Investigation of the relationships between preschool children's theory of mind skills and symbolic representations in drawings

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ABSTRACT

This research was conducted to evaluate whether there is a relationship between symbolic representations in preschool children's drawings, Theory of Mind (ToM) skills, and age. The research used a correlational survey design. The study group consisted of 120 children aged 4–6 years. Data collection tools were "Theory of Mind Tasks," "Representational Drawing Tasks," and a "Personal Information Form." In the first application, the tests were administered individually and face-to-face to the children. In the second application, the children's drawings were evaluated. As a result of the analyses, it was determined that children's representational drawing success scores increased with age and that girls had higher scores than boys. Furthermore, it was concluded that the sub-dimensions of theory-of-mind skills were significantly related to representational skills in drawings.

KEYWORDS: Theory of mind; Symbolic representations; Preschool; Drawing; Child; Early childhood

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1. Introduction

The concept of representation is broadly defined as the mental evocation of events, phenomena, and objects through symbols or images, and it plays a central role in cognitive development (Bakırcıoğlu, 2012; Bredekamp, 2015). Symbolic representation, in particular, involves mentally associating one object or situation with another to form the basis for a wide array of cognitive and linguistic abilities. As Berk (2015) noted, symbolic skills are expressed through mental images and conceptual groupings, contributing directly to thinking, language development, and imitation.

Building on Piaget's theory of cognitive development, the "symbolic function substage" between ages 2 and 4 marks a developmental milestone in which children become capable of mentally representing unseen objects or situations. However, representational abilities at this stage are not without limitations; egocentrism and animism may hinder children's ability to differentiate between internal representations and external realities (Santrock, 2011). A substantial body of research (Gopnik & Slaughter, 1991; Gopnik & Meltzoff, 1997) has investigated how symbolic functioning contributes to the emergence of Theory of Mind (ToM). Between the ages of 3 and 5, children begin to understand that others may hold beliefs that differ from reality, an insight that marks a critical stage in ToM development (Wellman et al., 2001).

In general terms, "Theory of Mind" is the ability to attribute independent mental states to both ourselves and others to predict and explain behavior (Premack & Woodruff, 1978; Wellman, 2020).

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Perner (1999) and Baron-Cohen et al. (1985) argue that ToM involves not only the recognition of others' beliefs and intentions, but also an internal monitoring of one's own mental states. Gopnik and Meltzoff (1997) determined that when children can report their own mental states, they can also report the mental states of others. Early studies focused primarily on demonstrating normative development, identifying simple desire around age 2 (Wellman & Woolley, 1990), beliefs around ages 3–6 (Wellman et al., 2001; Wimmer & Perner, 1983), and more advanced aspects of the theory of mind in middle childhood and beyond (Carpendale & Chandler, 1996).

Subsequent studies have examined factors that cause individual differences, such as theory of mind and language (Jenkins & Astington, 1996) and demographic characteristics (Cutting & Dunn, 1999). Doherty (2009) identified ToM as inherently tied to mental representation, while Keskin (2005, 2010) provided empirical support for this relationship, showing that children with more advanced ToM skills produce richer symbolic representations in both artistic and play contexts. Most studies have emphasized verbal (Hou et al., 2023; Hughes, 2011; Jenkins & Astington, 1996; Lillard & Kavanaugh, 2014) or social indicators (Güven et al., 2019; Hou et al., 2023; McCormick et al., 2022), while the representational aspect, particularly in visual formats such as drawings, remains less thoroughly investigated.

Walker and Murachver (2012) suggested that symbolic function and language may stem from a shared cognitive base linked to ToM. Granti (2004) demonstrated that ToM abilities begin to emerge around age four, as indicated by false-belief tasks and mental-state vocabulary assessments. Keskin (2005) further supported this by identifying connections between imaginative role-play and ToM development. Drawings as symbolic artifacts have long been recognized as valuable indicators of children's cognitive, psychomotor, and emotional development (Keskin, 2010). Beyond mere expression, drawings serve as windows for children's internal representation of the world (Thomas & Silk, 1990; Kındap & Sayıl, 2005). Thompson (1995, 2006) highlighted how visual arts allow children to communicate complex ideas through nonverbal modes, and Liben (2009) stressed the cognitive benefits of early exposure to symbolic tools such as books, maps, and drawings.

Despite this recognition, empirical work connecting children's visual-symbolic expressions to ToM development remains scarce. Recent Turkish studies have added valuable cultural context by exploring ToM in relation to social problem solving (Arslan, 2021), story comprehension (Sarı & Altun, 2018), and developmental predictors (Arıkan & Tüfekçi, 2020). However, these studies similarly prioritize behavioral or verbal measures, overlooking visual-symbolic outputs such as drawing. This study focuses on identifying which symbolic elements are present in preschool children's drawings, examining whether these symbolic representations are connected to ToM abilities, and investigating the possible relationships between symbolic representations and ToM changes across age and gender.

1.1. Research Questions

1. Does the theory of mind development differ by age in four, five, and six-year-old children?
2. Does the theory of mind development differ by gender among four-, five-, and six-year-old children?
3. Do symbolic drawing scores differ by age in four, five, and six-year-old children?
4. Do symbolic drawing scores differ by gender among four-, five-, and six-year-old children?
5. Does the relationship between theory of mind tasks and symbolic drawing scores vary by age?

6. Does the relationship between theory of mind tasks and symbolic drawing scores vary by gender?

2. Method

2.1. Research Design

This study was designed using a relational survey model, which is a quantitative research method. The survey model aims to describe a past or present situation as it exists (Karasar, 2011, p. 77). The relational screening model aims to examine the degrees of relationship that exist or are thought to exist between two or more variables, as well as the ways in which the variables influence each other and their changes simultaneously (Karasar, 2019).

2.2. Participants and Procedure

The study group consisted of 120 children aged 4–6 attending two public kindergartens in a city center in the Black Sea Region of Turkey. Forty children of all age groups were included in this study. The study group was selected using an easy sampling method, which involves including individuals or groups in a study based on the researcher's reach or accessibility (Ekiz, 2009, p. 106). Table 1 shows the demographic characteristics of the study groups.

Table 1 ***Distribution of children by age and gender***

Category		
Age	4 years old	51 (42.5%)
	5 years old	37 (30.8%)
	6 years old	32 (26.7%)
	Total	120 (100.0%)
Gender	Girl	63 (52.5%)
	Boy	57 (47.5%)
	Total	120 (100.0%)

Table 1 shows the distribution of study groups according to age and sex. Accordingly, the number of 4-year-old children was 51 (42.5%); the number of 5-year-old children was 37 (30.8%); and the number of 6-year-old children was 32 (26.7%). Regarding sex distribution, 63 girls (52.5%) and 57 boys (47.5%) comprised the study group.

2.3. Data Collection Tools

Data were collected using a personal information form; the First-Degree False Belief Task, the Second-Degree False Belief Task, and the Faux Pas (making a blunder and understanding blunder) Test to determine theory of mind skills; and Golomb and Farmer's (1983) tasks "Draw children playing" and "Draw a landscape with trees, flowers and a lake in it" for representative drawings.

2.3.1. The First-Degree False Belief Task

The first-degree false-belief task was developed by Baron-Cohen et al. (1985). Using the false-belief task at the first degree, they aimed to measure one person's understanding of another's false belief. The Sally-Anne paradigm: Sally and Anne are two toy characters. First, Sally places a marble in her

basket. She then leaves the stage, and Anne moves the marble and hides it in her own basket. Then Sally comes back. Question: "Where will Sally look for her marble?" If the child points to the marble's old location, he or she passes the False Belief question. If the child points to the marble's current location, he or she fails because the child does not consider Sally's belief.

2.3.2. The Second-Degree False Belief Task

Second-degree false-belief tasks were developed by Stone et al. (1998). These tasks have a more complex structure than first-degree false belief tasks. In second-order false-belief tasks, one is expected to attribute false beliefs to the person in the story. Story: Martha and Oliver talk in the kitchen. Oliver is eating cookies. Oliver leaves the room. Martha closes the cookie box and places it in the closet. Oliver looks through the keyhole when he is out of the room and sees Martha moving the cookies. Belief question: "Where does Martha think Oliver thinks the cookies are?" If the child points to the table, he or she will be successful. If the child shows the locker, it fails.

2.3.3. Faux Pas Comprehension Task

Faux Pas tasks involve more complex structures, such as metaphors and irony, and are the highest-level tasks of the theory of mind (Stone et al., 1998). Story: Anne has had a big wedding and many gifts. Jeanette bought Anne a crystal bowl at a wedding. One year later, Jeanette was at Anne's for dinner. Jeanette accidentally dropped a wine bottle onto the crystal bowl, shattering it. Jeanette said, "I am so sorry, I broke the bowl." Anne's mom says, "Do not worry, I have never loved it anyway. Someone gave it to me for my wedding." Questions: (1) "Has a person said something that they should not have said?" (2) "Who is it that says something that they should not?" (3) "Why is what Anne says something that should not be said?" (4) "How did Jeanette feel?"

2.3.4. Application of Theory of Mind Tasks

For theory-of-mind tasks, the researchers worked one-on-one with the children in a quiet room at the school. Cerrah-Özsevgeç and Kontaş (2021) evaluated children's theory-of-mind skills using Turkish translations of theoretical scenarios that were animated for the study. While the children were watching the animations, the researcher told them the story. At the end of the animation developed for each task, the children were asked questions. Children who answered three questions correctly in each task were classified as "passed the test," while those who failed to answer were classified as "did not pass the test."

2.3.5. Representative Drawing Tasks

To determine the children's representative drawing achievements, Golomb and Farmer's (1983) tasks "Draw children playing" and "Draw a landscape with trees, flowers, and lakes" were used in the study. To determine representative drawing success scores, the Representative Drawing Success Criterion Evaluation Form developed by Kındap (2004) was used.

2.3.6. Implementation of Representative Drawing Tasks

During the application, the children were given A4-sized paper and crayons. Each of the two paintings was made two weeks apart, and the application was carried out in groups, with attention paid to seating arrangements to prevent the children from affecting one another. Before starting the picture, the children were given instructions: "Draw children playing" and "Draw a landscape with trees, flowers, and a lake."

2.4. Data Analysis

Data analysis was performed using SPSS, and the results were evaluated at the 95% confidence level. Two raters evaluated the children's drawings separately. The harmony among the evaluators was analyzed using correlation, and Kendall's tau-b tests; the differences in achievement scores by age

were analyzed using ANOVA, and the differences by gender were analyzed using t-tests. The relationship between the sub-dimensions of the theory of mind was analyzed using the chi-square test.

2.5. Validity, Reliability, and Ethical Considerations

The correlation and Kendall's tau-b analyses used to determine the compatibility of the 1st and 2nd scoring evaluations are shown in Tables 2 and 3. According to the analysis, there was a high level of correlation (r=0.896) and agreement (b=0.753) between the 1st and 2nd scoring of the Children Playing Drawing (p=0.000). Similarly, there was a high level of correlation (r=0.918) and agreement (b=0.773) between the 1st and 2nd Landscape Drawing scores (p=0.000).

Table 2 ***Harmony of the evaluators of the drawing of children at play***

	Correlation	Kendall's Tau b
Evaluation – Rater 1		
Coefficient	0.896	0.753
p	0.000*	0.000*
n	120	120

* $p < 0.05$

The correlation and Kendall's Tau-b analyses to determine the compatibility of the 1st scoring and 2nd scoring evaluations of the Children at Play Drawing are shown in the table. According to the analysis, there was a high level of correlation (r=0.896) and agreement (b=0.753) between the 1st and 2nd scorings of the Children Playing Drawing (p=0.000).

Table 3 ***Harmony of the evaluators of the landscape drawing***

	Correlation	Kendall's Tau b
Evaluation – Rater 1		
Coefficient	0.918	0.773
p	0.000*	0.000*
n	120	120

The correlation and Kendall's Tau b analyses to determine the compatibility of the 1st scoring and 2nd scoring evaluations of the Landscape Drawing are shown in the table. According to the analysis, there was a high level of correlation (r=0.918) and agreement (b=0.773) between the 1st and 2nd Landscape Drawing scores (p=0.000).

Ethical considerations: Permission and consent to conduct this research were obtained from the relevant institutions, schools, and the children's families.

3. Findings

Table 4 *Examining the age variability of scores*

	Age	n	Mean	SD	F
Evaluation – children playing	4 years old	51	18.78	5.83	6.786
	5 years old	37	21.91	4.54	
	6 years old	32	22.88	5.45	
Evaluation – Landscape Drawing	4 years old	51	18.29	5.57	12.313
	5 years old	37	20.72	5.27	
	6 years old	32	24.28	5.08	
Representational Drawing Success	4 years old	51	37.08	10.45	10.404
	5 years old	37	42.62	9.39	
	6 years old	32	47.16	9.82	

The results of the ANOVA test are presented in Table 4. According to the analysis, there were significant differences in scores for Children Playing (p=0.002), Landscape Drawing (p=0.000), and Representative Drawing Success (p=0.000). When the average scores were examined by age group, it was observed that children's success in representative drawing increased with age.

Table 5 *Examining the gender variation of scores*

	Gender	Average	SD	t	p
Rating – children playing	Girl	63	22.17	5.67	2.821 / p=0.006*
	Boy	57	19.36	5.21	
Evaluation – Landscape Drawing	Girl	63	21.91	5.73	2.574 / p=0.011*
	Boy	57	19.23	5.68	
Representational Drawing Success	Girl	63	44.09	10.71	2.890 / p=0.005*
	Boy	57	38.59	10.06	

The results of the t-test examining differences in scores by gender are shown in Table 5. According to the analysis, there were significant differences in scores for Playing Children (p=0.006), Landscape (p=0.011), and Representative Drawing Success (p=0.005) between girls and boys, with girls scoring higher than boys.

Table 6 *Comparison of representative drawing success with first-degree false belief success*

Representational Drawing Success	n	Average	SD	t	p
0 (Failed)	37	35.43	9.26	−4.431	0.000*
1 (Passed)	83	44.17	10.27		

According to the analysis, there was a significant difference between first-degree false beliefs and success in representative drawing (p=0.000). While the mean representative drawing success score of those who failed the first-degree false belief task was 35.43, the mean score of the children who passed was 44.17.

Table 7 *Comparison of representative drawing success with second-order false belief success*

Representational Drawing Success	n	Average	SD	t	p
0 (Failed)	77	38.44	9.41	−4.463	0.000*
1 (Passed)	43	46.91	10.90		

According to the analysis, there was a significant difference between second-degree false belief and success in representative drawing (p=0.000). While the mean score for those who failed the second-degree false belief task was 38.44, the mean score for those who passed was 46.91.

Table 8 *Comparison of representative drawing success with Faux Pas success*

Representational Drawing Success	n	Average	SD	t	p
0 (Failed)	102	40.16	9.94	−3.325	0.001*
1 (Passed)	18	48.92	12.22		

* $p < 0.05$

According to the analysis, there was a significant difference in the Representative Drawing Success of the achievements in the Faux Pas task (p=0.001). The mean score for those who failed the Faux Pas task was 40.16, whereas it was 48.92 for those who succeeded.

Table 9 *Investigation of the relationship between age and theory of mind tasks*

		4 years old n (%)	5 years old n (%)	6 years old n (%)	Chi-square / p
First-degree false belief	0 (Failed)	20 (39.2%)	9 (24.3%)	8 (25.0%)	χ^2=2.926, p=0.232
	1 (Passed)	31 (60.8%)	28 (75.7%)	24 (75.0%)	
Second-degree false belief	0 (Failed)	44 (86.3%)	18 (48.6%)	15 (46.9%)	χ^2=18.877, p=0.000*
	1 (Passed)	7 (13.7%)	19 (51.4%)	17 (53.1%)	

		4 years old n (%)	5 years old n (%)	6 years old n (%)	Chi-square / p
Faux Pas	0 (Failed)	51 (100.0%)	29 (78.4%)	22 (68.8%)	χ^2=16.900, p=0.000*
	1 (Passed)	0 (0.0%)	8 (21.6%)	10 (31.3%)	

The results of the chi-square test examining the relationship between age and theory-of-mind tasks are presented in Table 9. While there is no significant relationship between age and first-degree false belief (p=0.232), there is a significant relationship between second-degree false belief (p=0.000) and Faux Pas (p=0.000). As age increases, second-degree false belief and Faux Pas success increase.

Table 10 ***Investigation of the relationship between gender and theory of mind tasks***

		Girl n (%)	Boy n (%)	Chi-square / p
First-degree false belief	0 (Failed)	18 (28.6%)	19 (33.3%)	χ^2=0.318, p=0.573
	1 (Passed)	45 (71.4%)	38 (66.7%)	
Second-degree false belief	0 (Failed)	41 (65.1%)	36 (63.2%)	χ^2=0.001, p=0.977
	1 (Passed)	22 (34.9%)	21 (36.8%)	
Faux Pas	0 (Failed)	54 (85.7%)	48 (84.2%)	χ^2=0.000, p=1.000
	1 (Passed)	9 (14.3%)	9 (15.8%)	

There was no significant relationship between gender and first-degree false beliefs (p=0.573), second-degree false beliefs (p=0.977), and Faux Pas (p=1.000).

4. Discussion

This study aimed to determine whether there is an age-related relationship between preschool children's symbolic representations in drawings and their theory of mind (ToM) skills. The findings obtained from this study are discussed in light of existing literature.

The study revealed that children's scores on symbolic drawing increased with age (4, 5, and 6 years). This finding is consistent with the developmental literature (Malchiodi, 2013; Santrock, 2011) and with other studies (Gopnik & Slaughter, 1991; Kındap, 2004; Papandreou & Gousiou, 2020). Gopnik and Slaughter (1991) found that four-year-olds can report all their past mental states, including beliefs, compared to three-year-olds. Kındap (2004) determined that symbolic drawing achievement increases significantly with preschool age. Papandreou and Gousiou (2020) demonstrated that an increase in symbolic expression in children's drawings during the preschool period reflects the development of their mental representational capacity.

The findings also indicated that girls scored higher than boys on symbolic drawing tasks. Studies (Gardner, 1982; Kındap, 2004; Stuart, 1981, as cited in Malchiodi, 2013) show that girls perform better in symbolic representation tasks and that their more developed fine motor skills contribute to creating more realistic symbolic representations in their drawings.

This study also found a significant relationship between ToM skills (first-order false belief, second-order false belief, and faux-pas tasks) and success in symbolic drawing. This finding aligns with the literature, which considers symbolic representation as a foundational component of the theory of

mind (Walker & Murachver, 2012; Keskin, 2010). Research has shown that symbolic representations reflect not only cognitive development, but also social cognition (Lillard, 2021). Wimmer and Perner (1983) demonstrated that in tests of false beliefs and perspective-taking among children aged 3–9, children aged 4–6 show an emerging ability to represent the relationship between the mental states of two or more persons.

The findings showed that theory-of-mind skills improved with age. This finding fits the developmental framework proposed by Astington and Edward (2010). The results of studies by Flavell et al. (1992), Granti (2004), Ünlütabak (2012), and Cerrah-Özsevgeç and Kontaş (2015) with preschool children aged 3–5 support our findings. In this study, no significant difference was found between boys and girls in theory-of-mind performance. This result is consistent with the findings of similar studies (Arıkan & Tüfekçi, 2020; Ersoy, 2023; Güven et al., 2019; Kontaş, 2015). Baron-Cohen et al. (1999) also reported that girls performed significantly better than boys (approximately 2 years earlier) on advanced theory-of-mind tasks, such as faux pas, which may be linked to earlier development of language and social skills in girls (Kavanaugh & Engel, 2022).

4.1. Limitations and Future Directions

The limitations of this study are that the sample was restricted to children aged 4–6 attending public kindergartens in a region with similar socio-cultural characteristics, that children's Theory of Mind skills were evaluated according to symbolic representations in their drawings, and that the evaluation of symbolic representation scores in the development of theory of mind was examined according to gender. Future research may yield more comprehensive and generalizable results by including more age groups and considering theory-of-mind skills and variables. In longitudinal and wide-age-range studies, the development of symbolic representations can be examined across a broader age range. Studies conducted with groups of different cultural characteristics will allow comparisons of cultural contexts and theory-of-mind development.

4.2. Recommendations for Educators

Educational activities that support psychomotor, language, and emotional development should be planned and implemented for all children, regardless of their gender. Pretend play and artistic activities should be encouraged from infancy and early childhood onward to foster symbolic thinking and social understanding. Especially for preschool teachers, training should be organized to evaluate children's ToM development and implement supportive educational activities.

4.3. Conclusion

This study aimed to determine how the development of theory of mind in four-, five-, and six-year-old children varies with age, as reflected in their symbolic representations in drawings. The results showed that symbolic drawing scores of preschool children (4–6 years) increased with age, with girls scoring higher than boys. The study shows a significant correlation between theory-of-mind skills (first-order false belief, second-order false belief, and faux-pas tasks) and success in symbolic drawing. Theory of mind skills improve with age. Finally, there was no significant difference between boys and girls in theory-of-mind performance.

5. Declarations

5.1. Author Contributions (CRediT)

Hatice Darga: Conceptualization; Methodology; Investigation; Data curation; Formal analysis; Writing—original draft; Writing—review & editing; Visualization; Project administration.

5.2. Conflict of Interest

The authors declare that they have no known competing financial interests, institutional affiliations, or personal relationships that could have appeared to influence the work reported in this paper.

5.3. Funding Statement

The authors declare they have not received specific financial support for the research.

5.4. Data Availability Statement

Data are available from the corresponding author upon reasonable request.

5.5. Ethics Approval

This study was approved by the Ordu Governorship and Provincial Directorate of National Education (Approval Number: 8802389-44-E.14476266; Approval Date: 22.12.2016). After obtaining permission from the relevant authorities, discussions were held with the school administrators where the research would be conducted. Families were provided with explanatory information, and their consent was requested. Once the families gave their consent, the study commenced.

5.6. Use of Artificial Intelligence (AI) Tools

During the preparation of this work, we used [CHATGPT] on [JUNE 2025]. To save time, we edited the input flow, Method, and Introduction Section. Received help to translate. After using this tool/service, we reviewed and edited the content as needed and take full responsibility for the publication's content.

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