

# A Look at the Role of Theory of Mind and SES on Sharing Behavior in Early Childhood

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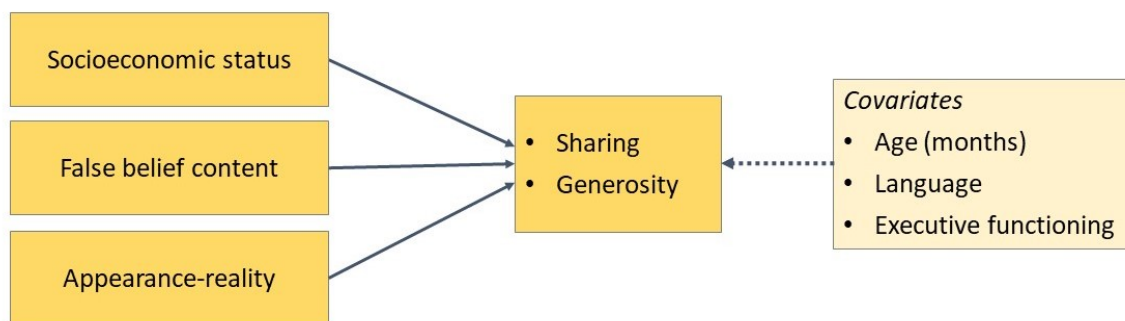
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# INTRODUCTION

- Findings on sharing, generosity and Theory of Mind (ToM), specifically using false-belief tasks, are inconsistent due to methodological variability (Imuta et al, 2016). The role of appearance-reality understanding, (i.e. the ability to understand multiple orientations of an object), has yet to be explored in relation to children's sharing behavior.
- Socioeconomic status (SES) has important implications on children's developmental outcomes (Ursache & Noble, 2016), extending to ToM and sharing skills.
- Other individual factors such as executive functioning and language are well-known correlates of ToM (Devine & Hughes, 2014), have also yet to be considered in relation to sharing.

**Research question: How does ToM and SES jointly influence sharing and generosity in preschoolers?**

## **Hypothesised Effects of SES, ToM Understanding of False Belief and Appearance-Reality on Sharing and Generosity, with Age, Language, And Executive Functioning as Covariates**



# METHOD

## **Sample Characteristics**

- Sixty-six 4- to 6-year olds ( $M = 62.9$  months,  $SD = 8.75$  months, range = 49.4-82.3; 29 boys).
- Participants recruited from first wave of Singaporean national survey of households with at least one child below 7 years old

## **Procedure**

SES and covariate measures were extracted from a national survey conducted at respondents' households. ToM, sharing and dictator tasks were conducted with experimenter at the university child lab.

## **Main IVs**

1. **SES.** Both parents' highest level of education used as proxy for SES. Each parent's highest educational qualification was converted into scores ranging from 1 to 9.
2. **ToM tasks:** (a) False belief content task (Gopnik & Astington, 1988); (b) Appearance-reality task (Rostan et al., 2014)

## **Main DVs**

1. **Sharing task** (Wu & Su, 2014)
2. **Dictator game** (Benenson et al., 2007)

## **Covariates**

1. **Working memory.** Forward digit span task (WISC-IV; Wechsler, 2003)
2. **Reading ability.** Letter-Word Identification and Passage Comprehension tasks (WJ IV ACH; Schrank, Mather, & McGrew, 2014)

## **Data Analysis**

- Partial correlational analyses were done between variables-of-interest after controlling for children's age.
- Hierarchical regression analyses were conducted to demonstrate additional variance explained by children's ToM after controlling for SES, children's age, executive functioning and language ability.

## RESULTS

**Partial Correlations between Study Variables after Controlling for Child Age (in Months)**

	<i>M (SD)</i>	1	2	3	4	5	6	7
1. Mother's education	5.02 (2.12)	–						
2. Father's education	5.29 (2.07)	<b>.72***</b>	–					
3. Reading ability	371.37 (38.27)	<b>.37**</b>	<b>.39**</b>	–				
4. Working memory	5.85 (2.97)	<b>.28*</b>	<b>.32**</b>	<b>.28*</b>	–			
5. False belief content	1.35 (0.90)	.13	.22	.08	.13	–		
6. Appearance-reality	7.73 (2.43)	.10	.07	.13	.15	.13	–	
7. Dictator game	2.76 (2.47)	-.16	-.13	.08	-.14	-.12	<b>.27*</b>	–
8. Sharing task	4.74 (3.07)	.16	<b>.31*</b>	.13	.001	-.03	<b>.31*</b>	<b>.28*</b>

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

### DV1: Sharing

**Hierarchical Regression Analysis for Variables predicting Sharing Behavior**

	Model 1			Model 2			Model 3		
	<i>B</i>	$\beta$	<i>p</i>	<i>B</i>	$\beta$	<i>p</i>	<i>B</i>	$\beta$	<i>p</i>
Child age	0.03	0.09	.473	0.04	0.11	.500	0.01	0.02	.876
Mother's education	-0.20	-0.14	.439	-0.19	-0.13	.458	-0.23	-0.16	.349
Father's education	<b>0.61*</b>	<b>0.41</b>	<b>.020</b>	<b>0.64*</b>	<b>0.43</b>	<b>.020</b>	<b>0.67*</b>	<b>0.45</b>	<b>.011</b>
Reading ability				0.004	0.05	.768	0.001	0.01	.927
Working memory				-0.12	-0.12	.393	-0.16	-0.16	.232
Appearance-reality							<b>0.42*</b>	<b>0.34</b>	<b>.009</b>
$R^2$		.11			.12			<b>.22*</b>	
Adjusted $R^2$		.07			.05			.14	

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; *B* = unstandardized coefficient;  $\beta$  = standardized coefficient.

### DV2: Generosity

**Hierarchical Regression Analysis for Variables predicting Generosity**

	Model 1			Model 2			Model 3		
	<i>B</i>	$\beta$	<i>p</i>	<i>B</i>	$\beta$	<i>p</i>	<i>B</i>	$\beta$	<i>p</i>
Child age	<b>0.09*</b>	<b>0.31</b>	<b>.013</b>	0.07	0.23	.130	0.05	0.16	.283
Mother's education	-0.17	-0.15	.401	-0.20	-0.17	.327	-0.23	-0.20	.248
Father's education	-0.02	-0.02	.932	-0.03	-0.03	.871	-0.01	-0.01	.952
Reading ability				0.01	0.22	.154	0.01	0.19	.198
Working memory				-0.11	-0.14	.317	-0.14	-0.17	.194
Appearance-reality							<b>0.30*</b>	<b>0.29</b>	<b>.019</b>
$R^2$		<b>.13*</b>			<b>.17*</b>			<b>.25**</b>	
Adjusted $R^2$		.09			.10			.17	

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; *B* = unstandardized coefficient;  $\beta$  = standardized coefficient.

# RESULTS SUMMARY

## Partial correlation analyses

- Sharing was positively correlated with generosity ( $r(63) = .28, p = .024$ ), and father's education ( $r(63) = .31, p = .011$ ), after controlling for children's age.
- Appearance-reality understanding was positively associated with sharing ( $r(63) = .31, p = .012$ ) and generosity ( $r(63) = .27, p = .031$ ).
- False belief understanding was not significantly related to sharing ( $r(63) = -.03, p = .843$ ) or generosity ( $r(63) = -.12, p = .327$ ).

## Hierarchical regression analyses

- Father's education ( $\beta = 0.56, p = .047$ ) and children's appearance-reality understanding ( $\beta = 0.49, p = .004$ ) were significant predictors of children's sharing, even after controlling for child's age, mother's education, and children's executive functioning and language.
- Children's appearance-reality understanding solely predicted their generosity ( $\beta = 0.29, p = .019$ ).

## DISCUSSION & CONCLUSION

- Children with greater appearance-reality understanding may better recognize others' mental states and emotions, compared to those with poorer appearance-reality understanding. They may be more motivated to consider others' needs above their own, and are more likely to share their resources with others.
- More educated fathers may engage their children about understanding the need to share with others more frequently, and have more resources to reward them for their sharing behavior, compared to less educated fathers.

# AUTHOR INFORMATION

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# ABSTRACT

Sharing is an important social skill for cultivating fairness and cooperation in society, and it involves understanding others' needs while recognizing their own. Generosity, similar to sharing, refers to sharing actions that are intrinsically motivated by concern for others. In children, studies have extensively investigated the relationship between sharing and Theory of Mind (ToM) development, but findings are inconsistent due to methodological variability. Moreover, the role of appearance-reality understanding, (i.e. the ability to understand multiple orientations of an object), as a measure of ToM has yet to be explored in relation to children's sharing behavior. In addition, family environmental factors, such as socioeconomic status (SES), have important implications on children's developmental outcomes, which extend to ToM and sharing skills. Other individual factors, such as executive functioning and language, which are well-known correlates of ToM, have also yet to be considered in relation to sharing and generosity. Therefore, we explored the joint influences of SES and ToM understanding on young children's sharing behavior and generosity, while controlling for language and executive functioning.

Sixty-six 4- to 6-year-olds (43.9% males,  $M = 62.9$  months,  $SD = 8.75$  months, range = 49.4 to 82.3 months) from diverse SES and multi-ethnic backgrounds in Singapore completed tasks assessing ToM measures of false belief and appearance-reality understanding, executive functioning, language, generosity and sharing behavior. Family demographic information on parents' education, used as a proxy for SES, were collected via parent interviews.

Correlational analyses showed that after controlling for children's age, sharing was positively associated with generosity ( $r(63) = .28, p = .024$ ), and father's education ( $r(63) = .31, p = .011$ ). Appearance-reality understanding was positively correlated with sharing ( $r(63) = .31, p = .012$ ) and generosity ( $r(63) = .27, p = .031$ ). Hierarchical regression analyses demonstrated that father's education ( $\beta = 0.56, p = .047$ ), and children's appearance-reality understanding ( $\beta = 0.49, p = .004$ ), were significant predictors of children's sharing, even after controlling for children's age, executive functioning, language, maternal education ( $R^2 = .22, F(6, 59) = 2.80, p = .018$ ). In contrast, children's appearance-reality understanding ( $\beta = 0.29, p = .019$ ) solely predicted their generosity ( $R^2 = .25, F(6, 59) = 3.19, p = .009$ ).

Our findings suggest that more educated fathers may engage their children about understanding the need to share with others more frequently, and have more resources to reward them for their sharing behavior, compared to less educated fathers. Additionally, children with greater appearance-reality understanding may be better at recognizing others' mental states and emotions, compared to those with lower ToM understanding. They may thus be more motivated to consider others' needs above their own, and are more likely to share their resources with others. Altogether, these findings highlight that children's ability to hold different views of reality, as well as parental socialization practices guided by SES, have a significant and impact on the development of sharing and generosity during early childhood. Future studies are needed to identify the mechanisms underlying the relationship between appearance-reality understanding, SES, and children's sharing.



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