The Relationship between Theory of Mind and Generosity with Home-Based Social Involvement

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ABSTRACT

The Theory of Mind is a complex construct that scholars have tried to explain in various researches. Even more complex is the relationship between having a Theory of Mind (the ability to read and understand people's intentions) and sharing behavior. This research found that children who can read and understand other people's intentions share less than children who do not, which implies that moral cognition is partially explained by a social intelligence component. This outcome clarifies differences in findings in previous researches and extends existing research by introducing home-based influences into the model.

Keywords: Theory of Mind, generosity, home-based involvement

CONTENT

PREFACE

This research is based on the study performed by Cowell, Samek, List and Decety (2015): The Curious Relationship between Theory of Mind and Sharing in Preschool Age Children. Two master students, Annique Vaessen and Michelle de Vries, from the Marketing department of the Erasmus School of Economics collected the data. Vaessen (2016) extends the original research by taking into account the school-environment of the children, whereas this research broadens the original scope by measuring the influence of the home-environment of the children. There is no content copied directly from the study of Cowell et al. (2015) or any other study.

The sample data is analyzed and tested in the program SPSS, which has enabled the writers to gain new insights in the topic of Theory of Mind.

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INTRODUCTION

Infants already sense differences in prosocial versus antisocial nature of characters when they are only 3 months old (Kuhlmeier, Wynn & Bloom, 2003). Showing this prosocial behavior is heavily interconnected with moral cognition. A child's ethical position starts to change between the ages of 3-5 years old and develops through the years (Robbins & Rochat, 2011). Paired with this change, the child starts to develop an aversion to inequality and wants to be perceived as fair by other humans. Its showed behavior goes from predominately selfish between the age of 3 and 4 years old, to approaching equality in distribution when sharing at the age of 7 and 8 years old (Fehr, Bernhard & Rockenbach, 2008; Shaw, Montinari, Piovesan, Olson, Gino & Norton, 2014).

Being social in nature, we humans frequently benefit other human beings (Robbins & Rochat, 2011; Li, Li, Decety & Lee, 2013). In case of generosity or distributive justice however, acts to benefit others become by definition costly to oneself (Gurven, 2004) and yet we show an overall increase in expressed sharing behavior between the ages of 3-8 years old (Benenson, Pascoe & Radmore, 2007; Fehr et al., 2008), evolving parallel to the change in moral stance. Despite much research on this topic, it remains unclear which mechanism is the main driver for this increase in generosity.

Over the years lots of researchers studied the development of the brain from infancy to adolescence regarding executive functioning (EF), also called cognitive control (Carlson, Zelazo & Faja, 2013). It is found that the development of these executive functions is connected with the development of the prefrontal cortex (Zelazo & Carlson, 2012). As the prefrontal cortex evolves, and with it the executive functions, infants grow their cognitive abilities – among others sharing, inhibitory control and working memory (Miyake, Friedman, Emerson, Witzki, Howerter, & Wagar, 2000). Several studies assume that these capabilities are of important influence on pro-social behavior and the ability to control one's own desires. None of these studies found a clear significant influence (Monin, Pizarro & Beer, 2007; Takagishi, Kameshima, Schug, Koizumi & Yamagishi, 2010; Aguilar-Pardo, Martínez-Arias & Colmenares, 2013; Smith, Blake & Harris, 2013; Cowell, Samek, List & Decety, 2015; Cowell, Lee, Malcolm-Smith, Selcuk, Zhou & Decety, 2016).

However, four of these studies did find that perspective taking and Theory of Mind are correlated to sharing behavior (Takagishi et al., 2010; Smith et al., 2013; Cowell et al., 2015; Cowell, et al., 2016). Takagishi et al. (2010) found that children share more with their peers if they have a Theory of Mind. More specifically, the children who could put themselves in the shoes of the child in front of them shared on average more when they were asked to suggest a number of resources they wanted to share than children without a Theory of Mind. This would imply that the distributive justice of children is highly related to the ability to impute a mental state to oneself or one other. Cowell et al. (2015) actually found a remarkable correlation between first-order Theory of Mind and generosity, where children who do have Theory of Mind are less willing to share with their (unknown) peers than children who did not yet develop Theory of Mind. This would imply that children who can read the intentions of other people share less resources with others than children who cannot read other's intentions and could be seen as naïve.

Last year, two master students (Vuylsteke & Wessels, 2015) repeated the study of Cowell et al. (2015) in the Netherlands, but they found no significant correlation between Theory of Mind and sharing behavior. A suggested explanation was the difference in parental income – which often is paired with a lower socioeconomic status (SES) – of the children in the two samples. Indeed, Cowell et al. (2015) performed the study among children living in poorer socioeconomic areas, whereas the Dutch research used a sample of children that lived in very wealthy socioeconomic areas. These contradictory findings are the motivation for this study that investigates whether or not the correlation between Theory of Mind and generosity is influenced by parental income. In other words, this research tries to understand whether or not children that can read other's intentions share less then children who cannot and on top – if this is the case – whether this phenomenon is only shown by children that grew up in lower socioeconomic areas.

The theory that there are income-related factors that influence sharing behavior, is backed up by a previous study performed by Doland & Adelberg (1967). They already investigated sharing behavior differences among children from a private nursery school and a child welfare center for dependent and neglected children. In that study, the children at the private nursery school appear to share significantly more than children staying at the child welfare center. However, they did not explain the variance through

socioeconomic differences, but instead social reinforcement. This means that children in the well fare welfare center are both less responsive to social reinforcement and less often exposed to learning situations.

When explaining SES through maternal education, Benenson et al. (2007) found that children from higher SES families are more altruistic. When looking at adults however, research has found proof that people in the lower social classes are more generous and charitable than people from higher social classes (Piff, Kraus, Côté, Cheng & Keltner, 2010). The influence of SES on generosity was also investigated in a follow up study done by Cowell et al. (2016). In this study they tested different models in order to predict sharing behavior among five different cultures. They indeed found that the influence of Theory of Mind, SES and basic descriptives on distributive justice, varies per culture. This model proved to be an accurate predictor of generosity (explaining 29% of the variance), but SES had only little to no influence. However, the background of a child is very likely to influence the way he interprets other people's intentions. Children who are raised in families with a low income for example are likely to interpret the intentions from people with a high income differently than the ones of people with a low income. Income, SES but also additional intrinsic and extrinsic variables such as family structure, the position within the family and parenting influences are therefore interesting variables to take into account when researching the Theory of Mind.

After all, the difference in findings between the study of Cowell et al. (2015) and the one of Vuylsteke and Wessels (2015) remains unexplained. This research elaborates on these studies, by combining the existing data with new gathered data in both higher socioeconomic areas and lower socioeconomic areas. Firstly this research will investigate whether children that are still more naïve share more than children that already have developed a Theory of Mind. Secondly, it compares if that relationship differs among children coming from high versus lower income receiving families. Furthermore, it extends the research done by Cowell et al. (2015, 2016) as there is credible evidence that income and SES have a positive correlation to generosity, and intrinsic and extrinsic factors related to the direct environment of children have proven to have a significant influence on generosity. This study believes that the background of the children must be taken into account as it is a point of reference when interpreting other people's intentions. Therefore, supplemental factors that can be grouped as 'social-environmental factors' are added to the model. As the social environment of a child is predominantly twofold, this study distinguishes the 'Home-Based

Involvement', the child's home situation, and the 'School-Based Involvement', being the school and neighborhood of the child (Fantuzzo, McWayne & Perry, 2004). This paper focusses on the home-based involvement, measured by the factors: parental income, parental education (SES), number of siblings and the position within the family.

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THEORY

Theory of Mind

The primatologists Premack and Woodruff (1978) started to arouse scientists around the field of Theory of Mind when they published their research 'Does the Chimpanzee have a Theory of Mind?'. The study investigates whether chimpanzees have the ability to infer mental states of others, just like human beings. This idea could be called provocative, as this ability is a part of social cognition that differentiates us as humans from other primates (Gallagher & Frith, 2003).

Having a Theory of Mind starts with the cognitive ability to distinguish the reality from peoples believes by putting yourself in the shoes of that other person. The cognitive abilities that enable a person to do this, develop in early childhood when the prefrontal cortex and executive functions evolve (Zelazo & Carlson, 2012). At the age of around 6, these cognitive abilities reach an adult-like level, meaning that children ought to have an adult-like Theory of Mind at the age of 6 (Wimmer & Perner, 1983; Fodor, 1992). This is the reason that this study has conducted a sample of preschool children with an age of 4-6 years old.

In order to test if a person is capable of inferring the believes – or better said mental states – of others, psychologists developed the False Believe task. As humans, we predict other's behavior based on what we infer to be their mental states: what *knowledge*, *beliefs*, *desires and thoughts* etcetera they have. Understanding the situation and the mental state of the other person enables us to understand their intentions. However, one's knowledge or belief (mental state) can be contradictory to the reality. This is called a False Belief. Passing the False Belief task implies that a person is capable of separating the reality from false beliefs and indicates whether a person is able to have a Theory of Mind or not (Premack & Woodruff, 1978, Wimmer & Perner, 1983; Gallagher & Frith, 2003). This is, as being able to understand the mental state of another person enables you to read their intentions. The False Believe assessment created by Wimmer & Perner (1983) can be optimally explained through an illustrative example (see **figure 1**): Maxi eats a chocolate bar, but only finishes half of it. He puts the remaining piece of chocolate in the cupboard and goes out to play. Meanwhile, Maxi's mother opens the cupboard and finds the chocolate. She takes it out of the cupboard and puts it in the refrigerator. Maxi however still believes that the chocolate is in the

cupboard. If a respondent answers that Maxi therefore will look in the cupboard for his chocolate, where he *believes* that the chocolate is, the respondent is capable of having a Theory of Mind. When a respondent answers that Maxi will look in the refrigerator, where the chocolate is in *reality*, the respondent does not have a Theory of Mind.

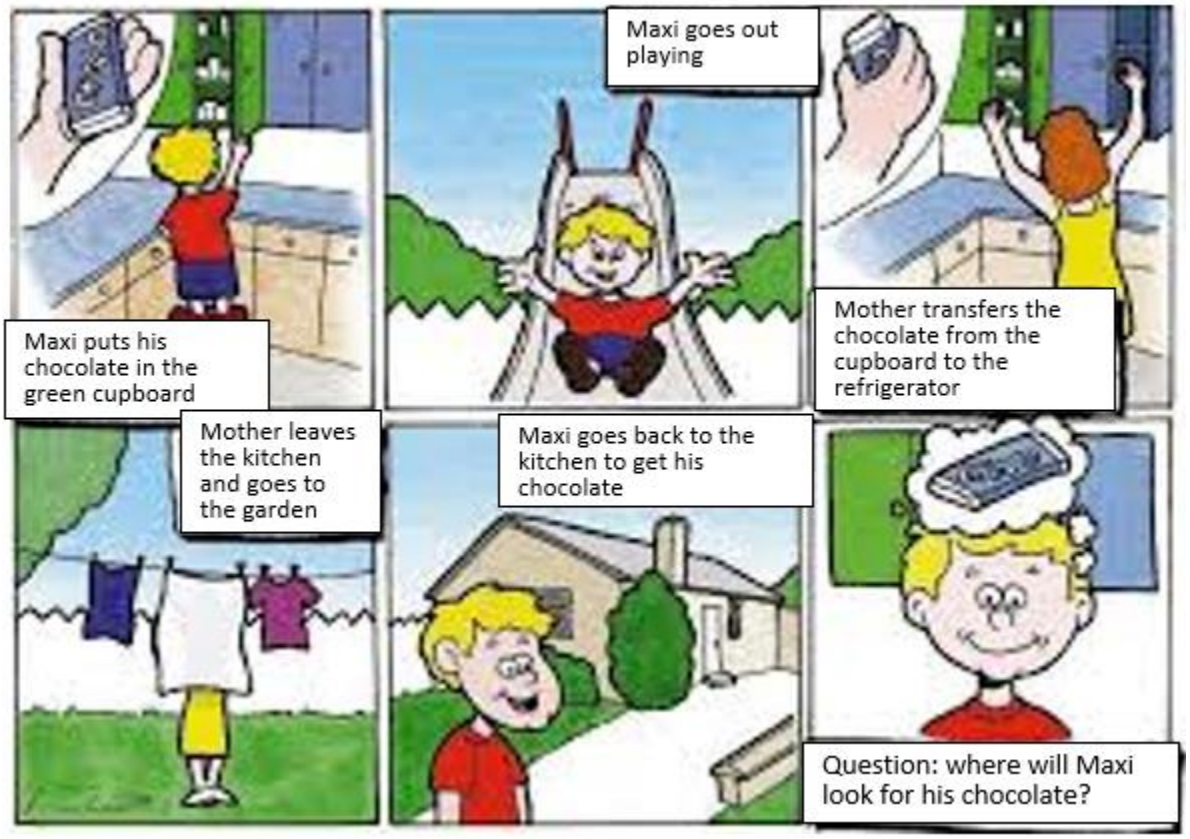

Figure 1: illustrative example of the False Belief task by Wimmer & Perner (1983). (Illustrative source: Wenjie, 2015)

When this is taken into a broader scope, we understand that having a Theory of Mind is an element of social intelligence. This means in daily life that a person with a Theory of Mind can put himself in the shoes of another person and therefore can *read the goals and intentions of other people*. So, whenever a child starts to develop a Theory of Mind, he becomes aware of the motives behind a person's behavior, meaning that he understands the situation the other person is in and thus understands the intention this person has. This can be explained by the story of the Trojan Horse.

When the Trojans defeated the Greek, the Greek still *wanted* to take over Troy. They *falsely let the Trojans believe* that they surrendered by giving them the wooden horse as a peace offer and pretended

to sail out of the Trojan bay. The Trojans did not understand the real intention of the Greeks, they *naively* accepted the offer that actually had Greek soldiers hidden inside. This naivety of the Trojans enabled the Greeks to take over the city after all.

This implies that children who did not yet develop a Theory of Mind do not understand what intentions other people might have, leaving them socially 'naïve'. For example, a young child without a Theory of Mind might not understand that its mother has a good intention when she tells the child to eat vegetables he does not like (namely a good health for her child). Also adults with a low Theory of Mind might not be aware of the intentions of other people. This can again be illustrated with an example. When a salesperson goes visiting his client he might use charming words to win the customer's sympathy. However, when the client has a low Theory of Mind he might miss out the primary intention of the salesperson: selling the client his product. Therefore it can again be said that people who have a low Theory of Mind are relatively naïve as they might not be aware of the (possibly 'bad') intentions other people might have.

It must be noted, that having a Theory of Mind is not the same as having a sense of empathy. Many people falsely believe that these phenomena are nearly the same as they both enable a person to put himself in the shoes of another person. However, the difference between the two lies in the difference in states that one is able to read. More precisely, having a Theory of Mind enables a person to infer *mental states* of another person (reading intentions) whereas being able to empathize enables a person to infer *emotional (or sensory) states* and thus reading emotions (Singer, Seymour, O'Doherty, Kaube, Dolan & Frith, 2004; Bagozzi, Verbeke, Dietvorst, Belschak, van den Berg & Rietdijk, 2013).

People also often mistakenly compare Machiavellianism to Theory of Mind, but Machiavellianism and Theory of Mind are definitely two different concepts. When people *manipulate* other people's beliefs for personal gain this is called Machiavellianism or, in some studies, tactical deception (Frith & Frith, 2005; Bagozzi et al., 2013), which is very different from having the ability to *understand* other people's goals or

intentions. On top, Bagozzi et al. (2013) even found that people with a high Theory of Mind show less Machiavellianism but actually often show higher empathy.

Generosity

One thing that sets us, social species, apart from other primates is the fact that we frequently benefit other human beings (Robbins & Rochat, 2011; Li, Li, Decety & Lee, 2013). Generosity is a sincerity to other people by giving away possessed resources in an exchange economy (Diprose, 2002). Therefore, it is a measure of social behavior, which makes it an interesting variable to investigate. Especially between the ages of 3-8 years we express more and more sharing behavior (Gurven, 2004), which in case of generosity becomes costly to oneself (Benenson, Pascoe & Radmore, 2007; Fehr et al., 2008). For, among others, this reason the measure of generosity or distributive justice varies in different social circumstances. Therefore, researchers developed different methods to measure generosity. The different methods also have been applied in researches that have investigated the relation between having a Theory of Mind and generosity. These different methods of measuring have led to different outcomes in findings. The methods that are used frequently in Theory of Mind related researches are forced-choice sharing with a known other, ultimatum games and dictator games.

Regarding the forced-choice sharing method there are two important aspects that must be taken into account when interpreting the results. Firstly, children have only two options: share their resources with others or keep all resources to themselves. In this case the amount of resources they are willing to share is not taken into account. Secondly, the peer with whom the resources are shared is known. This obviously impacts the sharing behavior, as people tend to share more with friends than with non-friends (Moore, 2009).

When using the ultimatum game, the participant also knows the recipient of the resources that are shared. However, contradictory to the forced-choice sharing method, the participant can make an offer to his peer regarding the number of resources he wants to share. The recipient can than either accept or decline the offer. In case of the lather, both will be left with no resources. A certain amount of social pressure and

risk therefore influences the decision of the number of resources the participant is willing to share. When the participant decides to keep all resources himself, the recipient will most likely reject the offer. Therefore the average amount shared will be relatively high. This method was used in the research of Takagishi et al. (2010). The study found that children who have a Theory of Mind are willing to share on average more than children without having a Theory of Mind. Most likely this is due to the fact that children who have a Theory of Mind can put themselves into the situation of the recipient and therefore make a fair offer which is less likely to be rejected.

This study makes use of the last method to study distributive justice: the dictator game. The study of Cowell et al. (2015) also made use of the dictator game that in contrary to the other methods is almost free of social pressure. The recipient is not present and unknown by the participant, which leads to a less biased decision to share (Cowell et al., 2015; Cowell et al., 2016). In contrary to the forced-choice sharing method, the procedure of the sharing process is twofold: first the participant needs to choose whether or not he wants to share, afterwards (in case he is willing to share) he needs to decide how many resources he wants to give to the recipient. Because the process of the dictator game is easy to control and easy to execute, it is a very relying tool to use in studies that measure social behavior (Engel, 2011). In contrary to the other studies Cowell et al., (2015) found that having a Theory of Mind does not increase sharing behavior but actually decreases it. The difference in findings with Takagishi et al (2010) most possibly has to do with the usage of the dictator game method as 1) the participant faces low social pressure since the recipient is unknown and not present and 2) all offers are accepted (see **table 1**).

Method	Recipient present	Recipient known	Forced to share	Comments
Forced choice	Possibly	Yes	Yes	
Ultimatum game	Yes	Yes	Yes (as offer of sharing 0 resources will most likely be rejected	Used by Takagishi et al. (2010)
Dictator game	No	No	No	Used by Cowell et al. (2015)

Table 1: Overview of methods measuring Distributive Justice

Social environment

Previous research has found that people from the lower-class part of the population share more than the people in the higher classes, are more charitable, trusting and helpful than people from high social classes

(Piff et al., 2010). However the findings of Benenson et al. (2007) contradict to this phenomenon as children coming from high SES families showed greater generosity in their study than children from lower SES families. When a person interprets the intentions of other people, his nurturing will become a point of reference. This means that people from lower social classes will interpret the intentions of a very wealthy man differently than someone who was raised in the upper class. Regarding children, not only the income and SES of the parents will be of influence on the evaluation of other's intents but also other references as siblings, fellow schoolmates and teachers. When looking at the impact that having a Theory of Mind has on generosity, the impact of the social environment of a child must thus be taken into account also.

This is the reason that this research investigates both the School-Based Involvement and the Home-Based Involvement (Fantuzzo et al., 2004) of children when measuring the relationship between having a Theory of Mind and sharing behavior. Whereas this study will cover the Home-Based Involvement, the study of Vaessen (2016) explains the School-Based Involvement. **Figure 2** displays the total scope of the study and the accompanying variables and shows the coverage by this research and the one of Vaessen (2016).

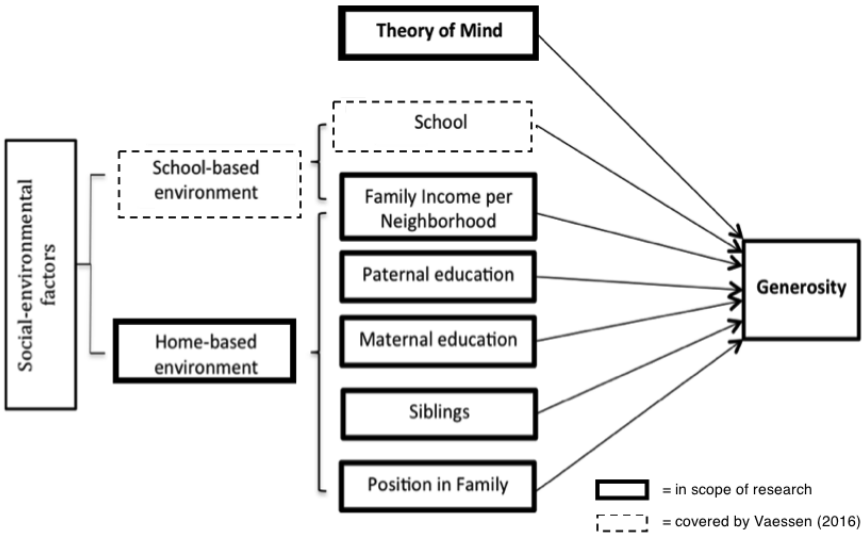

Figure 2: Theoretical Framework of the relationship between Theory of Mind and Generosity in the social environment of a child.

METHODS

Participants

In this study a large sample consisting of 4 to 6-year-old children (N = 259, M age = 58.84 months, SD = 8.86 and n = 130 male) was used. This is composed by:

I. Recruited 4 to 6-year-old children in Heerlen, in the South of the Netherlands (N = 150, M age = 58.56 months, SD = 8.33 and n = 76 female)

II. The sample built by master students Vuylsteke and Wessels in 2015 (N = 109, M age = 59.2 months, SD = 1.65 and n = 56 male) in Rotterdam, in the Northwest of the Netherlands.

In order to build sample-I, over fifty public primary schools in both lower and higher socioeconomic areas were contacted, as many schools either already cooperated in other researches or had the policy not to cooperate in researches at all. Eventually six schools cooperated, among which four schools in lower socioeconomic areas and two in high socioeconomic areas (see **table 2** for more detailed population descriptives around the school). For sample-II, children from two public schools in higher socioeconomic areas were recruited. In both samples, two graduate students performed the assessments in an individual chamber at the primary school of the participant.

School	Neighborhood	Income					Origin	
		households low income	households high income	below or around social minimum	income per habitant	income per income recipient	Western immigrants	non-Western immigrants
School A	Rennemig-Beersdal	50,0%	8,0%	14,0%	18000,00	24800,00	21,0%	7,0%
	Average	50,0%	8,0%	14,0%	18000,00	24800,00	21,0%	7,0%
School B	Schandelen-Grasbroek	60,0%	6,0%	18,0%	18800,00	24300,00	20,0%	14,0%
	Average	60,0%	6,0%	18,0%	18800,00	24300,00	20,0%	14,0%
School C	Meezenbroek-Schaesbergerveld	61,0%	7,0%	19,0%	17500,00	23400,00	20,0%	13,0%
	Schandelen-Grasbroek	60,0%	6,0%	18,0%	18800,00	24300,00	20,0%	14,0%
	Average	60,5%	6,5%	18,5%	18150,00	23850,00	20,0%	13,5%
School D	Meezenbroek-Schaesbergerveld	61,0%	7,0%	19,0%	17500,00	23400,00	20,0%	13,0%
	Schandelen-Grasbroek	60,0%	6,0%	18,0%	18800,00	24300,00	20,0%	14,0%
	Average	60,5%	6,5%	18,5%	18150,00	23850,00	20,0%	13,5%
School E	Welten-Benzenrade	32,0%	23,0%	6,0%	26600,00	34400,00	16,0%	3,0%
	Scattered Houses Voerendaal	29,0%	30,0%	5,0%	24400,00	31500,00	8,0%	1,0%
	Average	30,5%	26,5%	5,5%	25500,00	32950,00	12,0%	2,0%
School F	Caumerveld-Douve Weien	42,0%	20,0%	7,0%	28600,00	35700,00	16,0%	3,0%
	Heerlerbaan-Schil	33,0%	22,0%	7,0%	23600,00	33000,00	15,0%	7,0%
	Average	37,5%	21,0%	7,0%	26100,00	34350,00	15,5%	5,0%
School G	Prins Alexander	44,0%	20,0%	12,0%	23700,00	32400,00	10,0%	22,0%
	Zevenhuizen	29,0%	28,0%	6,0%	23700,00	32000,00	6,0%	4,0%
	Nieuwerkerk a/d Ijssel	29,0%	32,0%	6,0%	26200,00	36900,00	7,0%	7,0%
	Average	34,0%	26,7%	8,0%	24533,33	33766,67	7,7%	11,0%
School H	Meerpolder	20,0%	33,0%	5,0%	25900,00	39200,00	8,0%	13,0%
	Berkel	36,0%	20,0%	7,0%	23300,00	31700,00	7,0%	9,0%
	Noordeinde	24,0%	40,0%	n/a	24400,00	34000,00	6,0%	2,0%
	Zuiderpolder	18,0%	42,0%	n/a	25900,00	38700,00	7,0%	7,0%
	De Wadden	9,0%	58,0%	n/a	30000,00	47300,00	8,0%	7,0%
	Westpolder	15,0%	51,0%	n/a	29800,00	48900,00	7,0%	9,0%
	Noordpolder	29,0%	28,0%	6,0%	25800,00	35000,00	7,0%	7,0%
	Average	21,6%	38,9%	6,0%	26442,86	39257,14	7,1%	7,7%

Source: CBS numbers 2013

Table 2: Descriptives of the school neighborhoods

Procedure

All the participants were tested individually during a school day, in school time. Also, the children answered all questions verbally. Firstly the children were asked about themselves and their home situation (e.g. how old they are, how many siblings they have and whether these siblings are older or younger). Afterwards, the Theory of Mind and dictator assessment were performed. First, children were exposed to the false-believe task (Wimmer & Perner, 1983). Afterwards they completed the dictator game, adjusted for children. The parental education was completed by all parents through filling out the written informed consent form (see **exhibit 1**). Conform the ethical guidelines all parents gave written informed consent and all children gave verbal assent. This procedure and way of testing was approved by the ERIM.

MEASURES

Theory of mind

The Theory of Mind assessment was derived from the puppet false-belief location change task (Wimmer & Perner, 1983) and was performed with two stuffed puppets that are either male or female (the gender was matched to the participant's). Children were introduced to puppet 1 (Puck/Piet): "Puppet 1 is playing with a ball. Than, puppet 1 needs to store the ball and wants to retrieve it later. It has two storage options: the bucket or the bag. Puppet 1 decides to store the ball in the bucket/bag (referred to as original hiding place). Puppet 1 leaves the room. Than, a second puppet (Lizzy/Lex) enters the room. This puppet takes the ball out of the original hiding place and puts it in the alternative hiding location. Puppet 2 also leaves the room. Then, puppet 1 comes back into the room." The question for the participant now was "Where will Puck/Piet look for her/his ball?" If the participant answered the original hiding place, which is the correct answer, he or she had passed the Theory of Mind assessment. When the participant however pointed out the alternative hiding place, he or she had failed the assessment. In this case the participant cannot infer the thoughts and believes of puppet 1, which does not know that puppet 2 placed the ball elsewhere.

In order to minimize biased answers based on intercommunication with classmates who already participated in the assessments, the initial and alternative hiding place were often swapped.

Dictator game

Based on earlier modifications made to customize the dictator game to children (Fehr et al., 2008), stickers were used as resources. In this study, children were given the opportunity to choose 6 out of 60 stickers as "they did such a good job" in the false-belief assessment. If after their choice they were not happy with one of the stickers, they were given the opportunity to replace it with one that they liked until they were happy with all 6 stickers. Those stickers were now told to be theirs. Then, they were confronted with the fact that there were also children who could not participate in this game and therefore would not receive any stickers. The identity of these children was left uncertain. The participant could share some of

his/her own stickers with these other children if he/she wanted. They were given the task to put the stickers they wanted to keep in the one bowl and the ones they wanted to give away in the other. During this process, the investigators neither watched nor paid attention to minimize the experimenter bias. In order to ensure that the child understood the task, multiple rule checks were asked (e.g. to point out the bowl in which they had to put the stickers they wanted to keep). If the child failed to answer one of the checks, the rules were explained again until the task was clear. The generosity of the child was measured by the number of stickers they would give to another child on a 6-point scale.

Income

The income is measured by comparing the income per capita and income per income receiver against the national average. In order to gather this data, the neighborhoods where the participants lived were analyzed on a very narrow-scaled level. Thereafter the average income in this neighborhood was matched to the child. Children whose parents' income was above national average were labeled 'high' whereas children whose parents' income were below the national average are labeled 'low'.

SES

Most researches have used the maternal education as a benchmark to measure SES (Cowell et al., 2016). Parental education is also proven to be the most accurate measure to explain a child's behavior within SES measures so far (Bornstein, Hahn, Suwalsky & Haynes, 2003). However, paternal education gains more and more interest. Recent research has evinced that not only the mother, but also the father has built an important attachment with his child. His influence also affects the activation to social emotional outcomes (Dumont & Paquette, 2013). In times where emancipation among woman rises, the impact of the father must thus not be underestimated. Therefore, not only the maternal education but also the paternal education was measured in order to assign a 'high' or 'low' SES status to the child. Parents were asked to fill in their highest level of education on the written informed consent form. Afterwards the parental educational levels above national average led to a SES status labeled 'high' and every educational level that is equal to or below the national average led to a 'low' SES label. Maternal and paternal education stay separated.

Siblings and position

When starting the investigation with a participant, a couple of personal questions were asked to comfort the child (e.g. how old are you, what were you doing before you come here with me). Afterwards, the child was asked how many siblings it has and how old they are. The number of siblings was measured in numbers. The position in the family was measured as the oldest, the middle child, the youngest, only child or twins.

RESULTS

In this research the average amount of stickers shared was 1.05 stickers out of 6 per child (SD = 1.44, skewness = 1.25, kurtosis = .74). In order to test for potential gender or age effects, a 2 (gender) x 3 (3 ages) Analysis of Variance (ANOVA) was performed. Generosity was taken as the dependent variable. The results showed that both gender differences (F (1, 257) = .276, *n.s.*) and age differences (F (2, 256) = 1.753, *n.s.*) have no significant effect on the degree of generosity of the child.

To test the primary relation of this research, the difference in the average sharing of two groups was measured: Theory of Mind passers and Theory of Mind failures. In order to examine this relationship, an independent sample t-test was performed with Theory of Mind (yes/no) taken as the grouping variable and the stickers shared with other children as a test variable. Children that past the false-belief task and already developed Theory of Mind shared on average 0.815 stickers, which is significantly less (F (1, 257) = 8.994, $p < 0.01$) than children who failed the Theory of Mind assessment who shared on average 1.298 stickers (see **figure 3**).

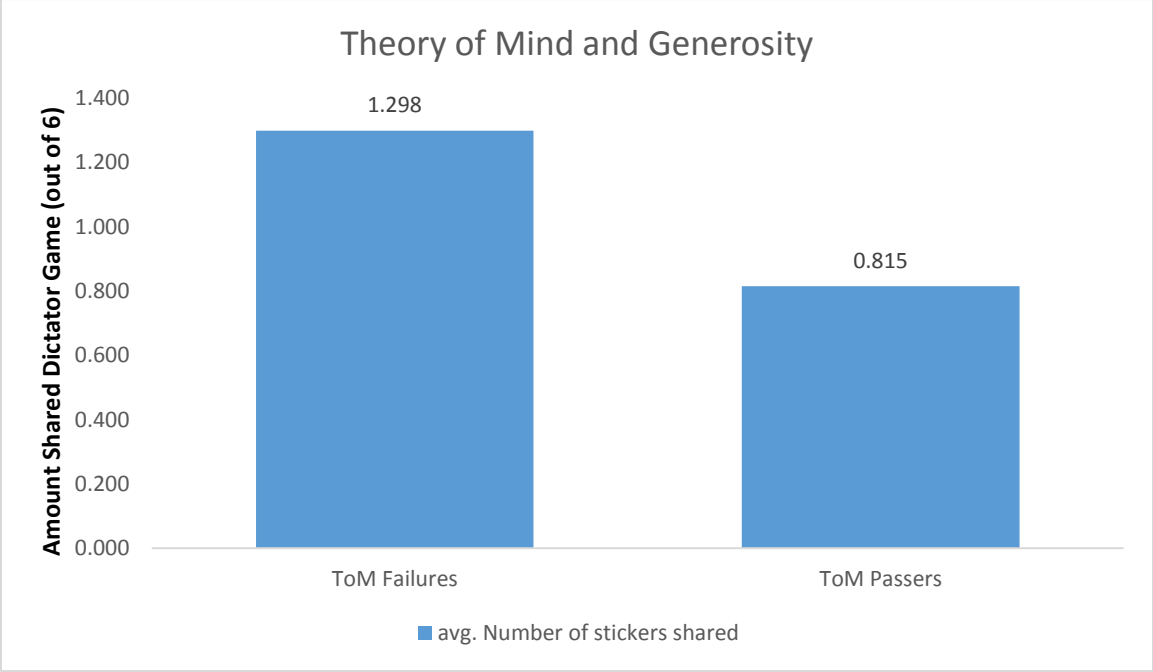

Figure 3: Dictator Game amount shared influenced by Theory of Mind Performance

Afterwards, income was added as a moderating variable to the model. By adding this moderator, the impact of the difference in income of the parents on the phenomenon (that children who can infer mental states of others share less than children who cannot) was tested. The results show that income has no significant influence on the relationship between Theory of Mind and generosity (β = 0.33, *n.s.*). In other words, inconsistent with the hypothesis the relationship between Theory of Mind and generosity is equally strong for children that are raised in high-income families and in low-income families.

Further, to test the model with Theory of Mind, income, paternal education and maternal education (corrected for gender), number of siblings and position within the family as independent variables and generosity as the dependent variable, a linear regression was conducted. This model is found to be a significant predictor of generosity (F (6, 141) = 2.557, $p < .05$) and explains 9.2% of the variance in sharing behavior, but not all variables have a significant and relevant influence on generosity (see **table 3**). Especially the number of siblings and the maternal education seem to have little to no influence on generosity (β = 0.099, *n.s.* and β = 0.004, *n.s.*, resp.).

Variable	Standardized Beta	Standard Error	Significance
Paternal Education	-.207	.102	.021
Theory of Mind	-.205	.233	.016
Position in Family	-.151	.089	.100
Income	.140	.191	.094
Siblings	.099	.131	.270
Maternal Education	.004	.101	.963

Table 3: Significance and importance of model variables

Initially paternal and maternal education had no significant influence on sharing behavior. However, due to the relatively small sample size, the parental education was nuanced and corrected for gender. As a child is more influenced by the parent of the opposite sex, the paternal education was corrected for the female gender and the maternal education for the male gender. After applying this correction, paternal education seems to have the greatest influence on sharing behavior (β = -.207, $p < 0.05$). Female participants

whose father passed a high education share only on average 0.23 stickers, whereas girls whose father finished a lower education share on average 0.85 stickers. This means that the higher the education of the father is, the less a female will share (see **figure 4**). No such correlation was found for male participants.

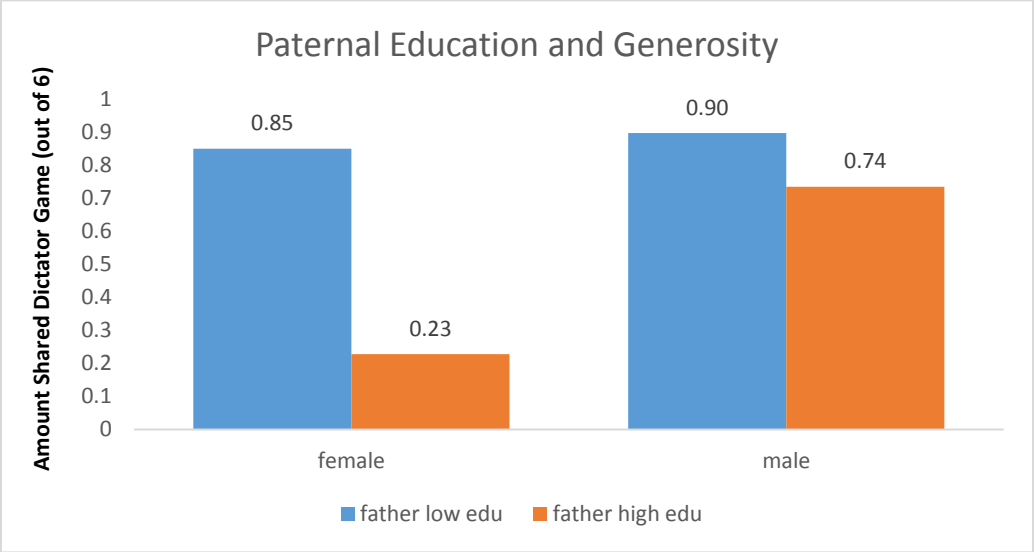

Figure 4: Dictator Game amount shared influenced by Paternal Education

Also the influence of the position that the child holds within the family is present but not significant (β = -.151, *n.s.*). Remarkable are the average amount of stickers shared by the middle children and the youngest children. With an average of 1.42 stickers, middle children are relatively more altruistic in comparison to others. The youngest children within a family on the contrary share significantly less with a Dictator Game amount average of only 0.89 out of 6 stickers. Interestingly, the number of siblings within the child's family has less impact on the sharing behavior. Also this correlation is found insignificant (β = -.099, *n.s.*).

Lastly the results show that, conform the hypothesis, income does have a positive influence on generosity (β = .140, *n.s.*) meaning that children from rich families share on average more (average 1.25 stickers) than children from poorer families who share on average 0.60 stickers. However, this correlation is also found to be non significant.

Concluding, there is indeed a significant negative correlation between Theory of Mind and generosity, which I believe is the driver of the phenomenon that children share less when they are able

to understand people's intentions. It must be noted that sharing less does not mean that they share nothing at all. Unlike initially hypothesized this relation is valid unregard the income of the family. Also the model that was based on the home environment of the child is apparently a valid partial predictor for sharing behavior (see **figure 5**).

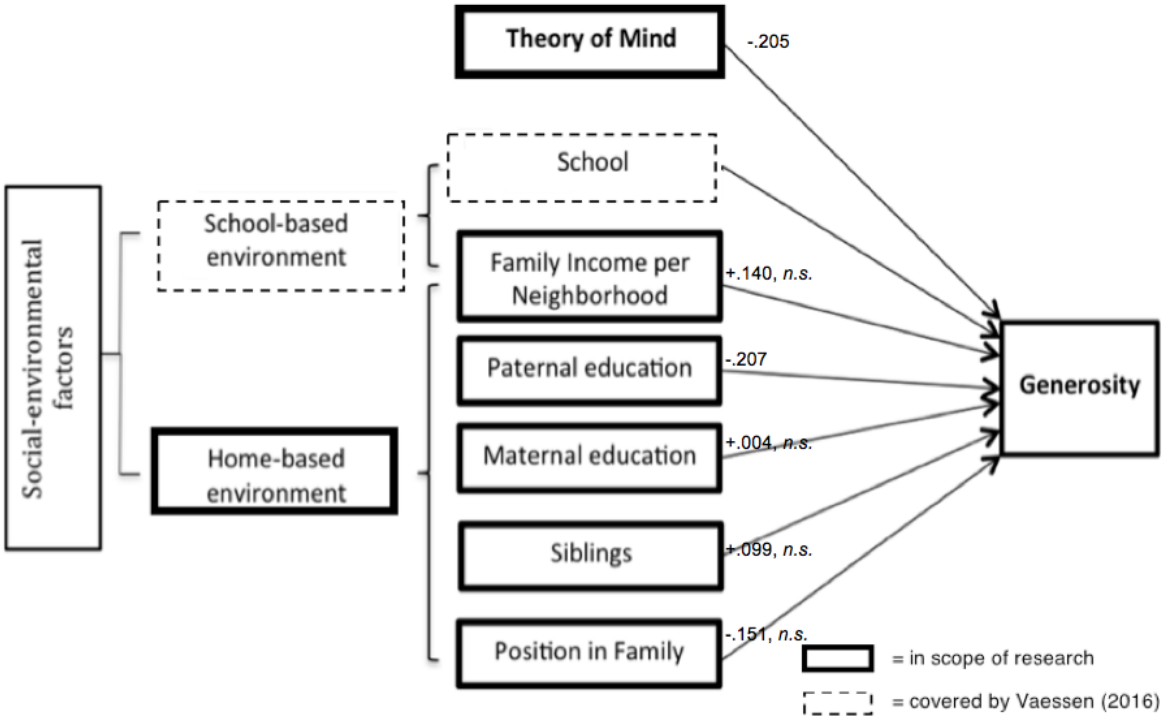

Figure 5: Regression model of children's generosity in the Netherlands, which illustrate how home environmental factors combined with having a Theory of Mind influence the sharing behavior of the child.

DISCUSSION

This study is based on the belief that when children lose their naivety by developing a Theory of Mind they share less with other people. This assumption was tested among a sample of 4-6 year-old children coming from both high and low socioeconomic areas in the Netherlands. The research 1) clarifies differences in findings in previous researches on Theory of Mind and generosity 2) deepens existing research by integrating new variables into the model and 3) proposes new insights for further research.

A lot of people intuitively might think that putting yourself in the shoes of someone else enables you to sympathize and empathize this person. This, for them, would imply that having a Theory of Mind would increase this person's generosity. Also, previous research shows that in general we generally tend to increase our generosity towards others between the ages of 3-8 years old (Benenson, Pascoe & Radmore, 2007; Fehr et al., 2008). However, the outcome of this research (in line with the one of Cowell et al. in 2015) shows that apparently there is a factor that causes a general decrease in children's sharing behavior, despite the fact that they want to appear more and more fair to other humans and develop an inequality aversion as they grow up. Indeed the numbers showed that there is a negative correlation between Theory of Mind (which develops only between the ages of 4-6) and generosity, but the implementation behind this correlation is far more interesting and on top key for this research. Children's moral judgement is immature. However when children develop their Theory of Mind, this enables them to understand that people show behavior based on intentions. When children understand this, they also understand that not all intentions are good in nature. They experience that people's intentions can be selfish or that certain people want something from them solely for personal gain. The childish naivety makes room for a healthy perspective on moral cognition. Apparently this change is reflected in their sharing behavior. The children are more reserved in what they share due to their grown social intelligence. Here it must be noted that these children did not stop sharing, but only decrease their sharing behavior. This results in a more selective distribution of possessions to people they believe deserve to receive these resources. This indicates that they became

smarter regarding the intentions of the people around them that they now can read and are more careful of what they share with others as they do not want to be taken advantage of. We strongly believe that this phenomenon is key in the concept of moral evaluation, meaning that moral cognition has a social intelligence component. Evaluating what you think is fair to share with others is influenced by the intentions you believe other people have. This phenomenon is valid for all children that develop a Theory of Mind and is, in contrary to what was hypothesized and suggested in previous research, not dependent on the income of the parents of the child.

On top, we broadened existing research by investigating the social environment of our participants. In order to take this into account, the effect of the social environment of a participant on its level of generosity was measured by integrating several home-based and school-based measures into the model. Whereas the research of Vaessen (2016) covers the school-based involvement, this research focuses on the home-based involvement by integrating the key factors that are hypothesized to influence the child's behavior: parental income, parental education, the number of siblings and the position within the family in combination with Theory of Mind. Indeed the home-based environment model as a whole is a significant predictor of sharing behavior, meaning that the background of the child in terms of social influences within the family plays a role when evaluating how many resources to share with other children. This implies that the interpretation of other's intentions by a child is coherent with the social influences the child is exposed to at home. The home environment can therefore be seen as a point of reference when someone wants to understand the goals or intentions of another person. Two critical notes need to be made here. The parental income is measured by taking the average income of that neighborhood. This might be inaccurate in some cases. Moreover and part of the first note, children coming from high socioeconomic families more often show Theory of Mind which means that the two variables partially explain the same variance.

Lastly, the home-environmental involvement and Theory of Mind only explain 9,2% of the variance in sharing behavior. Further research therefore might benefit from adding other home-environmental factors

to the model as for example parenting styles. Also it might be worth investigating what other factors serve as points of reference when people evaluate other's intentions like for example parenting styles.

PRACTICAL IMPLICATIONS

Though on average all grown human beings have developed a Theory of Mind, it is very important to keep in mind that they not always use it in daily life (Keysar, Lin & Barr, 2003). Also we can distinguish people with a high Theory of Mind and with a low Theory of Mind. Having employees with a high Theory of Mind is therefore a powerful asset when it comes to the practical implications of this study.

Business implications: management and employees

Theory of Mind has proven to be of great relevance when talking about managerial skills. The relationship between the manager/employer and the employee can always be explained conform the principal-agent mechanism (Eisenhardt, 1989). When the manager (principal) is able to apply his Theory of Mind he will be able to read his employee (agent). He understands the motives of his employee and can evaluate whether the intentions his employee has deserve to be rewarded. By better understanding his employee, he can thus better manage the employee's rewards.

However, you do not only want the managers in your firm to have a high Theory of Mind, but actually all employees. Although most retail businesses become more and more data driven (McAfee, Brynjolfsson, Davenport, Patil & Barton, 2012) you do not only want your employees to be analytical intelligent but also you want them to be social intelligent. The rational behind this is mainly fold. Firstly, employees with a high Theory of Mind are less generous, but will spend the resources they have available more efficiently. For example, when a sales representative has a discount budget available to allocate to certain clients, he will be able to allocate a higher amount to customers that need a greater incentive than to customers who already have the intent of buying his product due to his high social intelligence. By being able to read his customer's intentions, he can thus spend his resources most effectively which make his operations cost efficient. This is coherent with the second and probably even more important reason to recruit employees with a high Theory of Mind. Previous scholars already pointed out that the application of Theory of Mind

in bargaining situations, for example a client meeting, is key in the sense that being able to read your bargaining partner will help you to better understand his signals or personal cues which on its turn leads to a more suitable bargaining offer or outcome (Dietvorst et al., 2009). As 'it takes one to know one' you want your employees to be able to understand who exactly is on the other side of the table, and how this person thinks. This is not only relevant in sales, but also in marketing. As a marketer you can give your customer an incentive to buy your products through various tools (e.g. pricing and promotion tactics, communication tools etc.). However when a marketer does not understand the thinking, habits and needs of his consumer, or shortly the *goals and intentions* of his consumer, he cannot customize his communication to make sure the right marketing message reaches the right consumer at the right time (Chen & Popovich, 2003). If he promotes the product benefits which stand out versus the competition but are of no relevance to his consumer, his marketing will not be successful. However, if he is able to understand his consumer's desires (and thus knows their intents when they come to a store) he will be able to communicate the right relevant message which eventually leads to a higher conversion rate.

Marketing implications: brand building

Theory of Mind is found to be a relevant predictor in brand-attitude forming when being only 3-5 years old (McAlister & Cornwell, 2010). The first brand building blocks of Keller's (2011) Customer Based Brand Equity model are therefore already influenced at a very young age. The study results show that home-based social influences cohere with having a Theory of Mind when measuring the child's generosity. This suggests that the family background of a child influences how a person with a Theory of Mind evaluates inferred intentions of other's (assuming that they become less generous as they understand that other's intentions can be 'bad' also). A speculation from my side here is that the evaluation of the brand identity that a brand has built in the consumer's mind was already influenced at a young age by his home environmental influences. In this case, the brand should take this into account in its marketing messages, especially when they are of an emotional nature.

Marketing implications: marketing tools

As this study has shown that understanding and being aware of other people's intentions raises a certain form of social skepticism, a suspicion from my side is that specifically clarifying intentions can actually be used as a marketing tool. It might be worth to further investigate the validity and applicability of this thought. The assumption will be explained by the hand of two very accurate forms of marketing: crowdfunding and political marketing.

Crowdfunding

Crowdfunding is a financial tool to raise money online for a project, business or idea. Seen the enormous reach of the mechanism and the low threshold, it is gaining popularity among business (Mollick, 2014). However, a great barrier for supporters of a pitch is that they don't know the intentions of the person behind. As this study has shown, moral judgement depends on the way people infer intentions and motives. Not being sure of the intents of the person behind the pitch could therefore lead to a less generous donation. If the Theory of Mind could here be applied as a marketing tool, it would look like the following: the initiator of the crowdfunding project should give background on himself and his intentions to the visitors of the platform. Then, the potential donators will understand his intentions and validate them. This will lead to greater donations. This rational could therefore also be applied on charity marketing.

Political Marketing

A similar thinking goes up for political marketing as well. Sharing behavior is the absolute base of a lot of political discussions as for example social safety nets, income taxes and refugee regulations. For example left oriented parties would like the wealthier half of the population share their resources more proportionally with the less fortunate. However, the opinion on the intentions of fellow citizens or foreign

citizens differ among the population. This effects the willingness to share with others, and therefore the willingness to contribute to the society in terms of resources. As many political issues are related to this principle, it is a very important mechanism during political campaign. Donald Trump for example, the presidential candidate of the Republicans during the 2016 campaign in the United States, plays on to this very well. He *explicitly communicates* his view on *the intents* of other people when he tries to persuade his voters into his plans. By communicating these intentions, people who initially might not have thought about the real motives of other's will then feel like they understand and eventually support the plans. A very accurate topic is the refugee policy in a lot of countries as some politicians want to welcome these people whereas others want to close the borders. In case of the latter, if this politician can persuadably debate that the intention of refugees is for example to take advantage of the wealth of a country, rather than escape the poor conditions in their home country, this might persuade people who thought they needed to vote pro opening the borders out of moral obligation to vote against. Applying the Theory of Mind as a marketing tool here could therefore again be interesting for further investigation.

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APPENDIX

Exhibit 1 – Parental Consent

Geachte ouders/verzorgers,

In week 24 zal er een kort onderzoek plaatsvinden in de groepen 1 en 2 op basisschool Windekind door Michelle de Vries en Annique Vaessen.

Wij, Michelle de Vries en Annique Vaessen, zijn bezig met onze scriptie voor de Master Economie en Bedrijfseconomie aan de Erasmus Universiteit Rotterdam en voor onze scriptie breiden wij een al bestaand onderzoek verder uit. Deze brief schrijven wij namens Willem Verbeke, Professor aan de bovengenoemde universiteit.

Enkele jaren geleden heeft er een onderzoek plaatsgevonden met als onderzoeksvraag: zijn kinderen tussen 3 en 6 jaar oud meer of minder bereid of te delen wanneer zij zich kunnen inleven in anderen. Dit heet het hebben van Theory of Mind. Theory of Mind is in het kort gezegd het vermogen van mensen om een beeld te vormen van het perspectief van een ander persoon. Het resultaat van dit onderzoek was dat kinderen die geen Theory of Mind hebben (dus zich minder goed in anderen kunnen verplaatsen) vrijgeviger zijn dan zij die dit wel hebben.

Wat gebeurt er tijdens dit onderzoek?

Het onderzoek zal door de kinderen vooral als een leuk spelletje worden ervaren. Dit zal er als volgt uitzien:

Deel 1 Theory of Mind

De kinderen krijgen een kort toneelstukje te zien van ongeveer 1 minuut waarin een poppetje ballen in emmers legt. Hier zullen wij hen een vraag over stellen. Uit hun antwoord op deze vraag kunnen wij afleiden in hoeverre zij zich kunnen inleven in het poppetje.

Deel 2 Bereidheid om te delen

Vervolgens zullen de kinderen stickers krijgen van ons waar we een vraag over stellen en vervolgens mogen ze deze mee naar huis nemen. Hieruit kunnen we opmaken in hoeverre een kind vrijgevig is.
Er zijn verder geen goede of slechte antwoorden, al hun antwoorden zullen ons helpen meer inzicht te krijgen in het thema ‘inlevingsvermogen’.

Het onderzoek duurt slechts 5 minuten en zal tijdens schooltijd worden uitgevoerd. De kinderen worden een voor een even uit de klas gehaald. Het onderzoek is volledig anoniem en het enige wat de kinderen ons geven is hun leeftijd en het beantwoorden van de vragen die hierboven zijn toegelicht.

Door strikte regelgeving omtrent onderzoeken bij kinderen, is ons onderzoek voorgelegd aan ERIM International Review Board. Deze commissie heeft ons onderzoek goedgekeurd.

Mocht u nog vragen hebben dan kunt u telefonisch of via e-mail contact met ons opnemen. Mocht u het onderzoek willen lezen waarover wij onze scriptie schrijven dan kunt u dat vinden via google: The curious relation between Theory of Mind and Sharing in Preschool Age Children (Jason Cowell et al.). Mocht u het niet kunnen vinden dan kunt u ons ook een mail sturen en dan zullen wij het onderzoek naar u sturen.

Indien u akkoord bent met de deelname van uw kind zouden wij u willen verzoeken om onderstaande gegevens in te vullen en deze brief ondertekend **uiterlijk vrijdag 10 juni** te retourneren bij de leerkracht.

Naam ouder/verzorger _____
Ouder/verzorger van _____
Groep _____

Hoogst genoten opleiding moeder* _____
Hoogst genoten opleiding vader* _____

Handtekening ouder/verzorger _____

Datum _____
*Deze informatie wordt strikt anoniem behandeld. Voor het onderzoek erg van waarde, maar niet verplicht om in te vullen.

Uw medewerking wordt door ons zeer op prijs gesteld.

Met vriendelijke groet,

Annique Vaessen en Michelle de Vries

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