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RESEARCH ARTICLE

SOCIAL COGNITION AND THEORY OF MIND FOR NORMAL DEVELOPMENT PRESCHOOLS CHILDREN

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ABSTRACT

Social cognition and social information are the most notable of human creativities. Social cognition is unlike many regular aspects of teaching subjects, as it requires more natural social interaction to be learned. On the other hand, the Theory of Mind (ToM) has demonstrated that a child's ability to understand people's mental states develops around the age of five or six, the time when children begin to go to preschool. To the author's knowledge, no study in Saudi Arabia has examined ToM among preschool students. Children (n=64) with normal developmental progression at preschools were requested to be evaluated by their parents. Social cognition was evaluated by parents using the Empathy Questionnaire. The ToM test serves as a framework for understanding and then training ToM. The Arabic adaptation version of ToM was used. A group of thirty three (33) children participated in the ToM treatment program and (31)children in a no-treatment control group. Within twelve weeks of ToM interventions, a meaningful improvement was reported in the ToM group's performance on some false belief tasks and no improvement was noted in the control group. The improvement of the social cognition was mainly demonstrated on a parents' Empathy Questionnaire for the ToM treatment program. **Conclusion**: This preliminary study suggests that it is possible to improve ToM skills and empathy skills through training among normal development preschool children. Regardless of specific school programs like peer tutoring or collaborative learning, ToM improvement has implications for preschool children's skills to think critically and to build their self-concept. Therefore, it is recommended that teachers are provided with an easy curriculum for teaching children ToM skills.

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INTRODUCTION

Children experience essential developmental changes at preschool level,. Their cognitive processes become more logical, their perspective and attention becomes more sophisticated. Mainly by age 5-6 years, preschool children obtain the skills to compile their theoretical knowledge of intention/perception and false beliefs (Patnaik, 2008). The most essential development in early childhood social cognition is the development of Theory of Mind (ToM) (Astington, 2010). Children's understanding of ToM has direct implications for their learning in school (Gardner, 2011). Social cognition or ToMis also at the core of preschool children's skills to get along with other people and to see things from their point of view.

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Recently, researchers have proposed links between teaching and ToM, arguing that the ability to learn efficiently depends on the development of ToM. It has been reported that within the preschool age, most children can be taught effectively when using ToM skills (Ding, 2015). TOM has received continued attention because of its impact on peer social relationships in preschool children. The main factor of the importance of investigating children's ToMfor normal development in preschool is that theymight establish their first reasonable theory as a result (Wellman, 1990). This will acknowledge the ToM as a critical skill for competent functioning in school social activities (Astington, 1995). Preschool children frequently provide a kind of psychological justification regarding emotions, thoughts and intentions. Precisely, about 88% of preschool children's justifications for certain actions were psychological justifications. Moreover, in addition to psychological justifications, preschoolers children provide physical justifications for physically caused human actions.

At this age, they could provide psychological justifications for voluntary actions and behavior, but not involuntary ones (Wellman, 2004). Children may start showing some awareness of the difference between thoughts in the mind and things in the real world by the age of 2.For example, in pretend play, children could show that they distinguish between an object (the block in reality) and thoughts about the object (pretend: the block as a car) (Kavanaugh, 2006). At this age, they also could be aware that a person is happy or angry, and that there may be a distinction between what they want and what another person wants (Meltzoff, 1999). The concept of ToM was introduced to psychology by Premack and Woodruff in 1978[10].This concept links with the ability to infer the full range of mental states (beliefs, desires, intentions, imagination, emotions, etc.) which could cause action. It means to be able to reflect on the contents of one's own and others' minds (Baron-Cohen, 2013). Such a cognitive mechanism allows children to recognise the beliefs and intentions of others. Therefore ToM skills are responsible for children's conscious functioning, among others, and its impairment could lead directly to limitations in coping in the social activities at schools and in the real world as well (Epa, 2015).

ToM contains two main components: a cognitive component that involves attributing beliefs and an emotional component that involves attributing emotions and desires. The content of ToM could be extended further to include two essential factors of cognitive ability - Factor One, decoding mental states according to perceived clues (such as tone of voice, body posture or imitated expression) and Factor Two, reasoning about these mental states -that aim to start a processes of integration of both contextual information about the person and information drawn from history (for example, a child's particular knowledge, experience and attitudes) and is intended to recognize the meaning of the behavior (Sabbagh, 2004). In the current study, ToM is defined as a mechanism to attribute mental states to others[14], and includes three levels:

Level one (TOM 1): Preliminary ToM: Atthis level, a child attributes needs, emotions, and other mental states to other children and uses terms such as, I think, I know. They recognize that certain stimuli lead to certain actions or behaviors, and that mental states can be concluded from stimuli-induced actions or behaviors.

For instance, if child lost his toy, he could be sad, not happy.
This level (TOM 1) includes two factors:

Recognition of emotions

Pretense: Level two (TOM 2): First Appearances of a Real ToM. At this level, children understand that the mind is separate from the real world. Preschool children start understandingthat action and behavior in the real world are different from what is in the mind, and they understand false belief tasks.

This level (TOM 2) includes two factors:

- First-order belief
- Recognizing the belief

Level three (TOM 3): Advanced ToM. At this level, Preschool children understand that the mind actively mediates the explanation of the real world.

They will know at this age that previous experiences will affect current mental states including emotions and social understanding.

This level (TOM 3) includes two factors:

- Second-order belief.
- Recognizing humor and faith.

On the other Side, ToMalso comprises apart of a person's empathic ability (Dvash, 2014). Empathy consists of two factors: The cognitive component of empathy which is defined as the ability to imagine or recognize the mental states of other children. The second factor of empathy is defined as the ability to respond to the emotional states of others[12].Empathy as a social cognitive skill and ToMare essential for children and for their everyday communication, interactions and activities at school or at home.Emotion and mainly empathy arethe major medium of children's communication and linkdirectly to their relations with others (Begeer et al., 2008). Although ToM and empathy are assumed to be essential skills enabling preschool children to function adaptively in social activities, no studies have addressed this assumption among normal children among Arabic communities. To address this gap in the Arabic literature, the current study was conducted.

Aim: The hypothesis of the present study is that ToMand empathy skillscould be improved through teaching in the preschool setting and considers the implications for children in this educational stage.

MATERIALS AND METHODS

Participants: A total of 64 normal, developed preschool children (ages 5:7–7:01; Mean 6:3; 28 males, 36 females) were included in the present study based on their parents' voluntary participation. A group of 33 children participated in the teaching ToM group and 31 children comprised the control group. Parents were then requested to evaluate their children in terms of mental ability (IQ test, EQ by Vineland scale, and ADHD, school achievements, school social behavior), which could help to control for potential differences in intelligence and other factors between groups.

Scales:

The Stanford-Binet Intelligence Test (IQ test): The Arabic version of the fifth edition of the Stanford-Binet Intelligence Test (SBITA) was used in the current study. It has good reliability and validity (Hanoura, 2002). The SBITA produces standardized scores with a mean of 100 and a standard deviation of 15 points. SBITA is intended to assess intelligence in four areas, including: Abstract and Visual Reasoning, Quantitative Reasoning, Verbal Reasoning, and Short-term Memory. The total IQ quotient was classified according to the Arabic version into mentally retarded (≤ 67), borderline intelligence (68-78), below average (79-88), average (89-110), above average (111-120), excellent (121-131) and genius (≥ 132) (Alqahtani, 2016).

The Vineland Adaptive Behavior Scales (EQ test): Preschool children's behaviors and skills to function effectively in the social environment was evaluated by the Vineland Adaptive Behavior Scales, Arabic version (VABSA) (Alotibi, 2004).

Social-emotional skills are frequently evaluated with VABSA in the Saudi Arabia community (Alqahtani, 2016). VABSA contains four subscales: Communication, Socialization, Daily Living Skills and Motor Skills. The VABSA provides the information required for an evaluation of several disabilities such as developmental delays, functional skills impairment, and learning disability. The mean total score of the Arabic version of the VABSA was classified as low adaptive behavior (≤ 69), below average (70-84), average (85-115), above average (116-130), and high adaptive behavior (≥ 131) (Alqahtani, 2016).

ADHD test: The Arabic version of the Vanderbilt diagnostic rating scale (Alqahtani, 2010) was used in order to assess attention deficit hyperactivity disorder (ADHD). Recent studies support the utility of the Vanderbilt diagnostic rating scale in the Arabic population as a diagnostic rating scale for ADHD[21]. Teachers and parents were asked to rate on a three-point rating scale (1 = never, 2 = sometimes, 3 = very often) with total scores ranging from 0 to 38. As core of 2 or 3 was considered to be a positive endorsement for each item. The full Arabic version of the Vanderbilt ADHD diagnostic rating scale includes sub domains which evaluate school behavior and performances. Items about school performances were rated on a 5-point rating scale by both parents and teachers. A rating of 1 or 2 is considered to be a positive endorsement for each item.

ToM test: The ToM test[22]was used in the current study. It is a 47-item standardized interview aiming to understand ToM in children from age of 5 yearsto13 years. The interview includes stories and drawings, and focuses on precursors of ToM, including awareness, emotional understanding and pretense. Discriminant validity of the ToM task was supported by fair performances of typically developed children compared to children with psychiatric disorders (i.e., ADHD and autism).

Empathy test: Empathy was measured via the Empathy Questionnaire (Rieffe et al., 2010) which was adapted and translated to Arabic by the current author (Alqahtani, 2016). It measures the level to which preschool children have the correct emotional response to another's emotional situation. This scale includes three sections:

- **Empathy Questionnaire (EmQue):** contains20-items divided into three subscales: Emotion Cognition; Attention to Others' Feelings and Prosocial Actions. Each item was rated on a three-point rating scale (0 = never, 1 = sometimes, 2 =often) with total scores ranging from 0 to 20.
- **Emotion Acknowledgment:** Preschool children's skills to acknowledge emotions were measured by six items. Each item was rated on a five-point rating scale (1 = almost never, 2 = rarely, 3 = sometimes, 4 = often, 5 = almost always).
- **Empathy Observation:** tests children's empathic responses to three emotions that are acted out nonverbally by the examiner/researcher: happiness when clicking with a pen, anger with a pen that fails to write, and pain/sadness upon hurting one's finger. Preschool children's responses were scored on a 20-item checklist (in emotions). Each item was rated on a three-point rating scale (0 = not at all, 1 = a little, 2 = a lot).

In this study, the full empathy questionnaire is a reliable and valid measure of empathy in children (Rieffe et al., 2010; Ketelaar, 2013). The reliability of this scale for this study was determined as Cronbach's alpha 0.83.

Teaching and training ToM: The ToM teaching program includes 12 structured sessions, which gradually focus on the use of ToM skills through 12 weeks. As an initial introduction to ToM, the first two sessions were given directly by trained psychology teachers to parents. Then the other ten sessions were provided by teachers as homework exercises and parents followed the structure of each session at home. ToM homework includes exercises such as listening to other children, making friends, perception, pretend and imitation. Children were trained to focus on the difference between pretend and truth, learning to evaluate a social condition and understanding children's emotions such as anger, happy, and sad. Then homework includes exercises to understand elementary ToM skills, such as placing oneself in the thoughts and feelings of other children (first order reasoning). Understanding pretend and deception are essential factors of this type of first order reasoning, and children are concentrated on deceiving other children who have a different viewpoint on reality than they do.

Data analysis and Presentation: The analysis in the current study focuses on estimating the size and educational importance of the effects of ToM in preschool children based on the sample of the current study, using Time 1 and Time 2 difference score means, ranges, SD, effect sizes and ANOVA, as recommended by the American Psychological Association (Begeer et al., 2011). An ANOVA One-way analysis between the two groups was used to compare how groups differ in gains. Between-group effect sizes were assessed according to Cohen's Effect sizes of 0.8, 0.5 and 0.2, assumed to be large, moderate and small, respectively.

RESULTS

Differences in the sample characteristics were evaluated using Chi-square tests and analyses of variance (ANOVA). The overall scores of the IQ test for both groups showed normal neurobehavioral levels in general with total scores of 98 and 96, for the ToM-taught group and control group, respectively. Also, Vineland total scores showed normal neurobehavioral levels with scores of 102 and 107, for the ToM-taught group and control group, respectively. In general, no significant group differences were found in terms of chronological age, IQ, Vineland score, ADHD score, achievements score, social behavior score, mother's age, mother's educational level ormonthly household income. In Table 1, the descriptive information is shown for all demographic data.

Improvement in Theory of Mind as a Function of Teaching: The descriptive data (means, ranges and the maximum scores) of teaching ToM: Precursors of ToM1, First Manifestations of ToM2, Advanced ToM3 domains and the total score are shown in Table 2. Results show the improvement in all ToM domains and in the total score after teaching and training ToM skills, compared with the control group. The best improvement in the teaching group (Time 2) was for precursors of ToM1and first manifestations of ToM2, with mean scores of 17.1, 17.2, respectively. Limitation of improvement after teaching and training ToM was seen in the advanced ToM3, with mean scores of 3.8.

Table 1. Descriptive information is shown for all demographic data. Chi-square tests and analyses of variance (ANOVA) were used to investigate the differences in the sample characteristics

	ToM Group (n=33)	Control Group (n=31)	Chi-square and ANOVA P
Age: Years, Months	6.2 (1.1)	6.3 (1.4)	.605
IQ: Full score	98 (10.1)	96 (9.4)	.362
Subscale: Verbal reasoning	100.3 (12.2)	100.8 (10.3)	
Subscale: Visual reasoning	105.5(9.8)	107.1(8.8)	
Subscale: Quantitative reasoning	91.1(10.7)	90.0 (9.5)	
Subscale: Short-term memory	96.7 (11.0)	97.2 (10.2)	
Vineland scale (EQ)	102.0 (14.4)	107.7 (12.9)	.921
Subscale: Communication	102.4 (8.3)	109.1(10.5)	
Subscale: Socialization	106.8 (17.4)	108.8 (13.1)	
Subscale: Daily life skills	99.5 (15.6)	101.0 (12.6)	
Subscale: Motor Skills	100.0 (0.5)	100.0 (0.3)	
ADHD	19.1 (4.4)	17.9 (3.8)	.483
Attention Subscale	11.4 (5.2)	11.8 (4.1)	
Hyperactive Subscale	13.3 (3.9)	15.8 (3.7)	
Achievements	5.5 (1.4)	5.2 (1.6)	.092
Less than peers in Reading	4.4 (0.9)	5.0 (1.0)	
Less than peers in Writing	3.7 (1.1)	4.1 (0.8)	
Less than peers in Mathematics	4.8 (1.9)	3.7 (2.0)	
Utilization special educational resources.	6.2 (0.2)	6.8 (0.4)	
Repeat a grade	0.6 (0.5)	0.5 (0.2)	
Social behavior	8.2 (3.7)	7.7 (3.8)	.871
Poor relationships with peers	4.8 (2.3)	4.6 (2.9)	
Poor following rules	2.8 (1.1)	3.1 (1.5)	
Disrupting others	5.8 (1.7)	3.9 (1.6)	
Not doing things properly as peers	1.1 (0.7)	3.2 (1.0)	
Mother's Age, n (%)			
≤ 29	25.3 (9.0)	25.9 (7.6)	.092
30-39	37.9 (5.4)	34.8 (4.7)	
≥ 40	40.1 (11.7)	43.3 (9.9)	
Mother's educational level			
High school or less	8 (3.1)	11 (4.2)	.847
Undergraduate or higher	25 (5.6)	20 (6.1)	
Monthly household income			
< 5000 SR	3 (7.6)	1 (0.1)	.077
5500-10000 SR	17 (2.7)	19 (3.0)	
≥10100 SR	13 (13.9)	11 (11.8)	

Table 2. Mean Scores and Range for TOM-Domains and Subdomains of the two groups over the two times.

Subdomain	Domain (Maximum score for age of 5-7 years)	Pre-Teaching ToM Group Time1		Post-Teaching ToM Group Time2		Control Group Time1		Control Group Time2	
		Mean	Range	Mean	Range	Mean	Range	Mean	Range
Precursors of Theory of Mind	ToM 1 (Max 20)	15.3	14-17	17.1	16-20	14.7	14-17	15.4	15-17
First Manifestations of a Real Theory of Mind	ToM 2 (Max 26)	13.3	10-20	17.2	15-24	12.9	10-20	13.1	14-21
More Advanced Aspects of Theory of Mind	ToM 3 (Max 10)	2.3	2-5	3.8	2-7	3.0	2-4	2.4	3-5
Total ToM	ToM (Max 36)	27.0	25-28	29.0	25-32	26.2	25-27	25.8	14-28

Table 3. Means (SD) and One-way ANOVA between Post-Teaching ToM Group and control group.

		Post-Teaching ToM Group	Control Group	F	P
Precursors of ToM1	Time 1	15.3 (1.4)	14.7 (2.0)	1.18	.007
	Time 2	17.1 (1.6)	15.4 (1.9)		
	Effect size	1.83	.84		
First ToM2	Time 1	13.3 (1.1)	12.9 (0.8)	1.28	.030
	Time 2	17.2 (1.3)	13.1 (1.9)		
	Effect size	1.9	.62		
Advanced ToM3	Time 1	2.3 (0.4)	3.0 (0.6)	.61	.081
	Time 2	3.8 (0.8)	2.4 (0.1.7)		
	Effect size	.71	.43		
Total ToM	Time 1	27.0 (2.9)	26.2 (3.5)	2.93	.009
	Time 2	29.0 (1.8)	25.8 (3.1)		
	Effect size	2.3	.68		

Testing effects of teaching ToM: The effect of teaching ToM was first analyzed in Table 3. When analyzing the improvement on the three subscales of the ToM task, specifically the essential ToM tasks, including precursors of ToM1, first manifestations of ToM2 and the advanced ToM3, there was a fair improvement for the first two subscales compared to the control group, (F1.18, P .007) and (F1.28, P .030), respectively, while no significant improvement was shown in the third subscale of ToM3 (F .61, P .081). The most important and significant result was reported for the total score of the ToM. The teaching group showed significantly more improvement in their ToM understanding than the control group (F 2.93, P .009).

Table 4. Mean, SD, effect sizes and ANOVA for Empathy - Subscales and Subdomains, between the two groups over the two times

Subscales of Empathy	Min-Max	Pre-Teaching ToM Group Time1		Post-Teaching ToM Group Time2		Control Group Time1		Control Group Time2		Effect sizes d	Time2×Time2 ANOVA F (1, 54) (P)
		M	SD	M	SD	M	SD	M	SD		
Emotion Contagion	0-14	11.6	1,2	13.7	0.8	12.0	1.8	12.4	1.4	.78	7.39 (.001)
Attention to Others' Feelings	0-14	10.8	0.9	13.5	1.4	11.0	1.4	10.8	1.6	.71	8.03 (.001)
Prosocial Actions	0-12	8.7	1.6	11.2	1.1	8.3	1.7	8.8	1.3	.41	4.21(.040)
Emotion Acknowledgment	0-30	22.3	3.1	28.7	1.9	19.9	2.1	21.1	2.4	.69	7.33(.001)
Empathy Observation	0-40	25.7	4.4	37.7	3.8	23.5	6.4	26.1	5.3	.64	6.99 (.002)

Testing teaching ToM on empathy skills: The descriptive data (ranges of minimum and maximum scores, means and standard deviation) of empathy skills through the groups (Teaching group and Control Group) over the times (Time1 and Time2) are shown in Table 4.According to the effect sizes in Table 4, the ToM-taught group reported more empathic skills on all subscales of the empathy scale, with effects ranging in magnitude from *d*=.41 for the subscale Prosocial Actions to *d*=.78 for the subscale Emotion Cognition, while the additional subscales of Emotion Acknowledgment and Empathy Observation show significant improvement with effect sizes of *d*=.69 and *d*=.64, respectively. According to the ANOVA test, the most significant effects through all subscales of empathy and comparing groups (Time2×time2) were reported for Emotion Cognition, Attention to Others' Feelings and Emotion Acknowledgment, with a result of *F*= 1, 54: 7.39 *p*.001; 8.03 *p*.001 and 7.33 *p*.001, respectively.

DISCUSSION

Though it is hypothetically recognized that ToM and empathy are two separate psychological concepts contributing to preschool children's social cognition in several ways, this hypothesis is yet to be tested because the tools assessing the two concepts are independent of each other and infrequently applied together. In the current study, separate tools for ToM and empathy were applied. Such an issue makes factor analysis in conclusive (Wang, 2015), therefore, factor analysis and correlation tests were ignored in the current analysis. As reported in many investigation studies (Goldstein, 2012), the current study had to rely on a quasi-experimental methodology in which we followed preschool children whose parents chose for them to be trained for ToM versus a control group. The current study was able to select two preschool children groups matched for demographic variables.

Thus we believe that the significant improvements of the ToM taught group that was reported allows the current result to support the possibility that these outcomes were indeed fostered by teaching ToM. The current study aimed to measure the level of social cognition and empathy among preschool children who were taught ToM compared to a control group, and to examine whether empathic behavior contributed to the development of ToM to the same extent in both groups. Our results show significant improvement in social cognition (ToM) and empathy skills after providing ToM skills by teachers and parents as homework exercises. During the course of 12 weeks of teaching ToM, teachers and parents rated their preschool children as becoming more empathic and having more ToM skills. This result is in line with a recent study of (Goldstein, 2012; Allen, 2013), which confirmed that teaching To Mtopre school children showed significant gains in empathy scores and social cognition. However, the current results could be unsurprising, given that the teaching ToM program includes an intensive focus on false belief reasoning, and that the false belief material from the ToM tool was also used during the ToM teaching program. Given the fact that most of the tools which are usually used to measure children's ToM and empathy are assessed by parents or teachers, the current study applied an additional tool that measures empathy according teacher/examiner observation. Having two different tools by two separated individuals will give the current results more validation. Moreover, the version of the instrument developed in this study (i.e., ToM and Empathy) will be available for teachers and researchers in our community to be used in preschool practices and research. Our preschools need to focus more on teaching ToM in their curriculums. Several studies show that teaching ToM has positive consequences for preschool children's social functioning and school success. Children with more developed ToM are better communicators and can resolve conflicts with their friends (Dunn, 1998). Their teachers would rate them as more socially competent and they are happier and more popular with peers (Astington, 2003). Furthermore, their school work is more advanced in some ways (Astington, 2005). Teachers in preschools should know that asking questions, talking about differences between believed and actual situations and exploring to find solutions are part of teaching ToM by which thoughts grow and develop (Patnaik, 2008). The current findings are based on a selected sample from the preschool stages. Previous studies recommended early teaching and early interventions for improving social cognition (Loureiro, 2013). Baird and Astington (Baird,. 2004) confirmed in their study that 5- and 7-year-old preschool children had a significantly better performance in the training ToM program. Butthis finding did not hold true for children4yearo old or less (Smith et al., 2015).

Conclusion

ToM is an essential component of significant social cognitive development at the preschool stage and between the ages of 5 to 7 years old. Preparing preschool children for social interactions through teaching ToM has implications for their academic skills and educational achievement. Regardless of other specific school implications like peer tutoring or collaborative learning, ToM improvement has implications for preschool children's ability to think critically and to build their self-concept (Patnaik, 2008; Fink et al., 2014). Teaching ToM in the early years of life, such as at the preschool stage, could play an essential role in developing children's awareness about mental states from primarily thought and behavior. A ToM curriculum can be structured to help preschool children acquire better control over their own cognitive processes. Such a curriculum could make the learning process a truly enriching one. Finally, this study suggests that teaching ToM for preschool children could be a promising intervention, but further study is needed to investigate such a teaching program for other school levels such as elementary schools.

Focusing on normal preschool children in teaching ToM not only has important implications for future educational investigations, but also could help to detect children with empathy and social understanding limitations for psycho educational intervention needs (Wang, 2015).

Limitation: The current investigation did not include language skills as a variable. Previous studies reported that children who received training in ToM showed improvement in linguistic constructs (Allen, 2013). Therefore, such an important variable needs to be investigated in a future study.

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