors.

5.8. Primary Analyses II

5.8.1. Normality of Distribution

It was checked whether the data met the normality of distribution using IBM SPSS software (Version 22).

For bilingual children, the reaction time measure for gaze-action condition was not normally distributed with Kolmogorov-Smirnov (50) = 0.130, p =.035. However, the reaction time measure for gaze-action condition was normally distributed, with a skewness of 0.968 (SE = 0.337) and kurtosis of 0.464 (SE = 0.662). The reaction time measure for incongruent gaze-action condition was not normally distributed with Kolmogorov-Smirnov (50) = 0.158, p = .003. However, the reaction time measure for incongruent gaze-action condition was normally distributed, with a skewness of 2.555 (SE = 0.337) and kurtosis of 10.017 (SE = 0.662).

For monolingual children, the reaction time measure for gaze-action condition was not normally distributed with Kolmogorov-Smirnov (50) = 0.139, p = .017. However, the reaction time measure for gaze-action condition was normally distributed, with a skewness of 0.995 (SE = 0.337) and kurtosis of 0.402 (SE = 0.662). The reaction time measure for incongruent gaze-action condition was not normally distributed with Kolmogorov-Smirnov (50) = 0.189, $p < .001$. However, the reaction time measure for incongruent gaze-action condition was normally distributed, with a skewness of 4.165 (*SE* = 0.337) and kurtosis of 22.981 (*SE* = 0.662).

5.8.2. Test of Homogeneity of Variance

According to the Levene's Test of Equality of Error Variances, reaction time measure for gaze-action condition ($F(1, 98) = 14.940, p < .001$) and for incongruent gaze-action condition ($F(1, 98) = 6.069, p = .016$) did not meet the assumption of homogeneity. It can be seen in Table 5.6.

Table 5. 6. Levene's Test of Equality of Error Variances in Experiment 3

	F	*df1*	*df2*	*Sig.*
Gaze-Action condition	14.940	1	98	.000
Incongruent Gaze-Action condition	6.069	1	98	.016

Since the data were not normally distributed according to the Kolmogorov-Smirnov test and did not meet the assumption of homogeneity, the logarithmic and square root transformations were done. However, these analyses did not correct the issue; therefore, the original data was used in Experiment 3. Also, since the data were not normally distributed according to the Kolmogorov-Smirnov test, it is necessary to use non-parametric tests. However, there is no appropriate non-parametric test for the experimental design; therefore, it was thought that using parametric tests as the main analysis would be a better option.

5.9. Main Analyses II

In order to examine the effect of bilingualism and pragmatic cues on spatial perspective taking performance, two-way repeated measures analysis of variance with a between-subjects factor of *language group* (2 levels: *monolingual* and *bilingual*) and a within-subjects factor of *pragmatic cues* (2 levels: *gaze-action condition* and incongruent *gaze action condition*) was conducted. For the analyses, reaction time was considered as the dependent variable.

As a result of the two-way mixed analysis of variance, it was shown that the main effect of the language group on reaction time was statistically significant ($F(1, 98) = 11.242$, $p = .001$, $\eta^2_p = .103$) (see Table 5.7). This finding indicated that monolingual children (M = 4.802, SE = 0.443) were quicker to describe the spatial relations from other-perspective compared to bilingual children (M = 6.901, SE = 0.443) (see Figure 5.6). However, the main effect of pragmatic cues (F (1, 98) = 1.829, p = .179, η^2_p = .018), and the interaction between language group and pragmatic cues on reaction time was not statistically significant (F (1, 98) = 0.283, p = .596, η^2_p = .003) (see Table 5.7). This finding indicated that reaction time across pragmatic cues was not statistically significantly different for monolingual and bilingual children (Figure 5.7).

Table 5. 7. Results of the Repeated Measure Analysis of Variance for Pragmatic Cues and Bilingualism

Source	SS	*df*	Mean Square	*F*	*p*	η_p^2
Within-Subjects Effects						
PragmaticCues	14.578	1	14.578	1.829	.179	.018
PragmaticCues*LanguageGroup	2.255	1	2.255	.283	.596	.003
Error(PragmaticCues)	780.911	98	7.968			
Between-Subjects Effects						
Intercept	6847.793	1	6847.793	349.460	.000	.781
LanguageGroup	220.283	1	220.283	11.242	.001	.103
Error	1920.347	98	19.595			

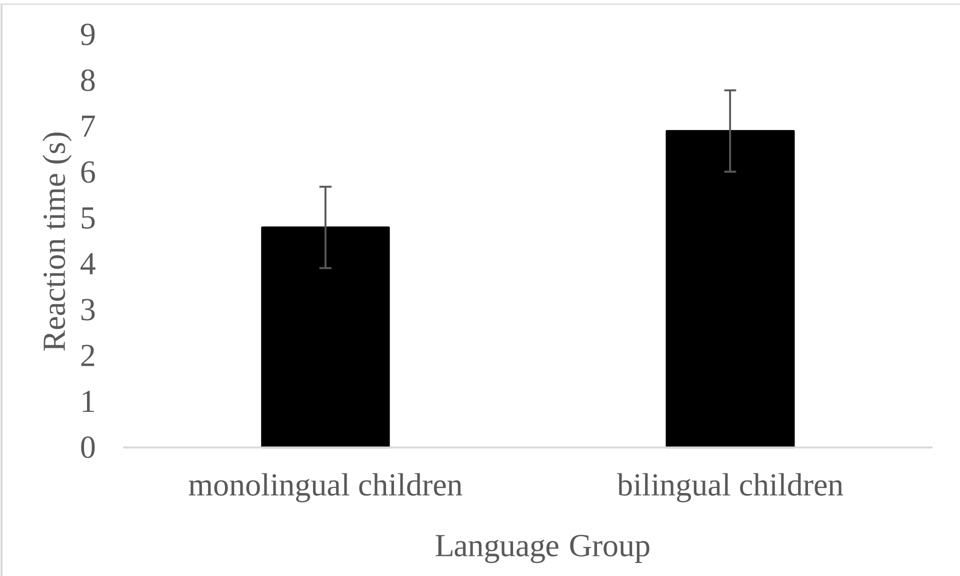

Figure 5. 6. Mean Reaction Time for Monolingual and Bilingual Children. Error bars show ±2 Standard Errors.

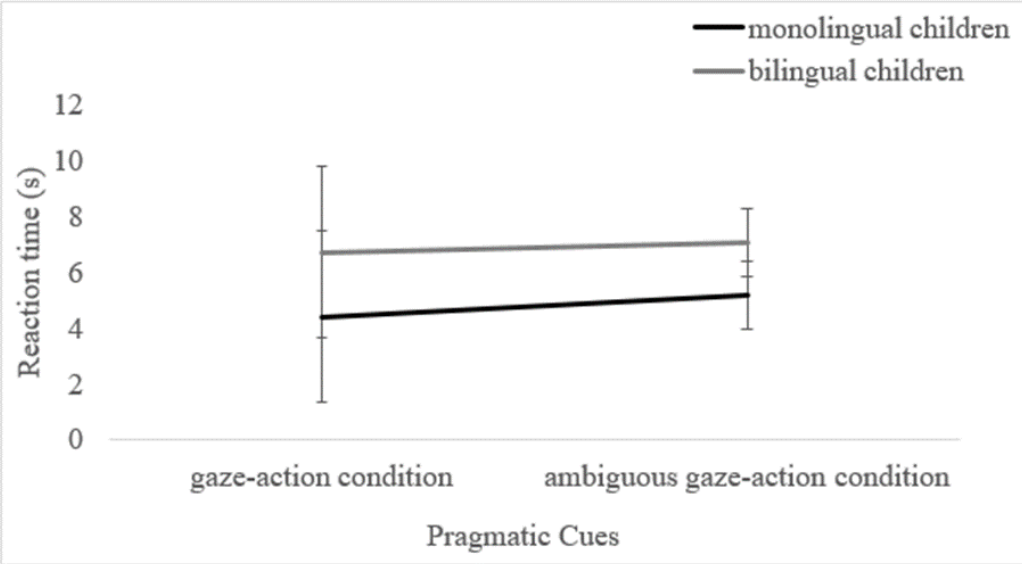

Figure 5. 7. Mean Reaction Time for Monolingual and Bilingual Children across Pragmatic Cues in Experiment 3. Error bars show ±2 Standard Errors.

5.10. Primary Analyses III

5.10.1. Normality of Distribution

It was checked whether the data met the normality of distribution using IBM SPSS software (Version 22). Mean accuracy for 6-year-olds was not normally distributed with Kolmogorov-Smirnov (26) = 0.263, $p < .001$. However, the accuracy for 6-year-olds was normally distributed, with a skewness of .630 (*SE* = 0.456) and kurtosis of -1.298 (*SE* = 0.887). Mean accuracy for 7-year-olds was not normally distributed with Kolmogorov-Smirnov (40) = 0.200, $p < .001$. However, the accuracy for 7-year-olds was normally distributed, with a skewness of .440 (*SE* = 0.374) and kurtosis of -1.222 (*SE* = 0.773). Mean accuracy for 8-year-olds was not normally distributed with Kolmogorov-Smirnov (34) = 0.213, $p < .001$. However, the accuracy for 8-year-olds was normally distributed, with a skewness of -.473 (*SE* = 0.403) and kurtosis of -1.423 (*SE* = 0.788).

5.10.2. Test of Homogeneity of Variance

The assumption of homogeneity of variance was met, $F(2, 63) = 0.878$, $p = .421$. It can be seen in Table 5.8.

Table 5. 8. Test of Homogeneity of Variance in Experiment 3

Levene Statistics	*df1*	*df2*	*Sig.*
.878	2	63	.421

5.11. Main Analyses III

In order to examine the effect of age group on spatial perspective-taking ability, a one-way analysis of variance with a between-subjects factor of *age group* (3 levels: *6, 7,* and *8-year-olds*) was conducted.

For the analyses, mean accuracy was considered as the dependent variable. The correct responses for each pragmatic cue were calculated as mean accuracy by dividing the number correct by the maximum of 4.

The relationship between age group and spatial perspective taking performance was statistically significant, F (2, 99) = 4.350, p = .016, η^2_p = .082 (see Table 5.9). Post-hoc analyses with Bonferroni correction indicated that the difference between 6-year-olds and 8-year-olds was significant, (p = .035) and the difference between 7-year-olds and 8-year-olds was significant, (p = .041) while the difference between 6-year-olds and 7-year-olds was not significant (p = 1.000) (see Figure 5.8).

Table 5. 9. Results of the One Way Analysis of Variance

	SS	*df*	Mean Square	*F*	*p*	η^2_p
Between Groups	1.297	2	.649	4.350	.016	.082
Within Groups	14.464	97	.149			
Total	15.762	99				

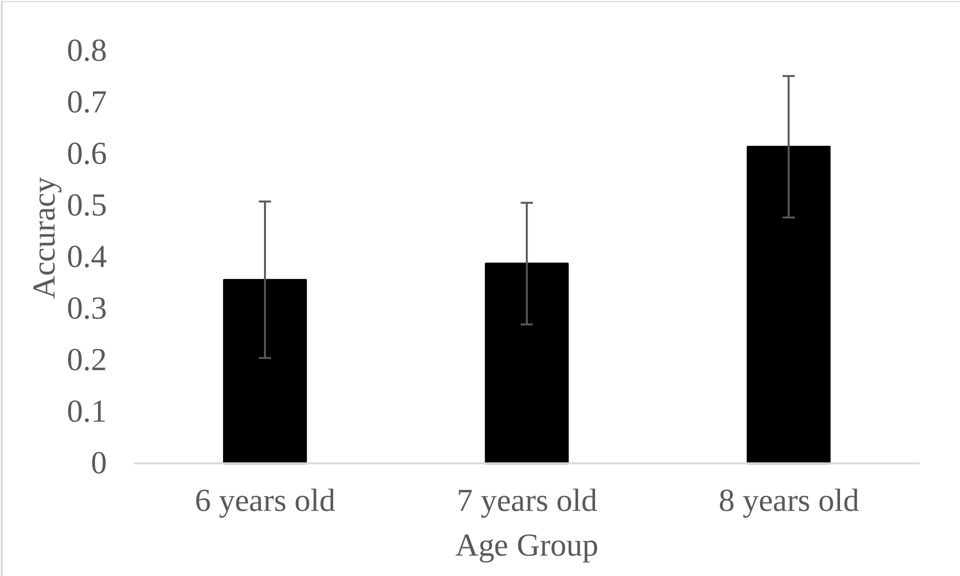

Figure 5. 8. Mean Correct Responses for 6, 7, and 8 Years Old in Experiment 3. Error bars show ±2 Standard Errors.

DISCUSSION

The present results confirmed that children's spatial perspective-taking ability was affected by the incongruity of pragmatic cues. More specifically, when children were required to describe the object relations with respect to another person's perspective, they performed better when action and gaze cues were incongruent rather than congruent. In other words, incongruent pragmatic cues led to more accurate spatial judgments with respect to another person's perspective. This finding shows that children are more sensitive to the incongruence of pragmatic cues, and therefore they adopt the perspective of another person rather easily when the pragmatic cues signal different intentions. The finding was consistent with the study (Furlanetto et al., 2013), suggesting that incongruity of pragmatic cues induces spontaneous spatial perspective-taking. In this way, the finding of Experiment 3 showed that the effect of incongruent pragmatic cues on spatial perspective-taking ability can also be seen in children and on an explicit level.

Moreover, bilingualism had a main effect on spatial perspective-taking ability. Bilingual children took another person's perspective more accurately compared to monolingual children, regardless of whether the action and gaze cues were congruent or incongruent. The findings of Experiment 3 were consistent with previous studies suggesting that compared to monolinguals, bilingual children showed better performance on various cognitive functions (Bialystok, 1999; Blom et al., 2014; Martin-Rhee & Bialystok, 2008). Also, the findings were in line with research suggesting that compared to monolingual children, bilingual children are more aware of pragmatic cues (Yow & Markman, 2011; Brojde et al., 2012; Verhagen et al., 2017).

In the experiment, the effect of pragmatic cues on reaction time was not found, which shows that time to adopt another person's perspective did not change depending on the presence of pragmatic cues. However, bilingualism had a main effect on the time to adopt another person's perspective. More specifically, monolingual children took another person's perspective faster than bilingual children. This finding was the contrast to our hypothesis. Based on previous studies suggesting that bilingual children show better performance in perspective-taking tasks (Goetz et al., 2003; Greenberg et al., 2013), one of the expectations was that bilingual children would be quicker to describe spatial relations from other-perspective compared to bilingual children. During conducting the experiment, it was observed that when asked to take another individual's spatial perspective, bilingual children more often rotated physically, placed themselves in the person's position, and repeated his/her pragmatic cues. Therefore, as a possible explanation, bilingual children are slower to respond because they try to take spatial perspective more often than monolingual children.

Furthermore, 6- and 7-year-olds performed similarly on the spatial perspective-taking task while the 8-year-olds performed better than all other age groups. This finding, showing the effect of the age group on the spatial perspective-taking ability, replicated the results of Experiment 2. Also, the findings were consistent with previous studies suggesting that spatial perspective taking improves especially between 7 and 8 years old (Salatas & Flavell, 1976; Frick et al., 2014).

CHAPTER 6
GENERAL DISCUSSION

The vast majority of studies have investigated perspective-taking ability in children through the assessment of false beliefs (Bialystok & Senman, 2004; Goetz, 2003; Kovács, 2009; Wimmer & Perner, 1983). However, the study focusing on spatial perspective-taking in children is very limited. Therefore, the main motivation of the thesis was to provide a better understanding of the children's spatial perspective-taking ability. More specifically, the motivation of Experiment 1 was to examine whether pragmatic cues and bilingualism influence the implicit level of spatial perspective-taking, whereas the motivation of Experiment 2 was to investigate whether the effect of pragmatic cues and bilingualism can be observed in the explicit level of spatial perspective-taking. Experiment 3 examined the effect of a pragmatic cue different from that examined in Experiments 1 and 2 in the explicit level of spatial perspective-taking. Also, another motivation of Experiments 2 and 3 was to examine the effect of age group on spatial perspective-taking ability.

The possible explanations for the findings, contributions of the thesis, potential limitations, and further suggestions for future work were presented in detail in the following sections.

6.1. Possible Explanations of the Findings

The findings of the thesis partially supported the hypotheses of Experiment 1. First, results indicated that pragmatic cues affected which perspective children adopt to describe object relations. When children observed the person with gaze-action cues, they described object relations with respect to another person's perspective more often. This finding is consistent with previous research suggesting that the presence of pragmatic cues, which are action and gaze, lead people to take another individual's perspective more frequently and describe the object relations accordingly (Furlanetto et al., 2013; Mazzarella et al., 2012). The finding of Experiment 1 verified that the effect of action-gaze cues on spontaneous spatial perspective-taking can also be seen in children.

The presence of gaze-action cues compared to other pragmatic cues enhanced spontaneous spatial perspective-taking more. This finding of Experiment 1 might be explained by past studies indicating that observing a person whose eye gaze, head orientation, or pointing are oriented to the same side has a strong effect on people's attentional orientating (Langton, 2000; Langton & Bruce, 2000). Since the perception of congruent gaze and action cues might attract the children's attention more, they may have tended to take another individual's perspective more. Also, previous studies showed that various cues can direct one's attention toward an external entity or event (Cole et al., 2015; Santiesteban et al., 2014). The findings of Experiment 1 showed that pragmatic cues displayed by another person can also direct the attention of an observer to the person. However, as mentioned above, the extent of attentional orientation changes according to the type of pragmatic cues. Thus, it is meaningful to say that, similarly to attention, the coexistence of action and gaze is a stronger pragmatic cue to take another's perspective spontaneously.

Moreover, it was found that there was a difference between the effects of gaze-action condition and gaze condition on spontaneous spatial perspective-taking, which is inconsistent with Tversky and Hard (2009). In addition, the results showed that the effect of an individual who displays gaze cue or action cue and a person who displays no pragmatic cue is similar for children. Given that the gaze-action condition has more effect on spontaneous spatial perspective-taking than other pragmatic cues conditions, we can say that a strong trigger is necessary for children to take a spontaneous spatial perspective more often.

However, considering the findings of Experiment 1, it cannot be said that compared to monolingual children, bilingual children take other-perspective more frequently when pragmatic cues are provided. The interaction effect of pragmatic cues and bilingualism was not found, which shows that bilingual children tend to adopt another individual's perspective more frequently, regardless of whether the cues are present. Although previous studies suggested that compared to monolingual children, bilingual children are more aware of pragmatic cues, especially in challenging situations (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011), the differences between monolingual and bilingual children in the spontaneous spatial perspective-taking task did not change depending on the presence of pragmatic cues in the current study. One of the possible explanations might be that since spontaneous perspective-taking is processed at an implicit level, this might not be such a challenging situation as the sensitivity of bilingual children to pragmatic cues can be seen.

The finding of Experiment 1 showed that bilingual children are more aware that another person may have a different visual experience. What could be the underlying mechanism for the advantage of bilingualism that cannot be explained by the effect of pragmatic cues? One of the possible explanations for why bilingualism affects the frequency of taking spontaneous spatial perspective as in other perspective-taking dimensions might be the bilinguals' socio-pragmatic awareness. Bilingual children's awareness that another person can speak a different language could ease the awareness that another person may have a different perspective. Therefore, socio-pragmatic awareness might predict bilingual children to take spontaneous spatial perspective more frequently.

The results of Experiment 1 indicated that spontaneous spatial perspective-taking is automatic and natural in children and is triggered by some circumstances. Experiment 2 verified that the effect of pragmatic cues and bilingualism on spatial perspective-taking can be observed at the explicit level as well as at the implicit level. More specifically, Experiment 2 demonstrated that action cue and gaze-action cues have more effect on spatial perspective-taking performance than gaze cue or a scene without a pragmatic cue. Thus, it is meaningful to say that action cue leads to more accurate spatial judgments with respect to another person's perspective. This result is consistent with the finding that subjects took another person's perspective more accurately when the person's action was observed (Furlanetto et al., 2013; Mazzarella et al., 2012). Therefore, we can say that the particular impact of action cue on spatial perspective-taking can also be seen in children. Perceiving another person's action allows us to make inferences about what the person is doing and will do (Sartori et al., 2011). In other words, one way to make inferences about another person's intention could be to perceive their action. Perspective-taking might be necessary to make an inference about the person's intention. Thus, perceiving another person's action might enhance spatial perspective-taking, in line with the presented findings above (Furlanetto et al., 2013; Mazzarella et al., 2012).

Moreover, Experiment 2 demonstrated that there was no difference between the effect of actor condition and gaze condition on spatial perspective-taking. A possible explanation for why a neutral expression and a gaze cue have a similar effect on spatial perspective-taking can be that the eye gaze does not provide enough cue to infer another person's intention as much as the action cue. Eye gaze is related to an individual's preferences and attention (Frischen et al., 2007) rather than what the person is doing or will do. Therefore, the gaze cue may not have triggered spatial perspective-taking as much as the action cue. Therefore, we can say that the characteristics of pragmatic cues, rather than the presence of pragmatic cues, affect the children's spatial perspective-taking ability. This thesis focused on the effect of pragmatic cues on the ability to take spatial perspective, and it would be better if further research investigate the underlying mechanism of these different effects of pragmatic cues.

Also, Experiment 2 indicated bilingual children were better at judging the objects' position from another's perspective than monolingual children. This finding is consistent with previous studies suggesting that bilingual children perform better than monolingual children in various domains (Bialystok, 1999; Blom et al., 2014; Martin-Rhee & Bialystok, 2008), one of which is perspective-taking (Goetz, 2003; Greenberg et al., 2013). Also, the result is in line with the past findings suggesting that bilingual children are more aware that others may have different mental states (Goetz, 2003; Kovács, 2008; Schroeder, 2018). Thus, the finding of experiment 2 showed that the advantage of bilingualism also extended to spatial perspective-taking ability requiring left-right judgment.

In Experiment 2, the interaction effect of pragmatic cues and bilingualism was found, which shows that compared to monolingual children, bilingual children took other-perspective more accurately when pragmatic cues were provided, that is action cue or gaze-action cues. It is meaningful to say that bilinguals' sensitivity to pragmatic cues has contributed to performing better in the spatial perspective-taking task where pragmatic cues are present. This finding is consistent with previous studies suggesting that compared to monolingual children, bilingual children are more aware of pragmatic cues, and therefore particularly in challenging situations, they perform better than monolingual children by using pragmatic cues more (Brojde et al., 2012; Verhagen et al., 2017; Yow & Markman, 2011). Thus, the finding of Experiment 2 also verified the sensitivity of bilingual children to pragmatic cues under another challenging context, namely spatial perspective-taking task.

The findings of the thesis partially supported the hypothesis of Experiment 3. First, results indicated that incongruity of pragmatic cues influenced children's spatial perspective-taking ability. Children made more accurate judgments about the objects' position from another individual's perspective when gaze and action cues were incongruent than when these cues were congruent. This result was in line with the past study founding that spontaneous spatial perspective-taking is triggered more by incongruent pragmatic cues (Furlanetto et al., 2013). The finding of Experiment 3 verified that the specific effect of incongruent pragmatic cues can also be seen in children and an explicit level of spatial perspective-taking. As an explanation suggested to this finding, perceiving a person who grasps an object but does not look at it might have produced ambiguity about what the person is doing and will do, and this ambiguity might have triggered perspective-taking more to understand the person's intention. Therefore, it is meaningful to say that the characteristics of pragmatic cues affect spatial perspective-taking ability, in line with the findings of Experiment 2. This explanation is also consistent with the result that people's decisions are influenced by pragmatic cues when they perceive ambiguity in another person's intention (Adams & Kleck, 2003).

Also, another finding of Experiment 3 indicated that bilingual children took another person's perspective more accurately than monolingual children, regardless of whether the action and gaze cues were congruent or incongruent. This finding is consistent with previous studies suggesting that compared to monolingual children, bilingual children are more aware of pragmatic cues, especially when there is a challenging situation (Brojde et al., 2012; Verhagen et al., 2017). Therefore, it is meaningful to say that bilinguals' sensitivity to pragmatic cues has contributed to performing better in spatial perspective-taking, which is one of the challenging situations.

Based on the previous studies suggesting that pragmatic cues affect spatial perspective-taking performance, one of the expectations was that children would take other-perspective faster in scenes with pragmatic cues than in scenes without the pragmatic cues. However, in Experiments 2 and 3, the effect of pragmatic cues on reaction time was not found, which shows that time to adopt another person's perspective did not change depending on the presence of pragmatic cues. These findings show that the pragmatic cues have an effect on the spatial description responses, not the time it takes to adopt one's perspective. Moreover, the interaction effect of pragmatic cues and bilingualism on reaction time was not found, indicating that time to adopt another's perspective across pragmatic cues was not different for monolingual and bilingual children. As a possible explanation, there might be a different mechanism affecting the reaction time for spatial perspective-taking, such as executive function, as was argued in the discussion section of Experiment 2. Previous studies have suggested that the executive function seems to be required to take another individual's perspective, and also bilingual children have a higher level of executive functioning than monolingual children (Bialystok, 1999; Bialystok & Martin, 2004; Bialystok & Viswanathan, 2009). Therefore, it might be a different mechanism that affects monolingual and bilingual children's time to take another's perspective, such as executive function. Nevertheless, as far as I am concerned, there is no other study investigating the time children adopt spatial perspective and the factors that might affect this time. Therefore, future studies might examine children's spatial perspective-taking ability with respect to reaction time.

More interestingly, in Experiment 2, the effect of bilingualism on reaction time was not found, but in Experiment 3, it was found that bilingualism had an effect on reaction time, indicating monolingual children took another person's perspective faster than bilingual children. Although this finding is the contrast to our hypothesis, based on the observation during experiments, bilingual children made more effort mentally and physically to adopt another person's perspective compared to monolingual; therefore, RTs might have increased. A possible explanation for the inconsistent results in Experiments 2 and 3 might be the difference between bilingual children in the two experiments, for instance, in terms of executive function. Therefore, it might be essential to reinvestigate the effect of bilingualism on reaction time, controlling for possible variables.

To date, several research have focused on spatial perspective-taking, one of the perspective-taking dimensions. Therefore, the debate about the age at which spatial perspective-taking ability develops continues. Experiments 2 and 3 indicated that spatial perspective-taking ability increased significantly at 8 years old. More specifically, 8-year-old children have a better understanding that two people can see the same objects differently than other age groups. The findings on the issue are in line with the past findings suggesting that spatial perspective-taking ability improves significantly between seven and eight years old (Frick et al., 2014; Salatas & Flavell, 1976). One of the possible explanations for mixed results about the age at which spatial perspective-taking ability develops might be methodological differences and different environments in which children grow up. Given that the perspective-taking ability and the culture in which children grow up (Gauvain et al., 2014), or mother-child interaction (Farrant et al., 2012; Ruffman et al., 1999) are related, such factors might be the reasons for different age findings.

6.2. Contributions of the Thesis

Perspective-taking ability enables children to make inferences about another person's thought, behavior, emotion, or perceptual experience. In addition to providing comprehension of another's mental state, perspective-taking is an important milestone in social-cognitive development, from the development of reasoning skills to the formation of self-concept (Ittyerah & Mahindra, 1990; Ogelman et al., 2013). Therefore, various studies have been conducted on children's perspective-taking ability, and the number of studies on this domain is increasing. However, perspective-taking is a broad domain, and the studies about the factors that affect children's spatial perspective-taking ability are limited. Considering the relation between children's perspective-taking ability and different developmental areas, the importance of research on the factors that affect their spatial perspective-taking ability can be seen. Thus, the thesis has scientific contributions to the cognitive developmental literature in terms of obtaining findings about the effect of bilingualism and pragmatic cues on the spatial perspective-taking ability of six to eight years old children and being a resource for future studies on the issue.

Also, as far as I am concerned, the thesis is the first to investigate spontaneous spatial perspective-taking in children. To date, studies with children samples only looked at the explicit nature of spatial perspective-taking ability. Therefore, this thesis contributed to the literature by providing evidence that children also have a tendency to describe object relations from other-perspective, as in adults. Moreover, as far as I am concerned, the current study is also the first to investigate the effect of pragmatic cues on spatial perspective-taking ability in children. Therefore, this thesis contributed to the literature as it gives an idea about another factor, action cue, which leads children to explicitly and implicitly adopt a different perspective from their own.

Although evidence that pragmatic cues might encourage to take another's spatial perspective was provided by recent studies (Furlanetto et al., 2013; Mazzarella et al., 2012), as far as I am concerned, no research on whether pragmatic cues influence spatial perspective-taking ability differently in bilingual and monolingual children.

Hence, another strength of the thesis might be to examine the interaction between pragmatic cues and bilingualism in spatial perspective-taking ability.

The majority of previous studies usually examined the spatial perspective-taking ability in children using a similar methodology. More specifically, in these studies, inanimate objects or toy figures were presented to children. However, previous studies focused on adults' spatial perspective-taking performance generally have used photographs including a person. Experiments in the thesis used a method in which photographs including a person were presented to the children, and they were asked to make a right-left judgment. Hence, another strength of the thesis can be attributed to the method. This method, which shows that it can also be used in the sample of children, can also be a standardized method for future studies that investigate spatial perspective-taking ability over the whole life span.

6.3. Potential Limitations and Future Suggestions

There were some limitations to the experiments in this thesis. One of the limitations can be attributed to how children's language backgrounds are evaluated. In the experiments, children's language proficiency was assessed by their parents, and therefore it is possible that parents might not accurately assess their children's language background. Thus, the extent to which they are proficient in each language is needed to be assessed by using a more comprehensive method, such as both teacher and family assessment.

The thesis examined spatial perspective-taking ability in children using the left-right task. Subjects have to mentally rotate themselves in order to understand whether an object is on the left or right from another person's perspective. Therefore, it is important to make sure that children do not confuse the left-right directions before this task. Another limitation of the thesis can be that a standardized task was not used to assess left-right discrimination, and instead, they were asked to show their right hand and left hand. Therefore, it would be better if future studies can use a standardized task to assess whether children can discriminate between the right and left directions, such as Benton Right-Left Discrimination Test (Benton, 1968).

Also, in the thesis, one of the variables (pragmatic cues) was within-subjects variable. The most important advantage of within-subjects variable is that it increases power and decreases the effect of individual differences. However, there might also be disadvantages that may arise from the usage of such a variable. For example, since subjects are exposed to all experimental conditions, they may have exhausted, and their performance may decrease. Also, it may cause a learning effect due to practice. Those potential confounds are the main types of carryover effect. Therefore, another limitation can be attributed to the experimental design of the thesis. However, it is worth emphasizing that in experiments throughout the thesis, trials were presented in a random order to minimize potential problems that may arise from using such a variable.

Although children in the thesis were classified as bilingual or monolingual based on criteria used in previous studies, authors have identified different types of bilingualism, such as simultaneous bilingual, sequential bilinguals, or balanced bilinguals. Despite that the advantage of bilinguals over monolinguals is provided by the thesis, the spatial perspective-taking ability might differ for the types of bilingualism. Therefore, future studies might investigate whether there are differences between types of bilingualism for spatial perspective-taking ability.

In Furlanetto et al. (2013) study, spontaneous spatial perspective-taking was investigated using videos instead of photographs. Videos consist of dynamic scenes, and therefore information such as facial expressions or pragmatic cues presented in the scene is perceived as more realistic (Ambadar et al., 2005; Wehrle et al., 2000). The usage of a dynamic scene (i.e., video) instead of a static scene (i.e., photograph) might enrich and expand the literature on spatial perspective-taking in children. Therefore, it would be better if future studies can use dynamic scenes to investigate the effect of pragmatic cues on spatial perspective-taking ability.

In the thesis, the interaction between pragmatic cues and bilingualism on spontaneous perspective-taking was not found. Given that bilingual children show more preference for pragmatic information in challenging situations (Yow & Markman, 2011; Brojde et al., 2012; Verhagen et al., 2017), one of the possible explanations can be that the spontaneous perspective-taking task is not such a challenging task in which the sensitivity of bilingual children to pragmatic cues could be seen. Therefore, future studies might investigate possible mechanisms for why bilingual children tend to spontaneously take another's perspective more often than monolingual children, such as metalinguistic and sociolinguistic awareness.

CONCLUSION

Given that perspective-taking ability is a critical milestone in children’s social and cognitive development, studies have focused on the circumstances that might affect their perspective-taking ability. Despite relatively little research, it has been suggested that children’s spatial perspective-taking ability is influenced by such as age, bilingualism, angular difference, and spatial complexity.

Our results show that pragmatic cues are one of the circumstances affecting both the explicit and implicit nature of spatial perspective-taking ability. Also, our results verify studies showing the effects of bilingualism and age on spatial perspective-taking ability. Perhaps the most important result of this thesis is to offer a new layer to children’s spatial perspective-taking ability by showing that bilingual and monolingual children can differ in taking another’s perspective across pragmatic cues.

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APPENDIX A

Informed Consent Form

Sayın Veli;

Bu formun amacı çocuğunuzun yürütülen bir çalışmaya katılımı ile ilgili izin almaktır. Aşağıda, çalışmanın konusu, bölümleri hakkında bilgiler verilmektedir. Lütfen bu bilgileri dikkatlice okuyunuz.

"Çocuklarda Görsel-Uzaysal Bakış Açısı Alma Becerisi: Dilin ve Pragmatik İpuçlarının Etkisi" başlıklı çalışma, Yaşar Üniversitesi Lisansütü Eğitim Enstitüsü Psikoloji Anabilim dalında yüksek lisans yapmakta olan Elif KURUM adlı öğrencinin yüksek lisans tezi kapsamında gerçekleştirilmektedir. Tez danışmanı, Dr. Öğr. Üyesi Ayşe CANDAN ŞİMŞEK'tir.

Bu çalışmanın temel amacı, çocukların bakış açısı alma becerilerini ve bu beceride pragmatik ipuçların ve dilin rolünü incelemektir. Çocuğunuzun çalışmaya katılmasına izin verdiğiniz takdirde çocuğunuzdan bakış açısı alma becerisini ölçen bir testi yerine getirmesi istenecektir. Bu testte çocuğunuza bir aktörün ve iki objenin yer aldığı fotoğraflar sunulacaktır. Fotoğrafta yer alan aktörün objeleri nasıl gördüğü, kendisine sunulan 2 görsel arasından seçerek göstermesi istenecektir. Çalışma çocuğunuzun okulunda gerçekleşecek ve yaklaşık 25 dakika sürecektir.

Araştırma T.C. Milli Eğitim Bakanlığı'nın ve okul yönetiminin de izni ile gerçekleşmektedir. Ayrıca, bu araştırma için Yaşar Üniversitesi Etik Komisyonu'nun izni alınmıştır. Araştırma uygulamasına katılım tamamıyla gönüllülük esasına dayalı olmaktadır. Çocuğunuz çalışmaya katılıp katılmamakta özgürdür. Araştırma çocuğunuz için herhangi bir istenmeyen etki ya da risk taşımamaktadır. Çocuğunuzun katılımı **tamamen sizin isteğinize bağlıdır**, reddedebilir ya da herhangi bir aşamasında ayrılabilirsiniz. Araştırmaya katılmama veya araştırmadan ayrılma durumunda öğrencilerin akademik başarıları, okul ve öğretmenleriyle olan ilişkileri etkilemeyecektir.

Çalışmada öğrencilerden kimlik belirleyici hiçbir bilgi istenmemektedir. Cevaplar tamamıyla gizli tutulacak ve sadece araştırmacı tarafından değerlendirilecektir.

Uygulamalar, genel olarak kişisel rahatsızlık verecek sorular ve durumlar içermemektedir. Ancak, katılım sırasında sorulardan ya da herhangi başka bir nedenden çocuğunuz kendisini rahatsız hissederse cevaplama işini yarıda bırakıp çıkmakta özgürdür. Bu durumda rahatsızlığın giderilmesi için gereken yardım sağlanacaktır. Çocuğunuz çalışmaya katıldıktan sonra istediği an vazgeçebilir. Böyle bir durumda veri toplama aracını uygulayan kişiye, çalışmayı tamamlamayacağını söylemesi yeterli olacaktır. Çalışmaya katılmamak ya da katıldıktan sonra vazgeçmek çocuğunuza hiçbir sorumluluk getirmeyecektir.

Onay vermeden önce sormak istediğiniz herhangi bir konu varsa sormaktan çekinmeyiniz. Çalışma bittikten sonra da eğer herhangi bir sorunuz, merak ettiğiniz herhangi bir şey olursa araştırmacıya telefon veya e-posta ile ulaşabilirsiniz. Saygılarımla,

Araştırmacı: Elif Kurum

İletişim bilgileri:

Velisi bulunduğum .... sınıfı .... numaralı öğrencisi ....'in yukarıda açıklanan araştırmaya katılmasına izin veriyorum. (Lütfen formu imzaladıktan sonra çocuğunuzla okula geri gönderiniz*).

Tarih: .... /...../.......

İmza:

Veli Adı-Soyadı:

Telefon Numarası :

APPENDIX B

Personal Information Form

Lütfen, eğitim durumunuzu işaretleyiniz.

☐ İlkokul mezunu

☐ Ortaokul mezunu

☐ Lise mezunu

☐ Üniversite mezunu

☐ Lisansüstü eğitim mezunu

Lütfen, çocuğunuz ile ilgili aşağıdaki bilgileri doldurunuz.

Çocuğunuzun doğum tarihi (ay/yıl): ____ /___

Çocuğunuzun cinsiyeti: Kız ☐

Erkek ☐

Aşağıdaki problemleri çocuğunuz hiç yaşadı mı? (birden fazla seçeneği işaretleyebilirsiniz)

Görme problemi ☐ İşitme problemi ☐ Dil güçlüğü ☐ Öğrenme güçlüğü ☐

Eğer evet ise lütfen tanımlayınız (tedavi uygulandıysa açıklayınız)

____

APPENDIX C

Language Background Questionnaire

(1) Lütfen, çocuğunuzun bildiği dilleri **bilgi seviyesine göre**, sıralı bir şekilde yazınız.

1	2	3	4	5

(2) Lütfen, çocuğunuzun bildiği **dilleri öğrenme sırasına göre**, (anadil başta olmak üzere) sıralı bir şekilde yazınız.

1	2	3	4	5

(3) Çocuğunuz bildiği dillere kaç yaşında maruz kalmaya başladı?

Dil	1	2	3	4	5
Yaş					

(4)Lütfen, çocuğunuzun her bir dile **konuşma** bakımından ortalama maruz kalma yüzdesini belirtiniz. (Oranların toplamı %100 olmalıdır)

Dil	1	2	3	4	5
Yüzde					

(5) Lütfen, çocuğunuzun her bir dile **dinleme** bakımından ortalama maruz kalma yüzdesini belirtiniz. (Oranların toplamı %100 olmalıdır)

Dil	1	2	3	4	5
Yüzde					

(6) Lütfen, ok ile gösterilen satıra çocuğunuzun **evde** duyduğu tüm dilleri, ok ile gösterilen sol sütuna evinizde çocuğunuz ile iletişim halinde olan bireyleri yazınız (siz, eşiniz, kardeş, bakıcı, büyükanne, diğer aile üyeleri vb.), ve ilgili satırda her bireyin çocuğunuz ile bu dili/dilleri konuşma oranını yüzdelik olarak belirtiniz. (Oranların toplamı %100 olmalıdır)

ÖRNEK:

	Dil (-leri) buraya yazınız: ↓				
Kişileri buraya yazınız:↓	Türkçe	İngilizce	Almanca		
1.Anne	%60	%40	%0		
2.Baba	%95	%0	%5		

	Dil (-leri) buraya yazınız: ↓				
Kişileri buraya yazınız:↓					
1.					
2.					
3.					
4.					
5.					
6.					

(7)Lütfen, çocuğunuzun **okulda** maruz kaldığı dilleri yazınız.

1	2	3	4	5

(8) Lütfen, çocuğunuzun **okulda** her bir dile konuşma ve dinleme bakımından ortalama maruz kalma oranını yüzdelik olarak belirtiniz. (Oranların toplamı %100 olmalıdır)

Dil					
Yüzde					

(9) Lütfen, çocuğunuzun bildiği her dil için konuşma-anlama-okuma **yeterliliğini** 1'den 10'a kadar olan bir ölçek üzerinde puanlayınız. (1= hiç yeterli değil, 2= çok düşük oranda yeterli, 3= düşük oranda yeterli 4= ortalamanın altında yeterli, 5= yeterli, 6= ortalamanın üstünde yeterli, 7= iyi düzeyde, 8= çok iyi düzeyde, 9= üstün düzeyde, 10= mükemmel)

Dil:

Bu dil benim çocuğumun Ana / İkinci / Üçüncü / Dördüncü / Beşinci dilidir.

Konuşma	1 2 3 4 5 6 7 8 9 10
Anlama	1 2 3 4 5 6 7 8 9 10
Okuma	1 2 3 4 5 6 7 8 9 10

Dil:

Bu dil benim çocuğumun Ana / İkinci / Üçüncü / Dördüncü / Beşinci dilidir.

Konuşma	1 2 3 4 5 6 7 8 9 10
Anlama	1 2 3 4 5 6 7 8 9 10
Okuma	1 2 3 4 5 6 7 8 9 10

Dil:

Bu dil benim çocuğumun Ana / İkinci / Üçüncü / Dördüncü / Beşinci dilidir.

Konuşma	1 2 3 4 5 6 7 8 9 10
Anlama	1 2 3 4 5 6 7 8 9 10
Okuma	1 2 3 4 5 6 7 8 9 10

Dil:

Bu dil benim çocuğumun Ana / İkinci / Üçüncü / Dördüncü / Beşinci dilidir.

Konuşma	1 2 3 4 5 6 7 8 9 10
Anlama	1 2 3 4 5 6 7 8 9 10
Okuma	1 2 3 4 5 6 7 8 9 10

Dil:

Bu dil benim çocuğumun Ana / İkinci / Üçüncü / Dördüncü / Beşinci dilidir.

Konuşma	1 2 3 4 5 6 7 8 9 10
Anlama	1 2 3 4 5 6 7 8 9 10
Okuma	1 2 3 4 5 6 7 8 9 10

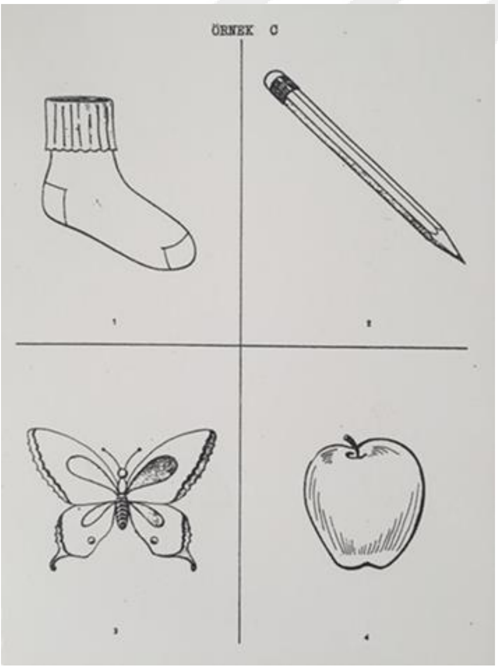
Katılımınız için çok teşekkür ederim.

APPENDIX D

Peabody Picture Vocabulary Test

8 yaş öncesi için yönerge: “Seninle bir çalışma yapacağız. Bu karttaki bütün resimlere bak (Her birini göstererek). Şimdi sana bir sözcük söyleyeceğim ve senin bu sözcüğe ait olan resme parmağını koymanı istiyorum. Hadi deneyelim. Parmağını “Kedi” resmi üzerine koy. Aferin, şimdi sana başka resimler göstereceğim. Her defasında bir sözcük söyleyeceğim, sen bana resmi bulacaksın. Bir süre sonra belki bazı sözcüklerin resimlerinin hangisi olduğundan emin olmayabilirsin, ancak ben senden tüm resimlere bakarak doğru olduğunu düşündüğün birini seçmeni istiyorum. Şimdi başlayalım. Bana “Kalemi” parmağınla göster.

8 yaş ve üstü çocuklar için yönerge: Sana bazı resimler göstermek istiyorum. Bak, bu kartta dört resim var, her birisi numaralanmış. (numarayı göstererek). Ben sana bir sözcük söyleyeceğim, daha sonra senin bana bu sözcüğü en iyi açıklayan resmi göstermeni isteyeceğim. Hadi bir tane deneyelim. Bana “Kalem” sözcüğünü en iyi tanımlayan resmi göster.




PEABODY RESİM - KELİME TESTİ

Adı ve Soyadı	:	Test Tarihi	:
Oturduğu Yer	Şehir Merkezi ☐ Gecekondu ☐ Köy ☐	Doğum Tarihi	:
Ulaşılan Son Madde Numarası	: Hata Sayısı :	Takvim Yaşı	:
Aldığı Puan	:	ALICI DİL YAŞI	:

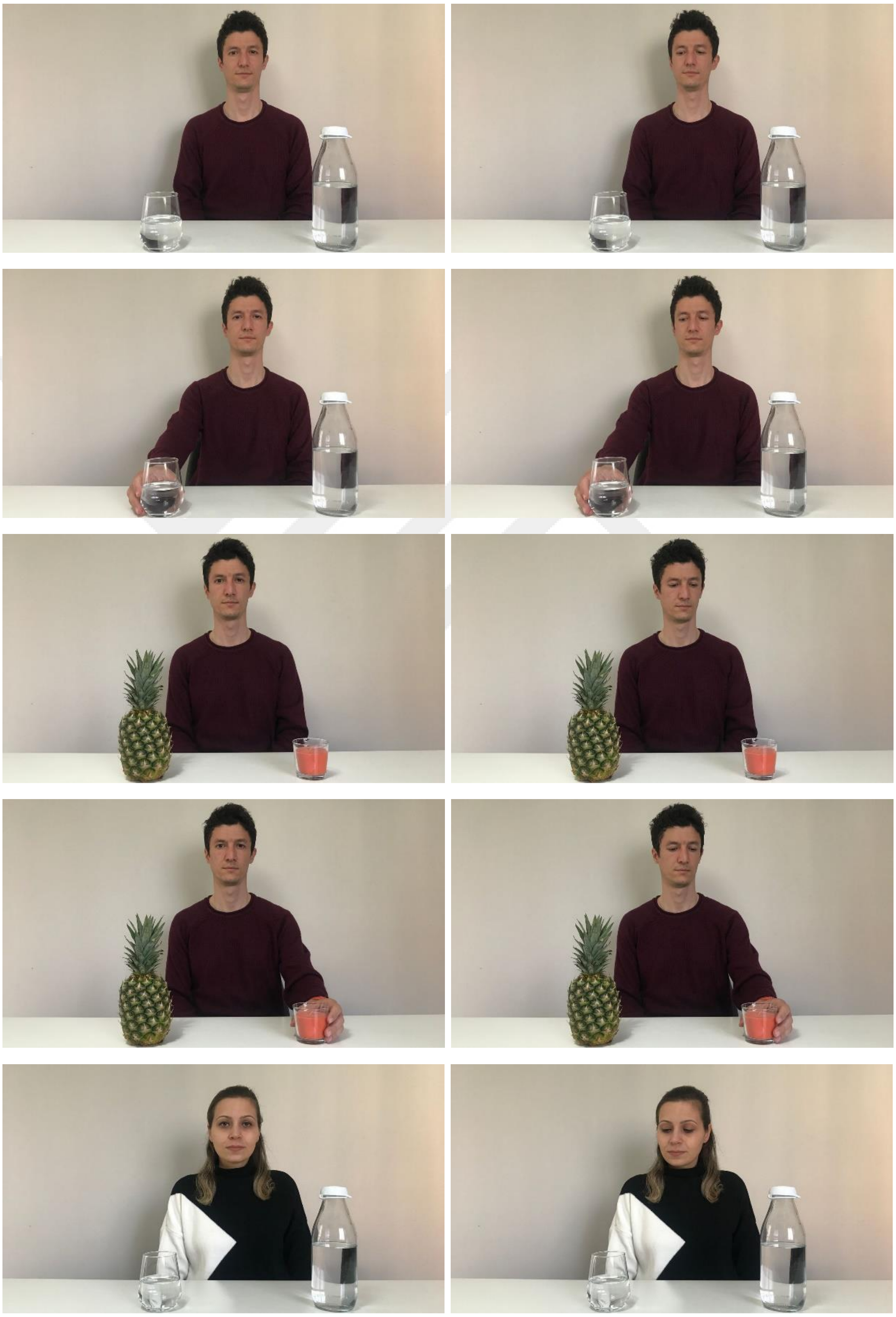
Sıra	Kelime	Anh.	Cevap	Sıra	Kelime	Anh.	Cevap	Sıra	Kelime	Anh.	Cevap
1.	Köpek	(3)		34.	Lamba	(1)		67.	Yaya	(2)	
2.	Makas	(3)		35.	[illegible]	(4)		68.	Kadeh	(4)	
3.	Ayakkabı	(4)		36.	Kemiren	(1)		69.	Ambulans	(2)	
4.	Parmak	(4)		37.	Sıçan	(1)		70.	Nem	(4)	
5.	At	(2)		38.	Toplayan	(2)		71.	Yağlama	(1)	
6.	Otobüs	(4)		39.	Tırmanan	(2)		72.	Değerlendirme	(3)	
7.	Çocuklar	(2)		40.	Yay	(2)		73.	Dehşet	(1)	
8.	Oturan	(3)		41.	Külah	(2)		74.	Küre	(1)	
9.	Masa	(2)		42.	Cımbız	(1)		75.	Profesör	(4)	
10.	Para	(4)		43.	İşaret	(1)		76.	Isı	(3)	
11.	Merdiven	(3)		44.	Örümcek Ağı	(3)		77.	Lehimleme	(4)	
12.	Ceket	(2)		45.	Yardım	(4)		78.	Memnuniyet	(2)	
13.	Yılan	(1)		46.	Çalan	(4)		79.	Mors	(3)	
14.	Çivi	(1)		47.	Esneyen	(2)		80.	Çapara	(1)	
15.	Kayık	(3)		48.	Fidan	(2)		81.	Eşek Arısı	(3)	
16.	Kaplumbağa	(4)		49.	Kanca	(2)		82.	İzleme	(2)	
17.	Zil	(1)		50.	Yüklü	(2)		83.	Güveç	(2)	
18.	Sandık	(2)		51.	Lokomotif	(1)		84.	Budist Rahip	(1)	
19.	Lastik	(3)		52.	Balina	(2)		85.	Hayret	(3)	
20.	Saklanan	(4)		53.	Saldıran	(4)		86.	Eyer	(4)	
21.	Uçurtma	(1)		54.	Sevinç	(3)		87.	Dere	(3)	
22.	Yüzük	(2)		55.	[illegible]	(2)		88.	Kemer	(3)	
23.	Süs	(4)		56.	Kemirici	(2)		89.	Kaplan	(1)	
24.	Böcek	(1)		57.	Sonbahar	(2)		90.	Kimyager	(4)	
25.	Makara	(4)		58.	Yelkenli	(4)		91.	Hendek	(2)	
26.	Vuran	(2)		59.	Petek	(2)		92.	[illegible]	(1)	
27.	Öğretmen	(2)		60.	Zaman	(1)		93.	[illegible]	(1)	
28.	Silah	(2)		61.	Dengeleyen	(1)		94.	Trabzan	(3)	
29.	Berber	(2)		62.	İnşaat	(3)		95.	Konut	(4)	
30.	Pişiren	(4)		63.	Sıralayan	(1)		96.	[illegible]	(3)	
31.	Ekin Toplayan	(4)		64.	Engel	(2)		97.	Saz	(2)	
32.	Paraşüt	(3)		65.	Stadyum	(1)		98.	Vaha	(1)	
33.	Çeken	(1)		66.	Nehir	(1)		99.	Casusluk	(4)	
								100.	[illegible]	(3)	

TEST GÖZLEMLERİ: ....

Uygulayan Uzman:

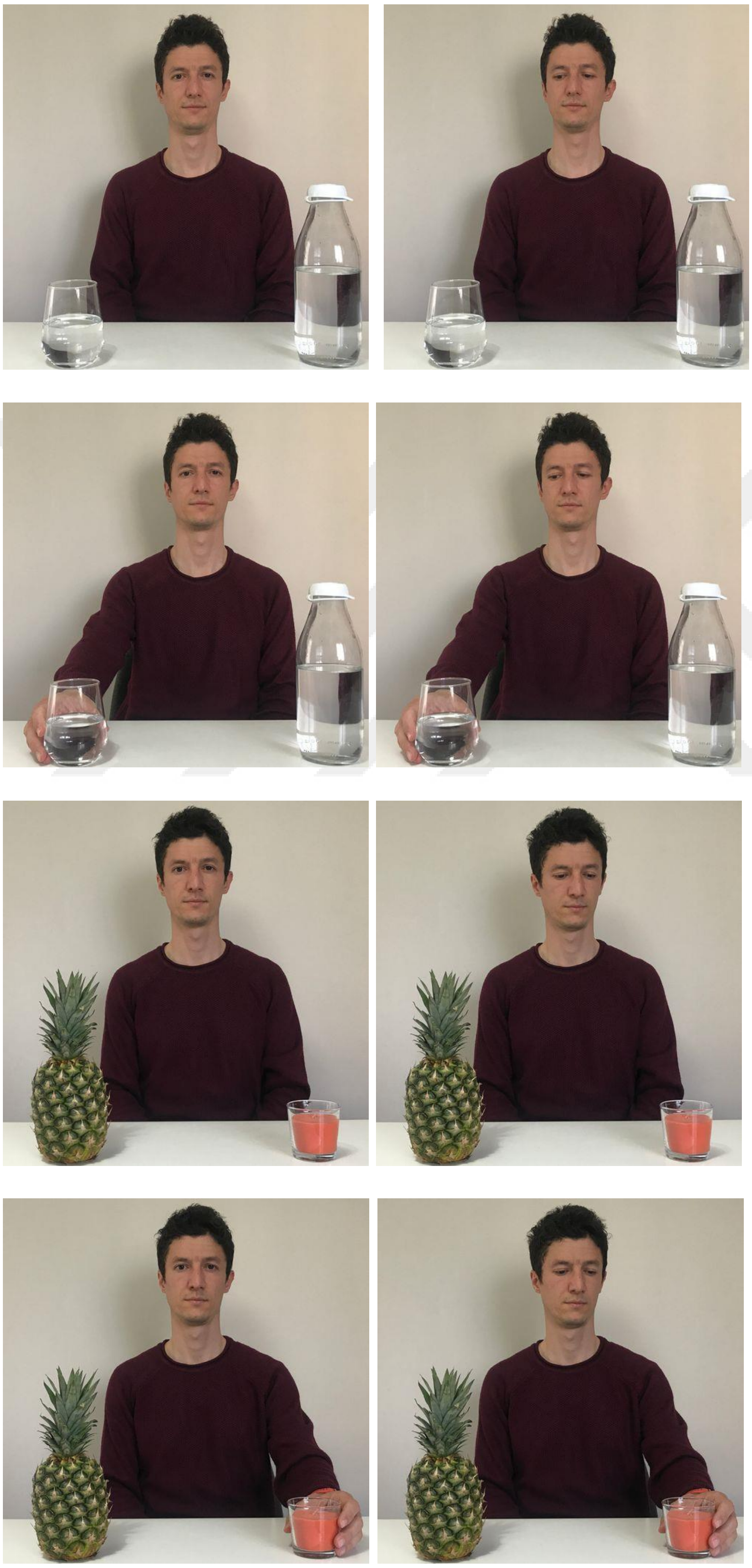
APPENDIX E

Photographs Used in Experiment 1



APPENDIX F

Photographs Used in Experiment 2







APPENDIX G

Photographs Used in Experiment 3








APPENDIX H

Ethical Approval

T.C.
İZMİR VALİLİĞİ
İl Millî Eğitim Müdürlüğü

Sayı : E-12018877-604.01.02-23408945 31/03/2021
Konu : Araştırma İzni- Elif KURUM

VALİLİK MAKAMINA

İlgi : a) MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 21.01.2020 tarihli ve 81576613-10.06.02-E.1563890 sayılı yazısı (Genelge 2020/2).
b) Yaşar Üniversitesi Rektörlüğünün 11.03.2021 tarihli ve 3286 sayılı yazısı.

Yaşar Üniversitesi Lisansüstü Eğitim Enstitüsü Psikoloji İngilizce Tezli Yüksek Lisans Programı 19300024002 numaralı öğrencisi Elif KURUM' un, "Çocuklarda Görsel-Uzaysal Bakış Açısı Alma Becerisi: Dilin ve Pragmatik İpuçlarının Etkisi" konulu tez çalışmasını Müdürlüğümüz Bornova, Karşıyaka, Konak, Narlıdere İlçelerine bağlı resmi ve özel ilkokullarda uygulama isteği ilgi (b) yazı ile belirtilmektedir.

Söz konusu araştırma çalışması uygulanmasının, Bornova, Karşıyaka, Konak, Narlıdere İlçelerine bağlı resmi ve özel ilkokullarda 2020-2021 eğitim öğretim yılında, eğitim öğretimi aksatmayacak ve eğitim kurumu yöneticilerinin uygun gördüğü şekilde yapılması Müdürlüğümüzce uygun görülmektedir.

Makamlarınızca da uygun görüldüğü takdirde olurlarınızı arz ederim.

Dr. Ömer YAHŞİ
Milli Eğitim Müdürü

OLUR
Erhan GÜNAY
Vali a.
Vali Yardımcısı

Ek:
1-Araştırma Değerlendirme Formu (1 Sayfa)
2-Anket Formları (41 Sayfa)

Bu belge güvenli elektronik imza ile imzalanmıştır.

Adres : Fevzipaşa mh. 452 sk. no:15 konak/ İZMİR
Belge Doğrulama Adresi : https://www.turkiye.gov.tr/meb-ebys
Bilgi için: Dudu ALP Bilgisayar İşletmeni
Telefon No : 0 (232) 280 36 31
Unvan : Bilgisayar İşletmeni
E-Posta: strateji35_1@meb.gov.tr
İnternet Adresi: Faks:2322803547
Kep Adresi : meb@hs01.kep.tr

Bu evrak güvenli elektronik imza ile imzalanmıştır. https://evraksorgu.meb.gov.tr adresinden f01e-0671-3c8c-b666-d79d koduyla teyit edilebilir.

T.C.
İZMİR VALİLİĞİ
İl Millî Eğitim Müdürlüğü

Sayı : E-12018877-604.01.02-31063476 07/09/2021
Konu : Araştırma İzni - Elif KURUM

VALİLİK MAKAMINA

İlgi : a) MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 21.01.2020 tarihli ve 81576613-10.06.02-E.1563890 sayılı yazısı (Genelge 2020/2).
b) Yaşar Üniversitesi Rektörlüğünün 26.08.2021 tarihli ve E-30694532-302.14.08-11088 sayılı yazısı.

Yaşar Üniversitesi Lisansüstü Eğitim Enstitüsü Psikoloji İngilizce Tezli Yüksek Lisans Programı 19300024002 numaralı öğrencisi Elif KURUM' un, "Çocuklarda Görsel-Uzaysal Bakış Açısı Alma Becerisi: Dilin ve Pragmatik İpuçlarının Etkisi" konulu tez çalışmasını İlimize bağlı resmi ve özel İlkokullarda uygulama isteği ilgi (b) yazıda belirtilmektedir.

Söz konusu ölçeklerin uygulanmasının, İlimize bağlı İlkokullarda 2021-2022 Eğitim öğretim yılında eğitim öğretimi aksatmayacak ve eğitim kurumu yöneticilerinin uygun gördüğü şekilde yapılması Müdürlüğümüzce uygun görülmektedir.

Makamlarınızca da uygun görüldüğü takdirde olurlarınıza arz ederim.

Dr. Murat Mücahit YENTÜR
Milli Eğitim Müdürü

OLUR
Sultan DOĞRU
Vali a.
Vali Yardımcısı

Ek:
1-Araştırma Değerlendirme Formu (1 Sayfa)
2-Anket Formları (24 Sayfa)

Bu belge güvenli elektronik imza ile imzalanmıştır.

Adres : Fevzipaşa mh. 452 sk. no:15 konak/ İZMİR
Telefon No : 0 (232) 280 36 31
E-Posta: strateji35_1@meb.gov.tr
Kep Adresi : meb@hs01.kep.tr

Belge Doğrulama Adresi : https://www.turkiye.gov.tr/meb-ebys
Bilgi için: Dudu ALP Bilgisayar İşletmeni
Unvan : Bilgisayar İşletmeni
İnternet Adresi: Faks:2322803547

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