IMPROVING LANGUAGE ACQUISITION OF AUTISTIC CHILDREN THROUGH IMPLEMENTING NON-VERBAL COMMUNICATION IN TEACHING METHODS

Emma Niederer

ANR 782770

Bachelor Thesis

Department of Communication and Information Sciences,

School of Humanities,

Tilburg University, P. O. Box 90153, 5000 LE Tilburg, The Netherlands

Supervisor: Dr. A. Alishahi

July 2013

Abstract

The acquisition of new language skills does not come as naturally for children with autism as it does for children without a disorder. Special attention has to be given to this aspect of cognitive development of their, already more challenging, life. Several studies show that non-verbal communication is something that these children pick up faster than other children and that this could be the key to help them with their verbal skills. In this study the aim was to determine if incorporating non-verbal cues into teaching methods would help autistic children recognize and remember new words more accurately than when only verbal cues were used. Results show that even though no significant effect can be found to confirm this statement, due to limited participants, a marginal difference is found in the remembrance and recognition of new words when these words belonged to the condition that combined verbal communication with non-verbal cues in the teaching method.

Keywords: non-verbal communication, autism, language acquisition, teaching methods.

Acknowledgements

During the writing of this thesis and conducting my experiment I was supported by several people, and I would not be able to have done it without them. At first I would like to thank Dr. A. Alishahi very much for being my supervisor, guiding me through the entire process and giving me valuable suggestions and insights. I am also grateful to the Xaveriusschool (location Station 29), and especially to speech therapist Marian de Visser, for collaborating with this study and giving me the opportunity to gain new insights on communicating with autistic children. In relation to this, I would also like to thank the parents who gave permission for the participation of their child in the experiment. I would like to thank J.D. Mastin for telling me how to code data and providing more information about joint engagement. Finally I would like to express my gratitude to my family and partner for their infinite support and suggestions.

Table of Contents

Abstract 2

Acknowledgements 3

Table of Contents 4

1. Introduction 5

2. Theoretical Background 6

2.1 Non-verbal Communication; gestures 7

2.2 Parental Intervention 9

2.3 Autism and non-verbal communication 13

2.4 Autism and verbal communication 15

2.5 Research Statement and Hypotheses 15

3. Methodology 17

3.1 Participants 17

3.2 Design and Materials 17

3.3 Procedure 19

3.4 Measurements 20

4. Results 21

4.1 Hypothesis 1 21

4.2 Hypothesis 2 and Hypothesis 3 24

4.3 Joint Engagement 24

5. Discussion 24

5.1 Hypothesis 1 25

5.2 Hypothesis 2 and Hypothesis 3 25

5.3 Research Question 26

5.4 Conclusion 26

5.5 Limitations and further research 26

References 28

Appendix A: Consent Letter 29

Appendix B: Consent Forms 30

Appendix C: Card Pairs 38

Appendix D: Normal Distributions for each condition 43

1. Introduction

Children diagnosed with autism face difficulties concerning communication that children without a disorder do not have to encounter. Autism covers a wide range of cognitive handicaps, including the progress of their speech development and the understanding of language (Rutter, 1974 in Bartak, Rutter & Cox, 1975). Besides the slow development of speech, autistic children also have problems with social interaction (Rapin & Tuchman, 2008), which results in them secluding themselves and not communicating with others in a way that seems regular to other people. These factors contribute to the fact that it is harder for children diagnosed with autism to acquire new language skills than it is for regular children. For people close to autistic children it also requires more effort to teach these children new verbal skills, since there is a different type of interaction. Teaching and learning verbal skills has to be done in an adapted way, so that children with autism still acquire a large vocabulary and certain language skills. Several studies have been done trying to find a way to interact with autistic children and finding tools that can aid the process of improving their verbal skills.

A common denominator that has been found across studies is that non-verbal communication seems to be a tool that can help improve the language skills of children with autism. The study by Bartak, Rutter and Cox (1975) displays that children with autism score higher on tests that include non-verbal elements, than children without a disorder. When non-verbal elements, such as gaze, pointing and mimicking were involved in the experiment, autistic children would recognize the displayed item faster. Another study showed that implementing non-verbal cues while talking to children with autism is helpful in terms of their understanding what is verbally said (Wing & Gould, unpublished, cited by Ricks & Wing, 1975). Longitudinal studies also showed that incorporating non-verbal communication into language learning helps autistic children acquire more new words over a period of time (Drew et al., 2002).

In this study we tried to determine whether incorporating non-verbal communication in teaching methods helps children diagnosed with autism recognize and remember new words more accurately than when only verbal communication is used to teach them these new words. This particular study differs from previous research in that here we combined verbal cues with non-verbal cues, and that these cues were given to the children simultaneously. Another new aspect of this study was that we wanted to see whether non-

verbal elements should be incorporated into the teaching methods of autistic children. The expected outcome is that non-verbal communication indeed does help in this process and therefore should be incorporated into teaching methods, based on findings in previous studies. By presenting autistic children with new words in either a verbal condition or a verbal plus non-verbal condition we can determine whether there is a significant difference.

2. Theoretical Background

Every child is unique and has his or her own different skills and difficulties; this is also the case for children who have some sort of disorder, such as autism. Autistic children cannot be generalized into one group because they all differ from each other and there are also different types of autism that all manifest in different symptoms. In this chapter I will report findings from different studies that have been done with regard to the speech development of autistic children. These results do not apply to every autistic child but can be applied to the "typical" autistic child.

In the article by Rapin and Tuchman (2008) a clear definition of autism is given: Autism cannot be defined as a disease; rather it is a symptom of atypical development of the immature brain. Autism is a behaviorally distinct syndrome with many known and unknown causes. It has a wide range of severity and it has no clear borders, so symptoms of the disorder cannot be fenced. Children who have autism are not ''sick'' or ''fragile,'' nor are they ''emotionally disturbed,'' despite the behavioral nature of many of their symptoms. The defining symptoms of autism almost always become clear in toddlers and preschoolers. They tend to persist throughout life, although often in their own adapted way. There are three key manifestations of autism:

1. Impaired sociability, empathy, and ability to read other people's moods and intentions, with resulting in inadequate or inappropriate social interactions.

2. Rigidity and perseveration, including stereotypes (purposeless repetitive movements and activities), the need for sameness, and resistance to change.

3. Impaired language, communication, and imaginative play.

Speech is typically delayed or may regress in children diagnosed with autism. Comprehension of speech is usually impaired, if not at the word level, then at the level of sentences. Some children are non-verbal or have sparse, impoverished, poorly articulated, and agrammatical speech. The severity of autism's deficits is extremely variable. Therefore,

the term autism spectrum disorders (ASDs), or the autisms, is appropriate because it covers the different forms of autism.

2.1 Non-verbal Communication; gestures

Autistic children lack language skills due to a specific cognitive defect; this had been found in a series of clinical studies (Rutter, 1974 in Bartak, Rutter & Cox, 1975). These children have a wide range of cognitive handicaps, including one that involves their verbal skills, which makes their speech development a lot slower than the average child and their understanding of language is seriously impaired (with the average child, I mean children who do not have autism or another disorder). Besides their language learning skills the hearing of young autistic children is also often impaired (Brisset, 1952; Gordon & Taylor, 1964; Mykiebust, 1956; Reichstein, 1964; Rosen, 1956; Worster-Drought, 1968 in Bartak et al., 1975), this makes it even harder for these children to learn a language or new words.

In the study of Bartak, Rutter and Cox (1975) one of the things they wanted to see was whether autistic children differ from average children concerning their language skills. In order to determine the child's ability to communicate in other ways than verbally, a test of understanding and expression of gesture was included. They used three types of material to test these non-verbal communication skills; objects (such as a sock or a ball), pictures of the objects, and words (such as eating and washing), the three types of material were in increased order of abstraction. To test gesture comprehension, the participants were presented with a selection of objects, pictures and words and then they had to point out what the gesture of the experiment leader resembled. So for example, if the experiment leader used a throwing and catching arm and body movement, the child had to point out that the experiment leader was miming the object or the picture of a ball. They also wanted to test the gestural expression of the child, in order to do that they presented the child with a stimulus and asked the child to show what to do with it, but this could not include words, so they had to express it through non-verbal communication. So if the experiment leader asked the child to show him “washing” the child could use his hand to go up and down his body in order to show that he was washing himself.

Results showed that autistic children scored higher in comparison to “dysphasic” children (these are children that did not have autism but were diagnosed with another language disorder) on the non-verbal communication elements of the tests, although not

always significantly higher. But autistic children used fewer gestures than the other children, which could indicate that they do not only have a problem with language, but also with gestures and their "inner language". On the verbal communication aspects of the test the autistic children scored lower than the dysphasic children. This could indicate that when using gestures to explain a word or a picture, autistic children will pick this up better than other children and therefore non-verbal communication could help these types of children to learn a language or new words.

Within non-verbal communication a distinction must be made between symbolic non-verbal communication and non-symbolic or concrete non-verbal communication, symbolic is when a child points at something to indicate that he or she wants to have that object, an example of concrete non-verbal communication is when a child pushes someone away with their hands. Argyle (1972) in Ricks and Wing (1975) classified the kinds of non-verbal communication used by humans under ten headings: bodily contact; proximity; orientation (the angle at which people sit or stand in relation to each other); appearance, including clothing; posture; head nods; facial expression; gestures; looking (eye contact); and non-verbal aspects of speech produced by variations in pitch, stress, timing, and volume. He also suggested that non-verbal communication has three different functions: (a) to communicate attitudes and emotions and to manage the immediate social situation; (b) to support and complement verbal communication with, for example, head nods, emphatic gestures, appropriate pauses while speaking, gestures illustrating size and shape; and (c) to replace language.

Autism is a disorder this is very hard to diagnose at an early age, at the earliest a firm diagnosis can be made at the end of the second year of the child's life, but the parents of autistic babies can be asked whether they notice a difference in them compared to non-autistic babies. This was done in the study of Ricks (1972) in Ricks and Wing (1975) and it showed that autistic children indeed express emotions in a different form compared to non-autistic children. In the study of Wing and Gould (unpublished, cited by Ricks and Wing, 1975) findings were that autistic children are able to convey the basic facial expressions, but that they tend to only show the extremes of emotions, so they can show anger and happiness but they cannot show doubt and embarrassment. It also showed that to autistic children these non-verbal communication skills do not come naturally through maturation, but are imprinted through repetition.

The study of Ricks and Wing (1975) also showed that although autistic children learn to speak at a later age than regular children and about half of them stay mute throughout their entire life, they do not substitute gestures for speech, like deaf children do. What autistic children mostly do to get what they want from their parents, is to take the hand of their mother or father and place it on the object he wants, or pushing a glass in the hands of the parent to indicate that he wants a drink. After this stage and when the child is a little bit older they can also use pointing to clarify to their parents what they want. Shaking their heads for saying no and nodding their heads for saying yes are hardly seen in autistic children. It proved to be difficult to teach autistic children how to use gestural languages, but in several studies it has been proven that it can work and that the child uses this type of non-verbal communication in order to communicate with their parents (Bartak, Rutter, & Cox, 1975; Webster, McPherson, Sloman, Evans, & Kuchar, 1973 in Rick & Wing, 1975). It is also usually helpful for teachers and parents to supplement speech with plenty of simple, obvious gestures used consistently (Wing & Gould, unpublished, cited by Ricks & Wing, 1975).

2.2 Parental Intervention

In the study of Drew, Baird, Baron-Cohen, Cox, Slonims, Wheelwright, Swettenham, Berry and Charman (2002) it has been found that non-verbal social communication skills are an important target in autism intervention and that this will likely lead to greater language skills in autistic children. This study did a pilot randomized control trail with parental intervention to improve the language skills of pre-school autistic children. The parent training program had different features, which included the promotion of joint action routines, the explicit teaching of joint attention behaviors such as index finger pointing and gaze switching, and the use of visual supports for spoken language. Target behaviors included commenting or declarative acts such as pointing, showing and holding objects out to adults (when combined with eye contact these are called “joint attention” acts). Another feature was doing specific activities with the autistic child, including mirror games (dyadic joint attention and imitation, moving on to mirror play with objects), index finger pointing in joint picture book “reading” (insisting on an adult-led pace, scaffolding and prompting index finger pointing to elicit adult naming), games to teach the child to follow adult index finger pointing (e. g. “Look!” to things the child likes), gaze switching eye contact game with balloons and bubbles, and

adult-led "table games" e. g. posting, lotto and sorting.

Next to the parent training group there was also a control group; the Local Services group. Both these groups had an initial assessment and a follow-up assessment. During the initial assessment Drew et al. (2002) made sure that there was no significant difference between the two groups. During the follow-up assessment the parental training group had a higher language comprehension (although not significantly), there was however a significant difference in "initial words understood" and "gestures produced". The parental training group also scored higher on overall language level, meaning that three of the children in the parent training group had spontaneous use of three-word phrases, five had single word speech and four had fewer than five words. In the Local services group no children had spontaneous use of three word phrases, three had single word speech and nine had fewer than five words. From the initial to follow-up assessment significantly more children in the parent training group moved from being non-verbal to having single word or phrase speech than in the Local services group.

Even though the findings of Drew's et al. (2002) study are consistent with basics of the parent training programme (a social pragmatic approach to developing non-verbal communication competence should lead to increased language competence), the language ability of the children in both groups was still severely compromised. 34 months old autistic children had the language age equivalent of a 16 months old regular child. This study showed that autistic children will always be behind regular children language and speech wise, but that parental intervention that uses non-verbal communication will help these children increase their language and speech skills.

Siller and Sigman (2002) say that autistic children respond less to joint attention than typically developing or developmentally delayed children. Similarly, they initiate joint attention less than children in these other groups, in that they attempt less to direct the attention of another person to an object or event by either pointing, showing, or alternating their gaze between an object and another person's eyes (Loveland & Landry, 1986; Mundy, Sigman, Ungerer, & Sherman, 1986; Sigman, Mundy, Sherman, & Ungerer, 1986; Mundy, Sigman, & Kasari, 1990; Sigman & Ruskin, 1999 in Siller & Sigman, 2002). Deficits in verbal communication are even more obvious in children with autism. Compared with typically developing children, most children with autism develop language late and at significantly slower rates (Le Couteur, Rutter, Lord, Rios, Robertson, Holdgrafer, & McLennan, 1989; Lord

& Rhea, 1997 in Siller & Sigman, 2002). What is striking about the language development of children with autism is that some children acquire good language skills and others remain largely non-verbal.

Early non-verbal communication and functional play skills have been linked to gains in language skills. One to three year old children with autism who responded more frequently to calls for joint attention by others made larger gains in language skills over a period of both 1 year (Mundy et al., 1990 in Siller & Sigman, 2002) and 9 years (Sigman & Ruskin, 1999 in Siller & Sigman, 2002) than children with autism who initially responded less to others' calls for joint attention, this supports the idea that non-verbal communication will help autistic children learn a language or new words.

Siller and Sigman (2002) also conducted a longitudinal study that incorporated a parent training programme, which compared the development of autistic children to developmentally delayed children and typically developing children. During this study they videotaped the three different groups while the child was presented with different types of toys, such as a ball, car or doll. They had three different elements within these play sessions that had to be measured; first the assessment of non-verbal communication skills, by asking the child for joint attention, and filming their response to it, and seeing if the child initiated joint attention. Secondly, the assessment of developmental and language skills, this was done by comparing the language skills of the children from the initial assessment with the three follow-up assessments. The final assessment was caregiver-child interactions; during which the caregiver and the child were filmed during play time.

The two major findings in their study were firstly that caregivers of children with autism synchronized their behaviors to their children's attention and activities as much as the caregivers of children with developmental delay and caregivers of typically developing children. Secondly, caregivers of children with autism who showed higher levels of synchronization during initial play interactions had children who developed superior communication skills over a period of 1, 10, and 16 years compared with children of caregivers who showed lower levels of synchronization during the first assessment. The fact that parents of children with autism achieve an equivalent level of synchronization is remarkable given how difficult it often is to determine what the child with autism is attending to and intending to do. The findings of Siller and Silman (2002) suggest that caregivers of children with autism successfully adapt their interactive behavior to the

language level of their child. It is interesting that the child's non-verbal communication skills are connected to caregiver's own tendency to initiate joint attention himself and by doing so the child will initiate joint attention sooner. But they are not connected to gain in the frequency with which children initiate joint attention unless the caregiver chooses to show, point, or offer an object that is already the focus of the child's attention. This evidence suggests that children with autism are able to learn by modeling if the activity selected is part of their attentional focus. Children with autism who have specific difficulties in interacting with other people might often experience these interactions as frustrating and unsuccessful. Therefore, an interactive partner who is sensitive to the child's interests might provide the child with the experience that interacting and sharing an interest with another person is fun and that this is motivating them. This research showed that the influence of the parent is very important in the speech development of an autistic child and that with a lot of attention and help the quality of language skills can improve significantly.

A third longitudinal study that also included parental interventions was done by Rogers, Hayden, Hepburn, Charlifue-Smith, Hall & Hayes (2006). In some ways this study was quite similar to the two previous discussed longitudinal intervention studies, by also trying to improve the language skills of autistic children. By using natural behavior teaching strategies they wanted to see whether children with autism acquired a new level of language skills over a period of twelve weeks. During a phase in this study the child was put in a setting with toys to play with and the objective was to teach the child to use the name for the toy if they wanted to play with it. For example, if the child ''requested'' a ball through reaching for it, the therapist would say ''Ball, you want ball'', while manipulating the child's lips to produce the initial syllable /ba/ or prompting in the entire sequence /bal/, and would give the child the ball in order to play with it. They played for a very brief period and then the situation was repeated so that the child had much opportunity to practice.

Results of this study were similar to the results of the other intervention studies; it showed that children who had intense supervision from their parents spoke more words after the study than children who did not have this type of supervision. After the study ended parents were encouraged to keep data of the speech development of their children, whilst continuing with the therapy the child followed during the twelve weeks of the study by themselves and report this to the therapist who was already working with the autistic child before the study was conducted. This showed that parents who continued prompting

their child with the same stimuli as the researchers made even more development with speech improvement and language skills with their child. It is crucial though that this type of therapy is closely matched to the already existing language level of the child, which means that it is very labor intensive and quite costly, however though, it shows positive results.

2.3 Autism and non-verbal communication

Research by Mesibov, Schopler and Hearsey (1994) in Lord, Risi, Lambrecht, Cook, Leventhal, DiLavore, Pickles and Rutter (2000) showed that children with mental retardation, with or without autism, appear more socially competent, less anxious, and more flexible when the language demands are low in relation to their level of language ability. Because the belief was that a low level of language ability must be connected with autism there used to be a lot of over-diagnosis of autism in children with insufficient language ability for the tasks and under-diagnosis of autism in children whose language abilities exceeded the expectations for certain tasks. This shows that language is a problem for autistic children, but that language and the autism diagnoses are not always connected to each other. Because verbal communication is problematic for most of them, non-verbal communication could really help these children to connect to the outer world.

Children with autism also have been found to show a limited range of non-verbal behaviors. In particular, less frequent use of eye contact, pointing, and showing objects has been reported (Baron-Cohen, 1989; Curcio, 1978; Landry & Loveland, 1989; Mundy, Sigman & Kasari, 1994; Sigman, Mundy, Sherman & Ungerer, 1986 in Stone, Ousley, Yoder, Hogan, and Hepburn, 1997). Autistic children have also been reported to be more likely to use pointing for the purpose of requesting than for indicating interest (Baron-Cohen, 1989; Curcio, 1978 in Stone et al., 1997).

In the study of Stone et al. (1997) the objective was to determine whether young children (two and three year olds) with autism, demonstrated different patterns of requesting and commenting, used different forms of non-verbal behaviors to communicate, and used less complex combinations of non-verbal behaviors during their communicative acts in comparison to non-autistic children. They fabricated 16 situations designed to call upon either requesting behavior or commenting behavior. Eight situations afforded the opportunity for the child to direct the adult's attention to an unusual or interesting event (commenting). Examples of the commenting situations are having a slinky drop from the

ceiling or having a balloon fly across the room as it deflates. The other eight situations were designed to call upon requesting behavior; for example, giving the child a clear jar containing crackers with the lid screwed tightly or giving the child a small amount of juice and then placing the juice container out of reach.

Results show that less than 1% of the communicative acts of autistic children were used for commenting. One explanation for the less frequent use of comments by children with autism may be that autistic children experience the sharing of attention with adults as less intrinsically rewarding than non-autistic children do. The reduced eye gaze and low rates of commenting in the communications of autistic children have an important element in common: Both suggest a lack of monitoring the attention of the communicative partner and this leads to a problem in shifting attention for the autistic child (Gomez, Sarria, & Tamarit, 1993; Mundy et al., 1986 in Stone et al., 1997). Difficulty in shifting attention has been seen as one of the factors underlying commenting problems (McEvoy et al., 1993; Mundy, 1995; Mundy, Sigman, & Kasari, 1993 in Stone et al., 1997) as well as other social deficits inherent to autism (Courchesne, 1995; Dawson & Lewy, 1989 in Stone et al., 1997). The greater use of direct motor acts (such as manipulating the examiner's hand) in autistic children may be an adaptation to compensate for difficulties in shifting attention between a partner and an object or event, which is consistent with the study of Ricks and Wing (1975) that is mentioned above. This study again shows that autistic children have difficulties with non-verbal communication and that they need supervision from parents or other caretakers in order for them to increase their communication skills.

A study by Mundy, Sigman and Kasari (1990) also showed that autistic children have difficulties with gazing at the object of communication and shifting their attention, this is in accordance with the findings of Stone et al. (1997). The ability to use gestures is assumed to reflect developments in the ability to regulate attention deployment between self, other, and object (Bakeman & Adamson, 1984 in Mundy, Sigman & Kasari, 1990). Joint attention skills may mark the development of the child's awareness that other people can see objects or events that the child sees (Rheingold, Hay, & West, 1976 in Mundy, Sigman & Kasari, 1990). Since children with autism lack these skills it is problematic for them to understand that other people observe the same things as they do and that could be an explanation why they do not communicate the same way as regular children do because they see no reason in conversing if their partner does not see the same thing as they do.

2.4 Autism and verbal communication

Lovaas, Berberich, Perloff, and Schaeffer (1966) in Ricks and Wing (1975) showed that autistic children acquire the ability to say new words through operant conditioning, an example of this is echolalia. This echoing has been found in children who are in their early stages of speech acquisition, but this soon fades away and is replaced by their spontaneous speech. With autistic children this echoing is not meaningful, but simply done as a parrot-like echo with exactly the same intonation and accent as the speaker. This could indicate that speech is not important to the autistic child and he or she does not see the need to interact with others or use verbal communication, this could be all the more reason why non-verbal interaction between parents and their autistic child is so important.

An alternative procedure that may evolve speech development in autistic children is simultaneous communication, meaning the simultaneous use of spoken language and signing of key words. Many autistic children in such treatment programs have demonstrated increases in spoken language development (Fulwiler & Fouts, 1976; Layton & Baker, 1981; Salvin, Routh, Foster, & Lovejoy, 1977; Schaeffer, 1980; Webster, McPherson, Sloman, Evans, & Kuchar, 1973 in Yoder & Layton, 1988). It is unclear whether simultaneous communication is a benefit for spoken language acquisition because of sign training, speech stimulation, or a combined effect of speech and sign. To investigate these three possibilities, Yoder and Layton's study (1988) compared the effectiveness of four training conditions: (a) sign training alone, (b) verbal imitation alone, (c) simultaneous presentation of sign and speech, and (d) alternating presentation between sign and speech.

Results indicate that sign training alone does not increase the number of words spoken by children with autism and verbal imitation alone was also found not significant. But a combination of sign and speech showed that autistic children have increased oral language skills after participating in this type of training. This could indicate that combining non-verbal communication with spoken words increases the level of language ability of children with autism.

2.5 Research Statement and Hypotheses

From this chapter we have seen that non-verbal elements benefit the language acquisition of children with autism, and that over time they acquire more new words than autistic children that only received verbal cues. It also shows that intensive guidance from caregivers

results in greater speech development and a larger vocabulary. In the previous studies this caregiver was usually a parent, which seems logical because this is the person that is the closest to the child and spends the most time with him or her. A logical next step for me seemed to be to explore whether a teacher could also be the one to incorporate non-verbal cues and therefore help the autistic child with language acquisition. Children spend a lot of time in school and therefore I believe it would be very beneficial for them when their teaching methods combines verbal cues with non-verbal cues, which could help them learn more accurately.

In the study of Yoder and Layton (1988) they presented the autistic child with speech and sign words simultaneously and it showed that it had positive effects on their language skills, so in this study I want to further expand this and present the participants simultaneously with verbal and non-verbal cues and expect them to have better results in this condition than when they are only presented with verbal cues.

From the theoretical background the following research statement can be deducted;

Children with autism can improve their language skills and vocabulary if their teaching method combines spoken words with non-verbal communication.

The hypotheses that can be subtracted from this research statement are as follows. The main hypothesis is;

H1: Autistic children will remember new words more accurately when verbal and non-verbal communication (say the word out loud and use non-verbal cues) are combined than when only verbal communication (say the word out loud) is used.

Two hypotheses that follow from the main hypothesis are;

H2: When the teacher is pointing at a picture of the word which is to be learned while also saying the new word out loud, the autistic child will remember the word more accurately than when only the word is said out loud.

&

H3: Children with autism will recognize new words more accurately when an image of the word is simultaneously presented while uttering the new word by the teacher.

By more accurately is meant that when asking the child to name the words that they were taught afterwards, they will be able to name more words from the condition that used verbal cues and non-verbal cues simultaneously than words from the condition that only used verbal cues.

3. Methodology

3.1 Participants

This study consisted of observing eight young Dutch boys (Age: *M*=6.38, *SD*=.52), all students at the Xaveriusschool, location Station 29 in Guttecoven, Limburg, the Netherlands. All participants were close to one another in age and all came from the same class (groep 2/3 in Dutch). All participants were diagnosed with some type of autism and received special education in order to deal with their autism. A component of this special education is speech therapy, which helps them with their verbal communication.

The speech therapist that works at this particular school selected the children whom she thought were suited to participate in the experiment. All eight participants were similar to each other in intelligence level, attention span, social skills and verbal skills. The participants were more or less comparable in vocabulary, so they were also comparable in which of the presented words they did or did not already knew.

3.2 Design and Materials

The words that were used in the experiment came from a box of cards that are used to learn the children at the Xaveriusschool new words. Each set of cards contains a certain theme and each theme is placed into the education of the children. While conducting the experiment the theme the children were about to work with was Fruits & Vegetables, therefore the school suggested that I use words from this theme so that the children would continue their education while participating in the experiment. The words were placed into two conditions; only verbal and verbal in combination with non-verbal communication.

Comparable words were paired with each other and each was used in a different condition. The criterion for pairing two words was similarity; the paired items had to be

similar to each other so that this would not be of significance during the analysis. If the paired words would not be similar to each other it might be possible that the child would recognize a certain fruit or vegetable over another because of the difficulty level of the portrayed image. Items were matched to each other on the basis of these factors; the number of syllables, appearance of the fruit/vegetable or the level that the fruit/vegetable would be unknown to the participants, although fruits were only matched with fruits and vegetables only with vegetables[1]. One already familiar pair was put into the data set in order to get the participant known to the intention of the experiment; this pair was "Banana/Pear". A total of 18 words were used, divided into two conditions and into nine pairs.

Table 1 shows the different pairs and conditions of the words selected from the Fruits & Vegetables card set. Appendix C shows the pairs of cards used in the experiment, the card on top came from condition one and the card below came from condition two.

Table 1: *Conditions and pairs of words in Dutch (English translation between brackets)*

	Condition 1	Condition 2
Pair 1	Aarbei *(Strawberry)*	Framboos *(Raspberry)*
Pair 2	Knoflook *(Garlic)*	Radijs *(Radish)*
Pair 3	Courgette *(Zucchini)*	Aubergine *(Eggplant)*
Pair 4	Kokosnoot *(Coconut)*	Ananas *(Pineapple)*
Pair 5	Stervrucht *(Starfruit)*	Passievrucht *(Passionfruit)*
Pair 6	Grapefruit *(Grapefruit)*	Avocado *(Avocado)*
Pair 7	Champignon *(Mushroom)*	Paprika *(Bell Pepper)*
Pair 8	Sperzieboon *(String Bean)*	Komkommer *(Cucumber)*
Pair 9	Banaan *(Banana)*	Peer *(Pear)*

[1] These pairing criteria were made in Dutch; in English they might not be similar to each other

3.3 Procedure

After the speech therapist had selected children who were fit for the experiment, the parents had to give their consent that their child would participate. A consent letter and a consent form were sent out, accompanied by a letter from the school itself that stated that the experiment would be conducted with their consent and supervision. The letter explained what the purpose of the experiment was and also ensured the privacy of the child. (Both the consent letter and the signed consent forms (both in Dutch) can be found in Appendix A & Appendix B). A total of nine consent forms came back signed, one participant was not present during the day the experiment took place, therefore only eight students participated.

Before the real experiment was conducted, a dry-run was done in order to see whether the experiment had to be adjusted, how the children would react to the experiment and it was also a test for the experiment leader, in order to see whether the experiment was conducted the way it supposed to be. The dry-run revealed certain aspects of the experiment that had to be adjusted before the real experiment took place.

The real experiment took place on a normal school day and the selected children were one at a time taken from their class into a silent room to participate in the experiment. Because children with autism are known to have difficulties when their normal routine is disrupted, the speech therapist told them that they would have to perform a little task with her and that there was someone else in the room who would watch while they did this little task and that she would videotape them so she could remember what happened during the task. The children were told to ignore the other person in the room that would videotape them.

Because children with autism have problems with irregularities and things that are different from how they normally are (Rapin & Tuchman, 2008), it was decided that the speech therapist would be the experiment leader. All participants were familiar with her and were comfortable around her. If I myself had acted as the experiment leader the children might not have reacted in the way they normally would have or even not responded at all. For this reason I was the one that videotaped the experiment leader and the child during the experiment and sat very discreetly at a faraway distance so that the child would not experience any disruption from my part.

The experiment started with the child saying their name, after this the experiment

leader had two conditions of cards which showed a picture of a fruit or vegetable that the child preferably did not know yet or did not know the name for. In condition one were words that would only be spoken by the experiment leader and the child had to repeat the word. The card with a picture of the words in this condition would not be shown to the child. Condition one was the verbal condition. Each word in condition one was paired to a word in condition two. After the child had repeated the word from condition one, the paired word from condition two was uttered by the experiment leader while simultaneously showing the card with a picture of the word. Condition two was the verbal combined with non-verbal communication condition, when the experiment leader showed the card with the picture; she would also gaze at the picture and point to the picture. The participant picked up on these non-verbal cues and therefore was led to also look at the picture. After all the words from each condition were presented to the child, the cycle was repeated in order for the child to hear and/or see each word again.

After the participants were presented with each word twice, the experiment leader shuffled all the cards so that the conditions were blended into each other. One at the time, the experiment leader showed the participant a card and asked what was on the card, the child had to name the fruit or vegetable that was portrayed on the card and if he did not know the answer the experiment leader would tell him what it was. So half of the cards were familiar to the child because he had seen them twice before in combination with verbal and non-verbal cues. The other half of the cards were not supposed to be familiar since the child had only heard the name but was not presented with an image or non-verbal cues. Some of the children did however recognize some of the fruits or vegetables from condition one. After the child had completed the task he was rewarded with a sticker and brought back to his class.

3.4 Measurements

After gathering all the data, I had to evaluate the subjects' performance in each condition. In order to evaluate their performance, three separate measurements were done to see whether a difference in performance was found between the conditions.

To begin with, it had to be measured how many words from each condition were remembered by each child, followed by a measurement of the accuracy of remembered

items (fruit and vegetables). Finally it was measured if the different pairs of words were of influence when trying to find a difference between the two conditions.

4. Results

4.1 Hypothesis 1

Autistic children will remember new words more accurately when verbal and non-verbal communication (say the word out loud and use non-verbal cues) are combined than when only verbal communication (say the word out loud) is used.

In order to confirm or dismiss this hypothesis the performance of the participants in each condition had to be compared to each other to see whether a significant difference would be found. When looking for a significant difference between the two conditions, Paired-Samples T Tests were done since the items are comparable and the experiment was a within-subject design. Three different T Tests were done so results would not be dependent on one statistical test and three separate SPSS files were made

The first data set displayed how many items each child remembered from the two conditions (each out the total of 9 items). To assess the assumptions of the test, we checked whether the data was normally distributed and whether the variance of the two samples was equal. After this a Paired-Samples T Test was done to see whether a significant difference between the two conditions was present.

The second set displayed the two types of items, fruit and vegetables, and how many items were recognized by the participants in both conditions. Because the fruit type consisted of 5 pairs and the vegetables type of 4 pairs of words it was not possible to put down how many items were recognized, it was decided that this would be measured by accuracy. If a participant remembered 2 out of 5 fruits and 3 out of 4 vegetables in condition 1, it was put down as 0,40 for fruit and 0,75 for vegetables. For this data set the variance and normal distributions were also checked, followed by a Paired-Samples T Test.

Data set 3 was quite similar to data set 2, except instead of dividing by types of words, this set was designed to see whether the pair of words was of influence when trying to find a difference between the two conditions. When the participant did not remember the word from pair 1 in the verbal condition, a 0 was put down, and if he did remember the non-verbal word from pair 1, a 1 was put down. The procedures and test that were done in order to find this were the same as in the previous data sets.

The pre-test (normalcy and variance equality) proven to be valid, so the Paired-Samples T Tests could be executed. The normalcy was found through normal distributions, their graphs can be found in Appendix D. In Data set 1 a marginal difference is found between the verbal and the non-verbal condition; Verbal (*M*=4.75, *SD*=1.28, S^2 =1.64), Non-verbal (*M*=5.13, *SD*=1.13, S^2=1.27). The Paired-Samples T Test showed t(7)=-1,16, p=.29. There is no significant difference between the two conditions (p > .05). A bar chart with the mean accuracy and error bars of this measurement can be found in Figure 7.

Data set 2 also showed a marginal difference between the two conditions; Accuracy in the verbal condition (*M*=.53, *SD*=.22, S^2= .05), Accuracy in the non-verbal condition (*M*=.58, *SD*=.21, S^2=.05). The Paired-Samples T Test showed t(15)=-.86, p=.40. There is no significant difference between the two conditions (p > .05). A bar chart with the mean accuracy and error bars of this measurement can be found in Figure 8.

Data set 3 again revealed a marginal difference between the two conditions; Verbal (*M*=.53, *SD*=.50, S^2= .25), Non-verbal (*M*=.57, *SD*=.50, S^2= .25). The Paired-Samples T Test showed t(71)=-.77, p=.44. There is no significant difference between the two conditions (p > .05). A bar chart with the mean accuracy and error bars of this measurement can be found in Figure 9.

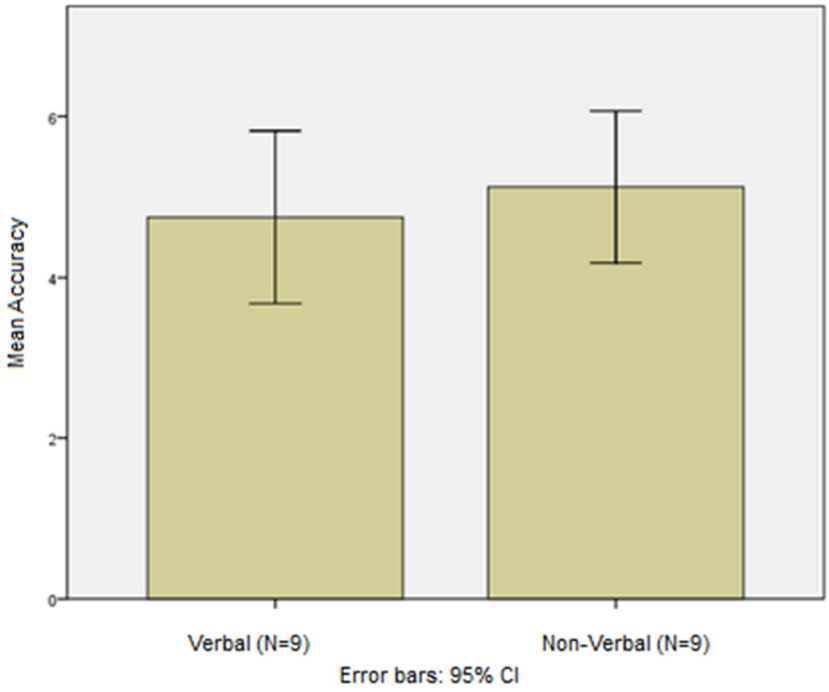


Figure 7: *Mean accuracy and error bars of measurement in Data set 1*

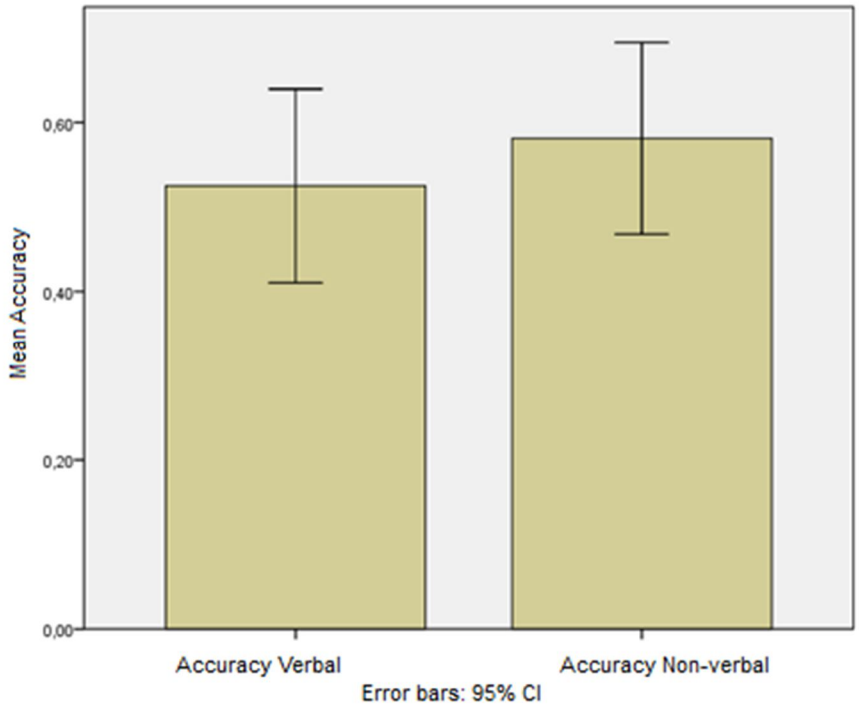


Figure 8: *Mean accuracy and error bars of measurement in Data set 2*

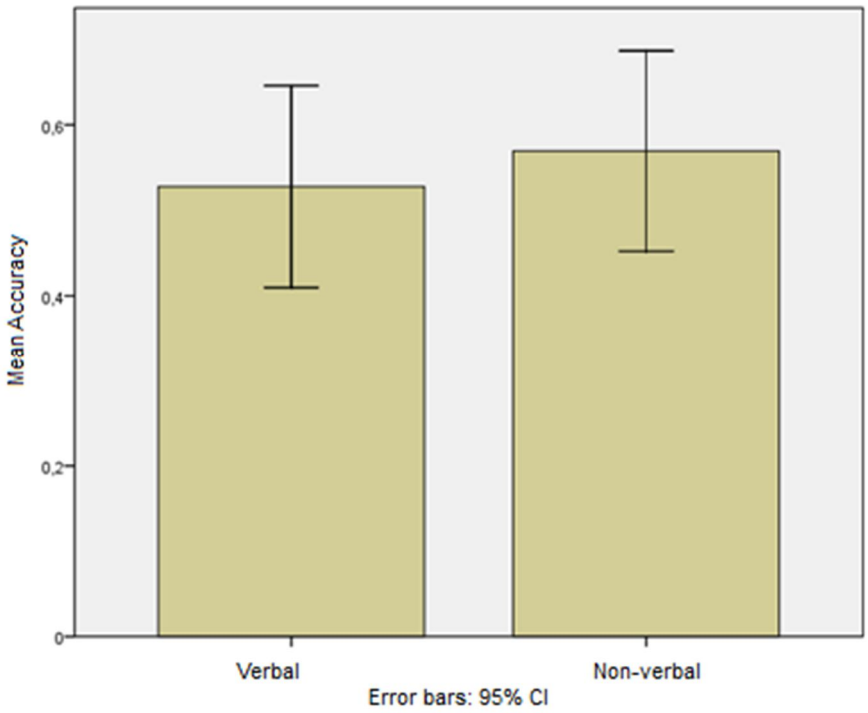


Figure 9: *Mean accuracy and error bars of measurement in Data set 3*

4.2 Hypothesis 2 and Hypothesis 3

H2: When the teacher is pointing at a picture of the word which is to be learned while also saying the new word out loud, the autistic child will remember the word more accurately than when only the word is said out loud.

H3: Children with autism will recognize new words more accurately when an image of the word is simultaneously presented while uttering the new word by the teacher.

Both these hypotheses are deducted from the main hypotheses and therefore only can be confirmed if hypothesis 1 is also confirmed. The same pre-tests and statistical test were done in order to find if there is a significant difference between the two conditions that can either confirm or dismiss hypothesis 2 and hypothesis 3. The outcome of the test can be found under Hypothesis 1.

4.3 Joint Engagement

While conducting the experiment, it was expected that the participants would have trouble with engaging with the experiment leader since it is know that children diagnosed with autism have difficulties with joint attention (see Theoretical Background). Being prepared that it would take some time to get the attention of the children and remain having joint engagement with them in order to properly conduct the experiment; it was remarkable that every participant, without exception, had no trouble at all remaining engaged with the experiment leader. While the participant might have had questions or remarks during the experiment, they were completely focused on the task when they were being asked to perform what was asked of them. This was an unexpected element that defies what has been found in previous material on this matter.

5. Discussion

The aim of this study was to see whether incorporating non-verbal elements into teaching methods showed improvement in the recollection of new words by young children diagnosed with a form of autism. In order to do so, an experiment was set up in which the participants were presented with new words, either belonging to the verbal condition or the non-verbal condition, and after two training sequences they were asked how the item presented to them on a picture card was called. The expected outcome suggested that when participants were presented with new words in the non-verbal condition they would

recognize and remember more new words afterwards then words that belonged to the verbal condition. This suggested outcome coincides with the research statement and the hypotheses;

RQ: Children with autism can improve their language skills and vocabulary if their teaching method combines spoken words with non-verbal communication.

H1: Autistic children will remember new words more accurately when verbal and non-verbal communication (say the word out loud and use non-verbal cues) are combined than when only verbal communication (say the word out loud) is used.

H2: When the teacher is pointing at a picture of the word which is to be learned while also saying the new word out loud, the autistic child will remember the word more accurately than when only the word is said out loud.

H3: Children with autism will recognize new words more accurately when an image of the word is simultaneously presented while uttering the new word by the teacher.

5.1 Hypothesis 1

Results showed that there is indeed a marginal difference between how many words were remembered in the two different conditions. It showed that more words belonging to the second condition were recollected by the participants, thus indicating that adding non-verbal cues when teaching new words has a positive effect on children with autism. Since the number of participants was quite low (N=8), it is impossible to find a significant effect when comparing the two conditions with statistical test. Therefore, since there is no significant difference ($p > .05$), hypothesis 1 is not confirmed and needs further investigation.

5.2 Hypothesis 2 and Hypothesis 3

Due to the limited number of participants, hypothesis 2 and 3 also cannot be confirmed due to the lack of a significant effect and have to be dismissed. These two hypotheses are in relation with, and deducted from hypothesis 1, so although no significant effect was found

($p > .05$), there is still an insignificant effect. It can be said that when new words are learned it helps to incorporate non-verbal elements into the teaching methods, like gazing and showing a picture, as results show that more words were remembered when combining non-verbal elements were combined with verbal elements than when only the new word was uttered by the teacher.

5.3 Research Question

Since none of the three hypotheses could be confirmed, other evidence is needed to confirm the research question. Even though no significant effects were found, results imply that this would be the case if the number of participants would have been greater. It is thus fair to say that children with autism can probably improve their language skills and vocabulary if their teaching method combines spoken words with non-verbal communication.

5.4 Conclusion

The hypotheses could not be confirmed since there were no significant effects found when comparing the verbal and non-verbal condition with each other. It is therefore also difficult to confirm the research question. The reason no significant effect could be found was related to the limited amount of participants in this study. Therefore it is acceptable to believe that non-verbal communication is a factor that helps children with autism learn new words more accurately and therefore can be incorporated by teachers in their teaching methods. A condition is that incorporating this non-verbal communication has to be done in a consistent and regular manner since these types of children thrive on routine and consistency (Rapin & Tuchman, 2008).

5.5 Limitations and further research

The first obvious limitation was the number of participants in this study. This was partially due to the fact that the participants had to meet certain requirements, such as age and having been diagnosed with autism. The cooperating school only had a limited amount of children in this age range that were diagnosed with autism and also consent from the parents was necessary in order to conduct the experiment on them. Due to certain time constraints and relying on others to respond it was also not an option to conduct the same experiment on other schools that had similar students. Another limitation was the fact that I

had to conduct this study on my own, which I enjoyed doing very much, but also meant that I might not have been able to do the same amount of work that could have been done were there more people involved in conducting this study.

While finishing up the experiment we came across another important limitation; in the verbal condition the child was not presented with a visual image of the word and the word was only uttered by the teacher. This means that the child had no cues that could lead him to learn the word and later on recognize the word when the images were presented. In this study the participants did recognize some words from the verbal condition, probably because they were somewhat familiar with the word before the experiment, but they could not have recognized it by only hearing the name of the fruit/vegetable. In the experiment we should have put this condition as a base line or as a "zero" condition, and not compare the two conditions but put the non-verbal condition against the base line to measure any improvements.

These limitations lead to recommendations for future studies; it would be very much recommended to find enough participants so that it is possible to find significant effects and therefore really can say whether non-verbal communication has an influence. In order to find enough participants, a larger amount of time or people has to be involved. You also have to keep in mind that you are relying on other people (the schools), which could mean that you could go for a month without any progress. It could also be interesting to see whether the incorporation of non-verbal communication into teaching methods would reach beyond language acquisition. Such as implementing non-verbal cues when teaching autistic children mathematics. In the future the verbal condition and the non-verbal condition should be made more comparable so that a reliable difference can be found between the two conditions.

References

Bartak, L., Rutter, M., & Cox, A. (1975) A Comparative Study of Infantile Autism and Specific Developmental Receptive Language Disorder: I. The Children. *The British Journal of Psychiatry,* 126, 127 – 145

Drew, A., Baird, G., Baron-Cohen, S., Cox, A., Slonims, V., Wheelwright, S., Swettenham, J., Berry, B. & Charman, T. (2002) A pilot randomised control trial of a parent training intervention for pre-school children with autism (Preliminary findings and methodological challenges). *European Child & Adolescent Psychiatry,* 11, 266 – 272

Lord, C., Risi, S., Lambrecht, L., Cook, E. H., Leventhal, B. L., DiLavore, P. C., Pickles, A. & Rutter, M. (2000) The Autism Diagnostic Observation Schedule–Generic: A Standard Measure of Social and Communication Deficits Associated with the Spectrum of Autism. *Journal of Autism and Developmental Disorders,* 30(3), 205 – 223

Mundy, P., Sigman, M. & Kasari, C. (1990) A Longitudinal Study of Joint Attention and Language Development in Autistic Children. *Journal of Autism and Developmental Disorders,* 20(1), 115 – 128

Rapin, I. & Tuchman, R. F. (2008) Autism: Definition, Neurobiology, Screening, Diagnosis. *Pediatric Clinics of North America,* 55(5), 1129 – 1146

Ricks, D. M. & Wing, L. (1975) Language, Communication, and the Use of Symbols in Normal and Autistic Children. *Journal of Autism and Childhood Schizophrenia,* 5(3), 191 – 221

Rogers, S. J., Hayden, D., Hepburn, S., Charlifue-Smith, R., Hall, T. & Hayes, A. (2006) Teaching Young Nonverbal Children with Autism Useful Speech: A Pilot Study of the Denver Model and PROMPT Interventions. *Journal of Autism and Developmental Disorders,* 36, 1007 - 1024

Siller, M. & Sigman, M. (2002) The Behaviors of Parents of Children with Autism Predict the Subsequent Development of Their Children's Communication. *Journal of Autism and Developmental Disorders,* 32(2), 77 – 89

Stone, W. L., Ousley, O. Y., Yoder, P. J., Hogan, K. L. & Hepburn, S. L. (1997) Nonverbal Communication in Two and Three-Year-Old Children with Autism. *Journal of Autism and Developmental Disorders,* 27(6), 677 – 696

Yoder, P. J. & Layton, T. L. (1988) Speech Following Sign Language Training in Autistic Children with Minimal Verbal Language. *Journal of Autism and Developmental Disorders,* 18(2), 217 - 229

Appendix A: Consent Letter

Beste ouders/verzorgers,

Voor mijn bachelorscriptie vanuit de Universiteit van Tilburg doe ik onderzoek naar non-verbale communicatie bij kinderen met autisme. Vanuit de Xaveriusschool is mij de mogelijkheid geboden om dit via hen te doen. Ik wil graag een aantal kinderen een simpele communicatie taak laten uitvoeren onder begeleiding van logopediste Marian de Visser en de resultaten hiervan later uitwerken.
Via deze brief wil ik uw toestemming vragen om uw kind deel te laten nemen aan deze taak en een video opname maken hiervan die ik later gebruik voor het analyseren van de taak. Deze video opname zal niet openbaar gemaakt worden en alleen worden gebruikt voor het onderzoek. Nadat het onderzoek is afgelopen zullen de video opnames worden vernietigd.
Als u hiertoe toestemming geeft kunt u het bijgevoegde consent formulier ondertekenen en retouneren aan Marian de Visser. Mocht u verdere vragen hebben dan kunt u contact opnemen via e.e.j.c.niederer@tilburguniversity.edu
Alvast bedankt voor de medewerking.

Met vriendelijke groet,

Emma Niederer

Studente Communicatie- en Informatie Wetenschappen
Tilburg University

Appendix B: Consent Forms

1.

nathan
09/10/0

UNIVERSITEIT VAN TILBURG

Understanding Society

Consent formulier

Met de ondertekening van dit formulier verklaar ik, de ondergetekende, akkoord te gaan met de deelname van mijn kind aan het onderzoek in het kader de bachelorscriptie van Emma Niederer, vanuit de Universiteit van Tilburg.

De bedoeling van het onderzoek is mij uitgelegd en ik heb de kans gekregen om alle onduidelijkheden nader verklaard te krijgen.

Ik begrijp dat mijn kind centraal staat in het onderzoek. Ik heb er geen bezwaar tegen dat mijn kind wordt opgenomen tijdens de communicatie taak, en dat de filmopname later wordt verwerkt.

Ik begrijp dat deelname volledig op vrijwillige basis gebeurt en dat ik ten alle tijde, en zonder opgave van redenen, mijn deelname aan het onderzoek kan opzeggen.

Naam ondergetekende (in blokletters)

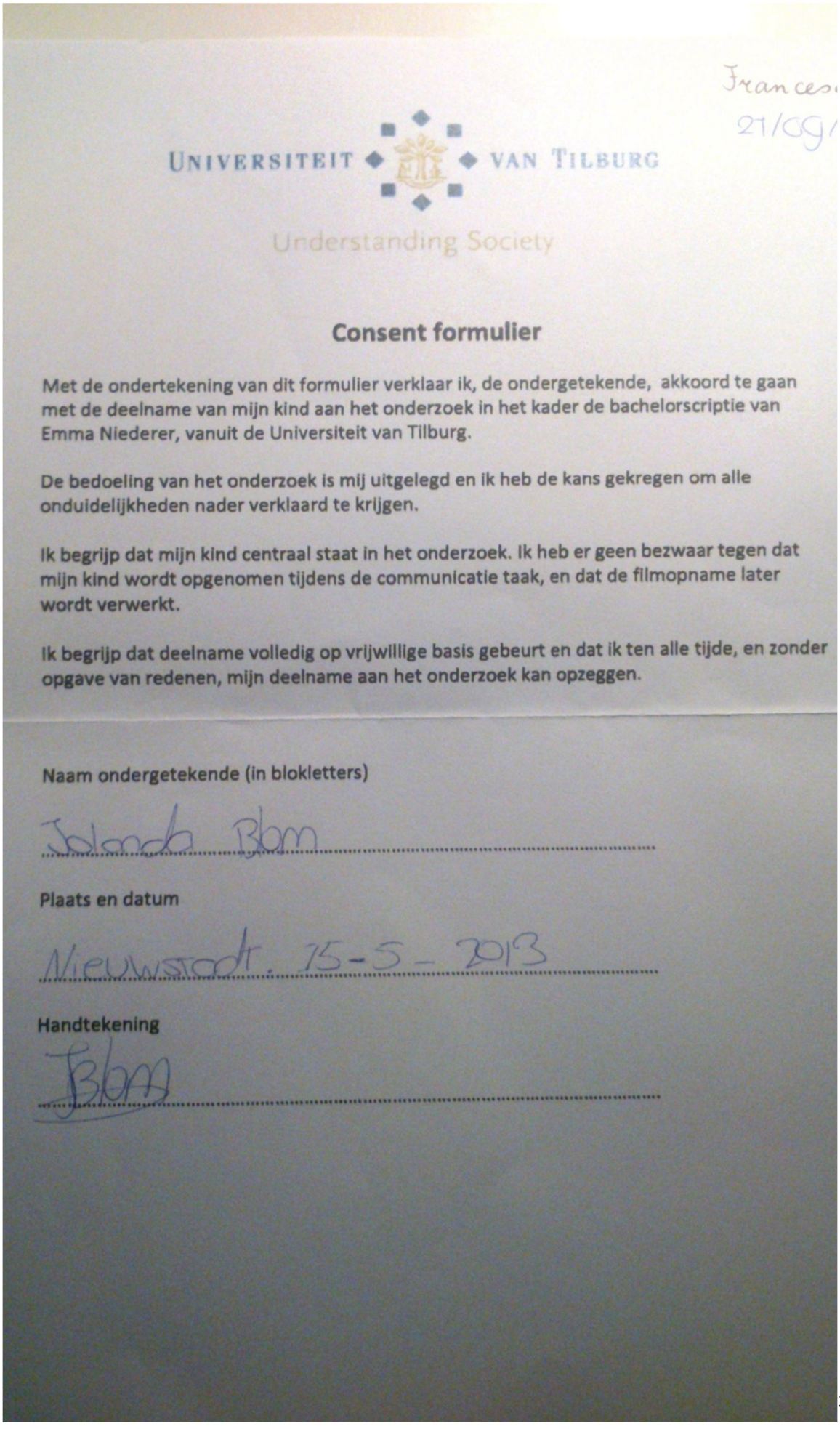
DEPEIS

Plaats en datum

Sten, 20-5-2013

Handtekening

2.



Frances
21/09/

UNIVERSITEIT VAN TILBURG

Understanding Society

Consent formulier

Met de ondertekening van dit formulier verklaar ik, de ondergetekende, akkoord te gaan met de deelname van mijn kind aan het onderzoek in het kader de bachelorscriptie van Emma Niederer, vanuit de Universiteit van Tilburg.

De bedoeling van het onderzoek is mij uitgelegd en ik heb de kans gekregen om alle onduidelijkheden nader verklaard te krijgen.

Ik begrijp dat mijn kind centraal staat in het onderzoek. Ik heb er geen bezwaar tegen dat mijn kind wordt opgenomen tijdens de communicatie taak, en dat de filmopname later wordt verwerkt.

Ik begrijp dat deelname volledig op vrijwillige basis gebeurt en dat ik ten alle tijde, en zonder opgave van redenen, mijn deelname aan het onderzoek kan opzeggen.

Naam ondergetekende (in blokletters)

Jolanda Blom

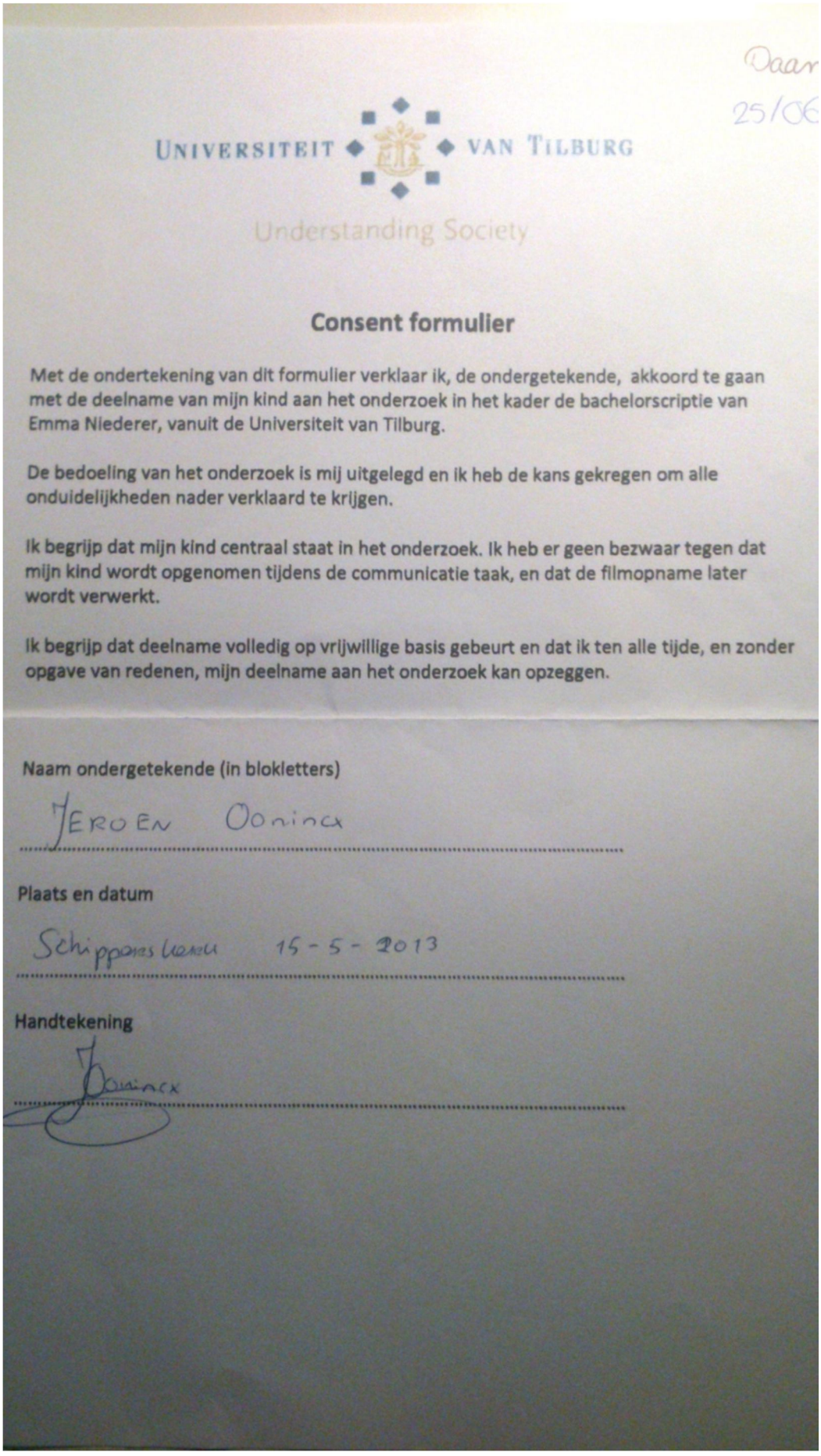
Plaats en datum

Nieuwstadt, 15-5-2013

Handtekening

Blom

3.



Daar
25/06

UNIVERSITEIT VAN TILBURG

Understanding Society

Consent formulier

Met de ondertekening van dit formulier verklaar ik, de ondergetekende, akkoord te gaan met de deelname van mijn kind aan het onderzoek in het kader de bachelorscriptie van Emma Niederer, vanuit de Universiteit van Tilburg.

De bedoeling van het onderzoek is mij uitgelegd en ik heb de kans gekregen om alle onduidelijkheden nader verklaard te krijgen.

Ik begrijp dat mijn kind centraal staat in het onderzoek. Ik heb er geen bezwaar tegen dat mijn kind wordt opgenomen tijdens de communicatie taak, en dat de filmopname later wordt verwerkt.

Ik begrijp dat deelname volledig op vrijwillige basis gebeurt en dat ik ten alle tijde, en zonder opgave van redenen, mijn deelname aan het onderzoek kan opzeggen.

Naam ondergetekende (in blokletters)

JEROEN Oonincx

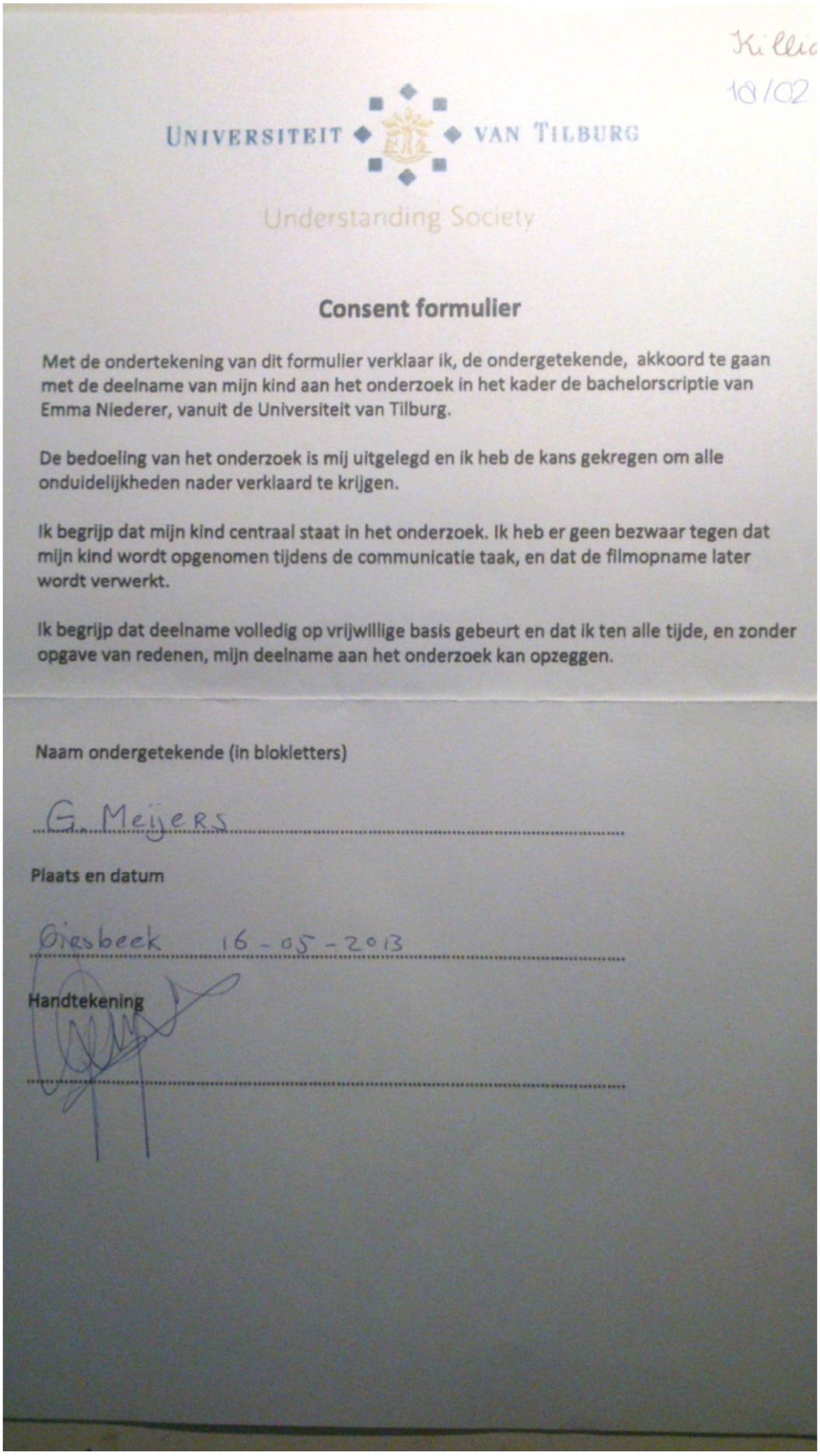
Plaats en datum

Schipperskerke 15-5-2013

Handtekening

Oonincx

4.



Killia
18/02

UNIVERSITEIT VAN TILBURG

Understanding Society

Consent formulier

Met de ondertekening van dit formulier verklaar ik, de ondergetekende, akkoord te gaan met de deelname van mijn kind aan het onderzoek in het kader de bachelorscriptie van Emma Niederer, vanuit de Universiteit van Tilburg.

De bedoeling van het onderzoek is mij uitgelegd en ik heb de kans gekregen om alle onduidelijkheden nader verklaard te krijgen.

Ik begrijp dat mijn kind centraal staat in het onderzoek. Ik heb er geen bezwaar tegen dat mijn kind wordt opgenomen tijdens de communicatie taak, en dat de filmopname later wordt verwerkt.

Ik begrijp dat deelname volledig op vrijwillige basis gebeurt en dat ik ten alle tijde, en zonder opgave van redenen, mijn deelname aan het onderzoek kan opzeggen.

Naam ondergetekende (in blokletters)

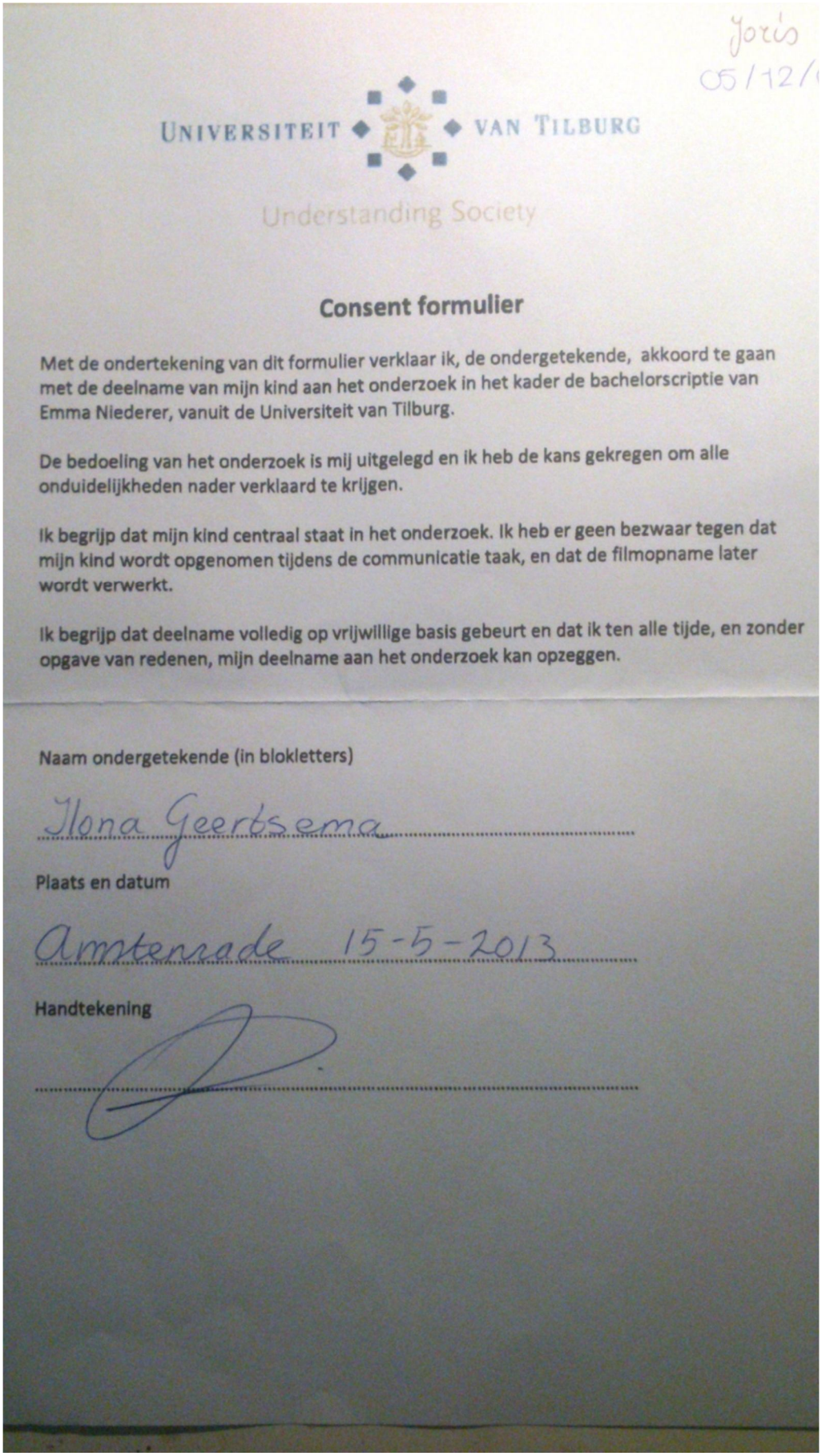
G. Meijers

Plaats en datum

Giesbeek 16-05-2013

Handtekening

5.



Joris
05/12/

UNIVERSITEIT VAN TILBURG

Understanding Society

Consent formulier

Met de ondertekening van dit formulier verklaar ik, de ondergetekende, akkoord te gaan met de deelname van mijn kind aan het onderzoek in het kader de bachelorscriptie van Emma Niederer, vanuit de Universiteit van Tilburg.

De bedoeling van het onderzoek is mij uitgelegd en ik heb de kans gekregen om alle onduidelijkheden nader verklaard te krijgen.

Ik begrijp dat mijn kind centraal staat in het onderzoek. Ik heb er geen bezwaar tegen dat mijn kind wordt opgenomen tijdens de communicatie taak, en dat de filmopname later wordt verwerkt.

Ik begrijp dat deelname volledig op vrijwillige basis gebeurt en dat ik ten alle tijde, en zonder opgave van redenen, mijn deelname aan het onderzoek kan opzeggen.

Naam ondergetekende (in blokletters)

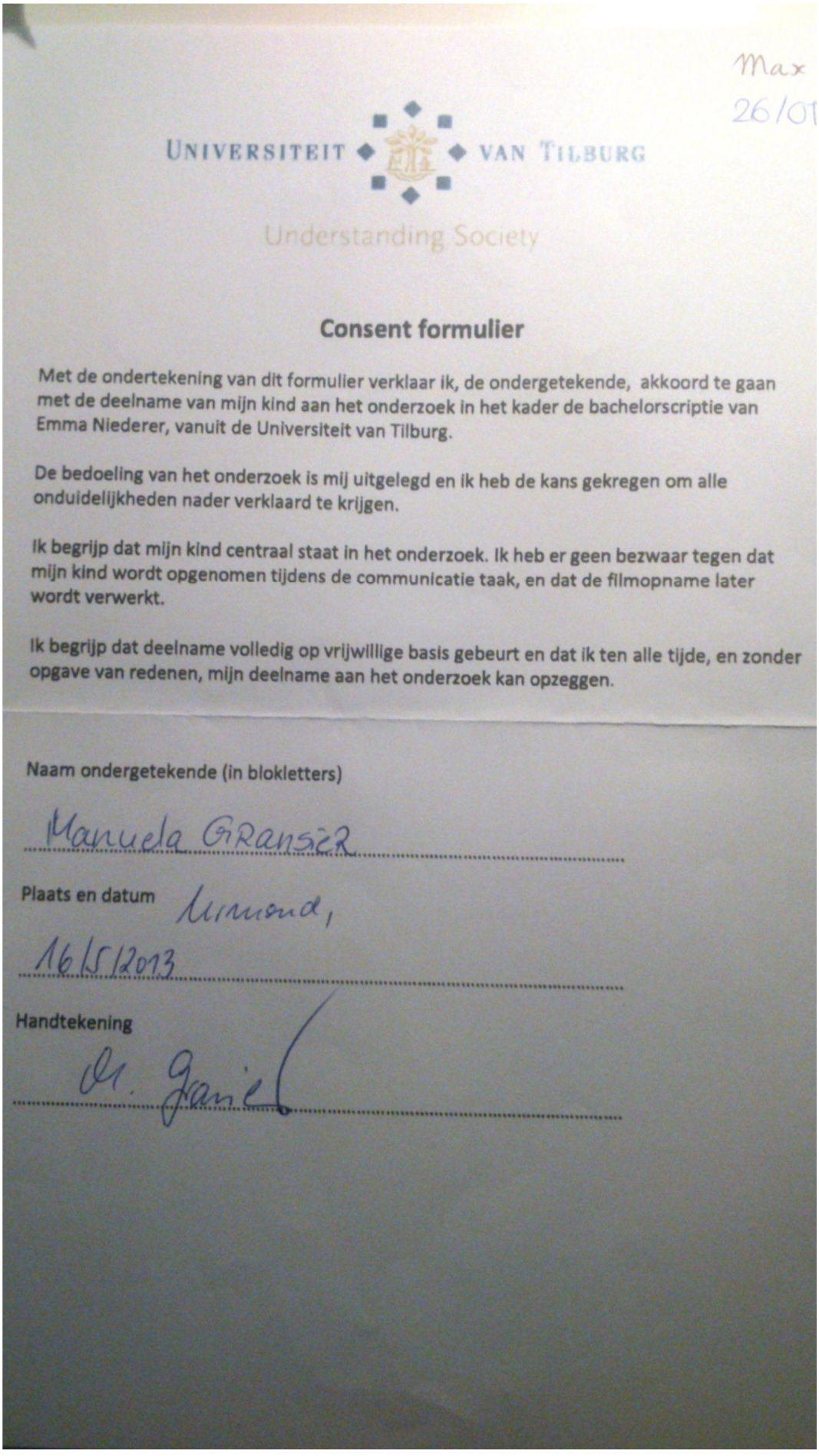
Ilona Geertsema

Plaats en datum

Amstenrade 15-5-2013

Handtekening

6.



Max
26/01

UNIVERSITEIT VAN TILBURG

Understanding Society

Consent formulier

Met de ondertekening van dit formulier verklaar ik, de ondergetekende, akkoord te gaan met de deelname van mijn kind aan het onderzoek in het kader de bachelorscriptie van Emma Niederer, vanuit de Universiteit van Tilburg.

De bedoeling van het onderzoek is mij uitgelegd en ik heb de kans gekregen om alle onduidelijkheden nader verklaard te krijgen.

Ik begrijp dat mijn kind centraal staat in het onderzoek. Ik heb er geen bezwaar tegen dat mijn kind wordt opgenomen tijdens de communicatie taak, en dat de filmopname later wordt verwerkt.

Ik begrijp dat deelname volledig op vrijwillige basis gebeurt en dat ik ten alle tijde, en zonder opgave van redenen, mijn deelname aan het onderzoek kan opzeggen.

Naam ondergetekende (in blokletters)

Manuela GRANSER

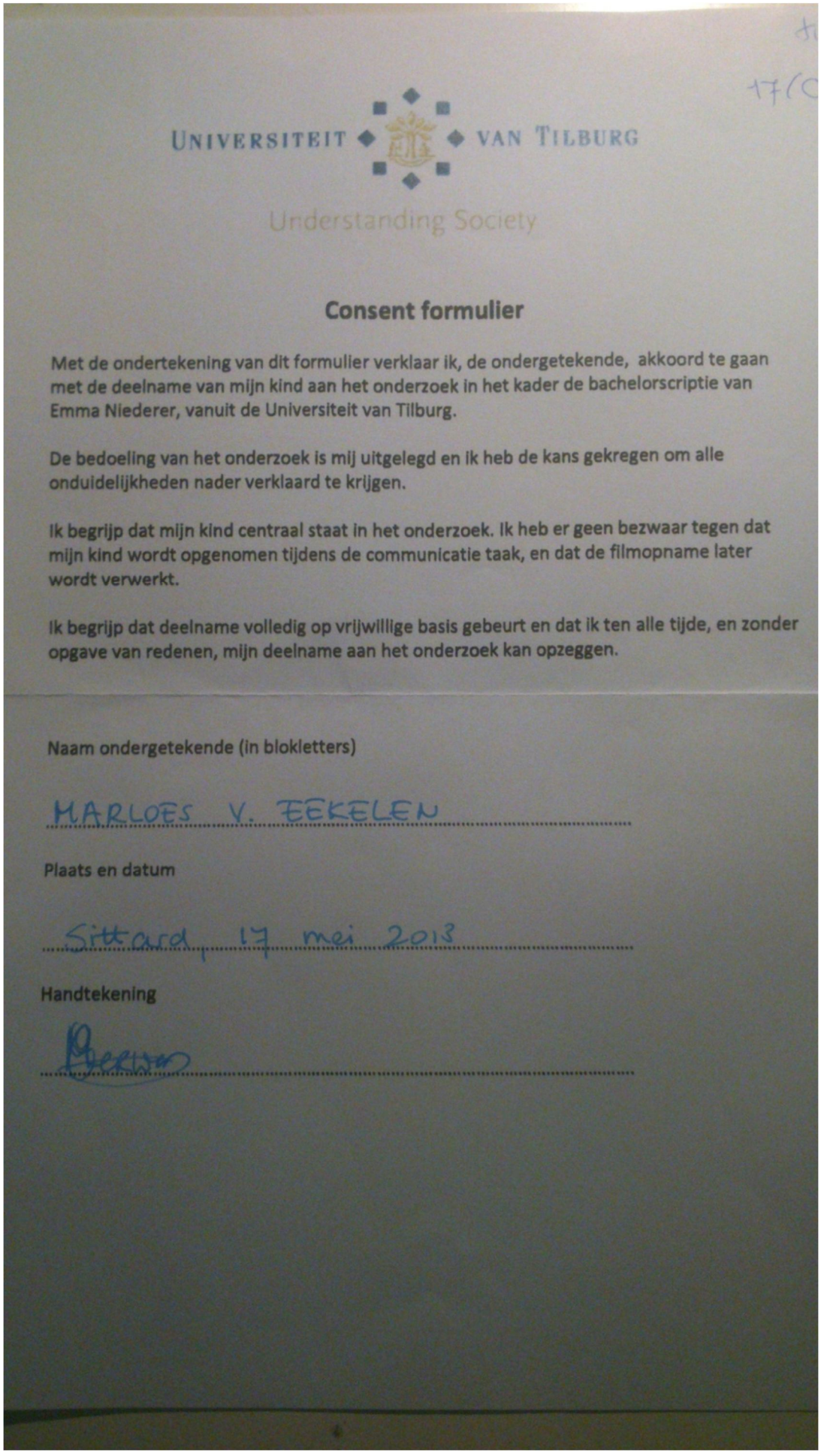
Plaats en datum Limmond,

16/5/2013

Handtekening

M. Granser

7.



UNIVERSITEIT VAN TILBURG

Understanding Society

Consent formulier

Met de ondertekening van dit formulier verklaar ik, de ondergetekende, akkoord te gaan met de deelname van mijn kind aan het onderzoek in het kader de bachelorscriptie van Emma Niederer, vanuit de Universiteit van Tilburg.

De bedoeling van het onderzoek is mij uitgelegd en ik heb de kans gekregen om alle onduidelijkheden nader verklaard te krijgen.

Ik begrijp dat mijn kind centraal staat in het onderzoek. Ik heb er geen bezwaar tegen dat mijn kind wordt opgenomen tijdens de communicatie taak, en dat de filmopname later wordt verwerkt.

Ik begrijp dat deelname volledig op vrijwillige basis gebeurt en dat ik ten alle tijde, en zonder opgave van redenen, mijn deelname aan het onderzoek kan opzeggen.

Naam ondergetekende (in blokletters)

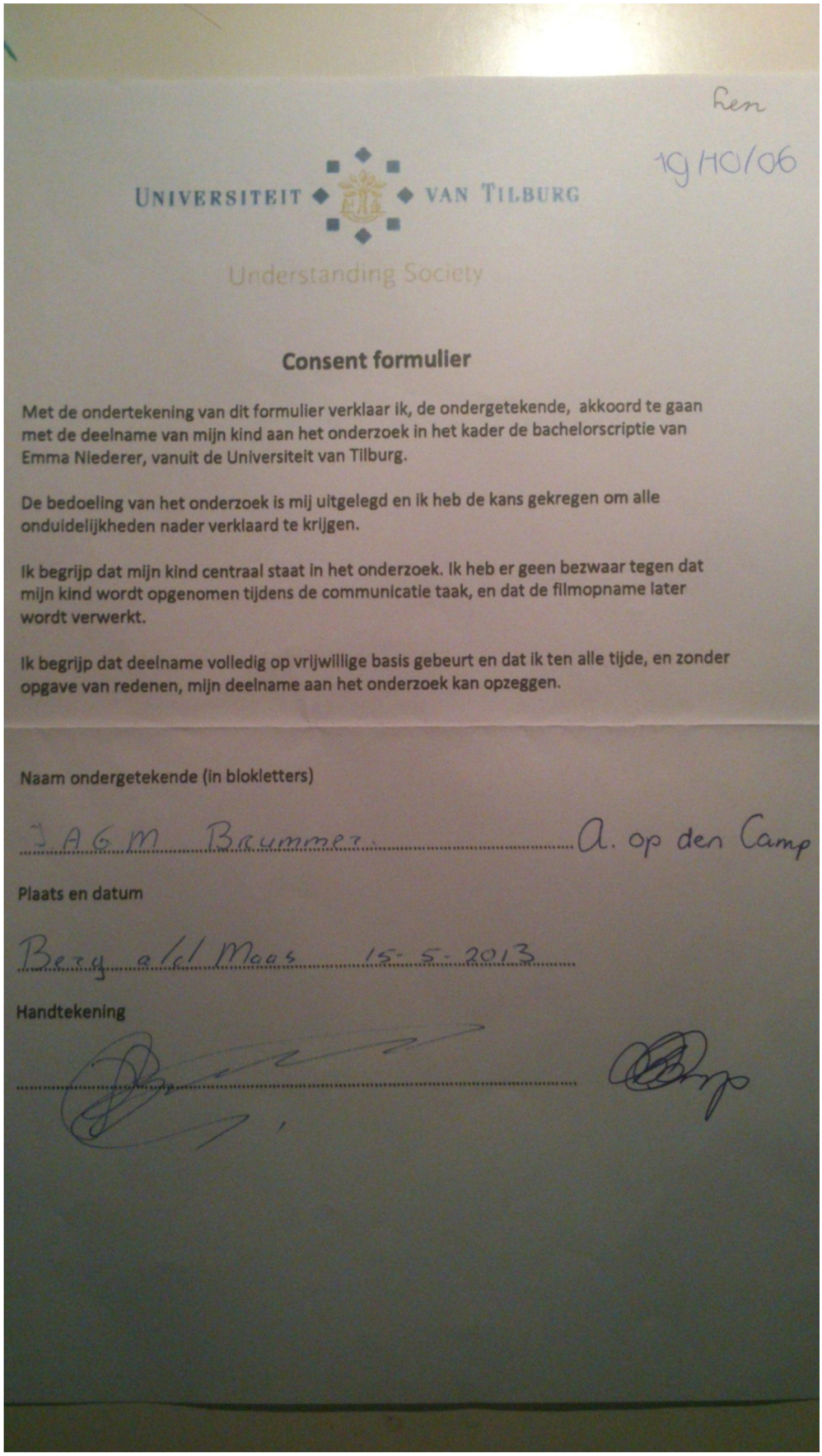
MARLOES V. EEKELEN

Plaats en datum

Sittard, 17 mei 2013

Handtekening

8.



Een

19/10/06

UNIVERSITEIT VAN TILBURG

Understanding Society

Consent formulier

Met de ondertekening van dit formulier verklaar ik, de ondergetekende, akkoord te gaan met de deelname van mijn kind aan het onderzoek in het kader de bachelorscriptie van Emma Niederer, vanuit de Universiteit van Tilburg.

De bedoeling van het onderzoek is mij uitgelegd en ik heb de kans gekregen om alle onduidelijkheden nader verklaard te krijgen.

Ik begrijp dat mijn kind centraal staat in het onderzoek. Ik heb er geen bezwaar tegen dat mijn kind wordt opgenomen tijdens de communicatie taak, en dat de filmopname later wordt verwerkt.

Ik begrijp dat deelname volledig op vrijwillige basis gebeurt en dat ik ten alle tijde, en zonder opgave van redenen, mijn deelname aan het onderzoek kan opzeggen.

Naam ondergetekende (in blokletters)

J A G M Baummer. A. op den Camp

Plaats en datum

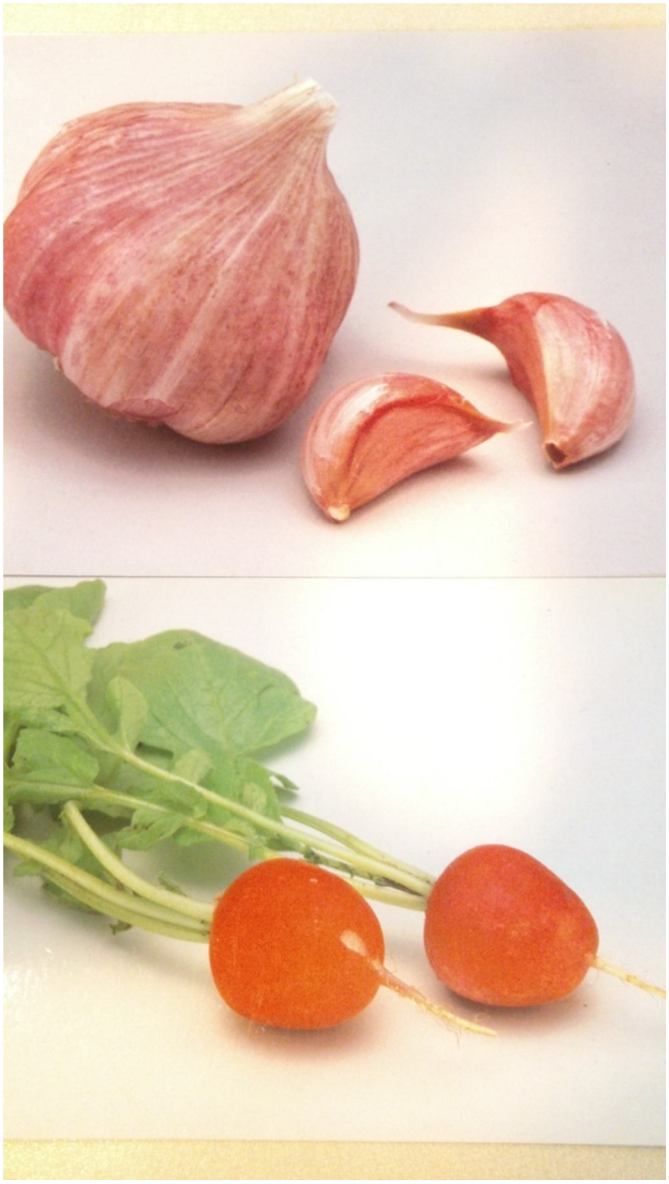
Berg a/d Maas 15-5-2013

Handtekening

Appendix C: Card Pairs

Pair 1: Strawberry/Raspberry

Pair 2: Garlic/Radish

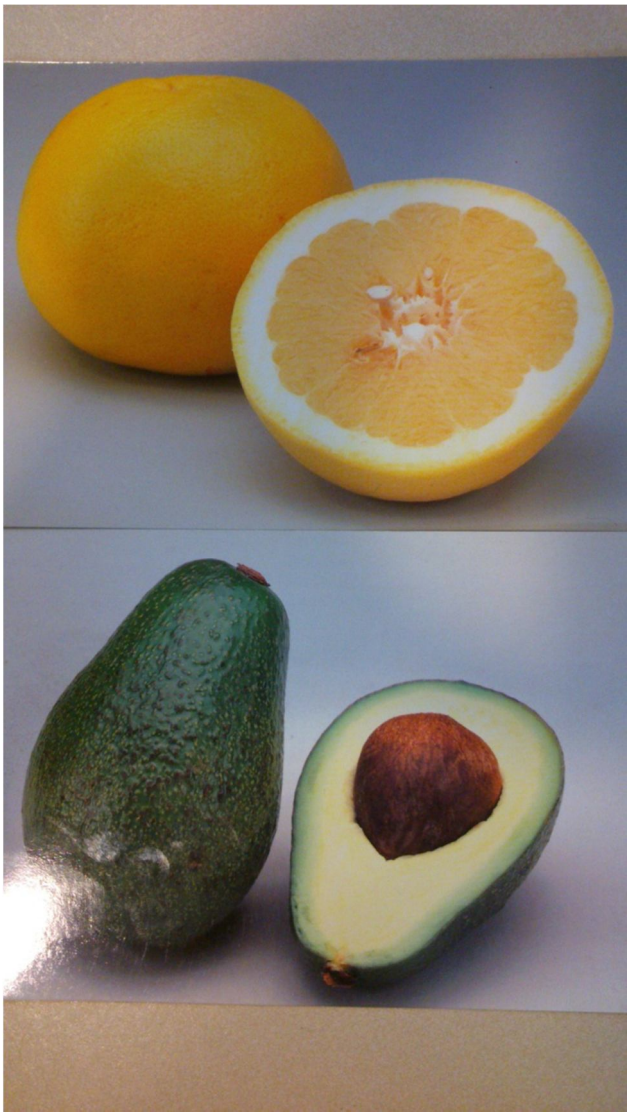


Pair 3: Zucchini/Eggplant

Pair 4: Coconut/Pineapple

Pair 5: Starfruit/Passionfruit

Pair 6: Grapefruit/Avocado



Pair 7: Mushroom/Bell Pepper

Pair 8: String Bean/Cucumber

Pair 9: Banana/Pear

Appendix D: Normal Distributions for each condition

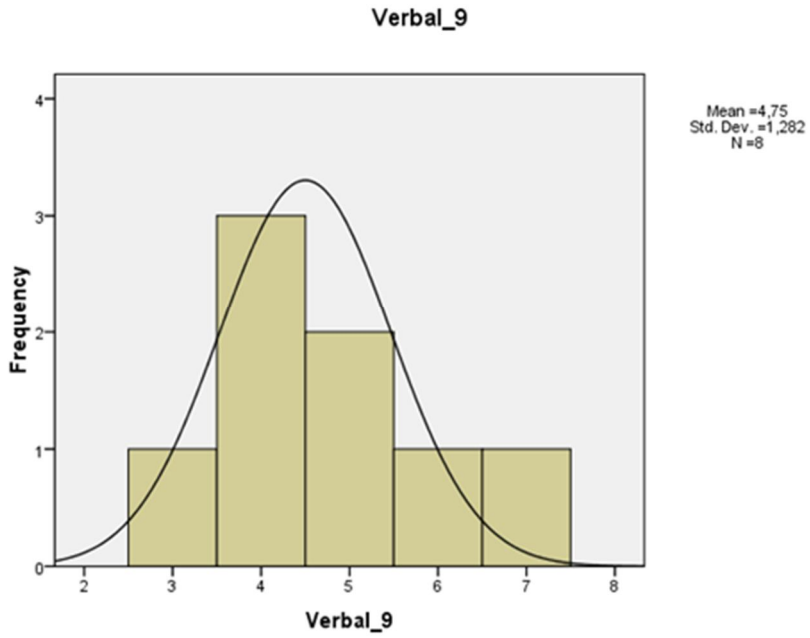


Figure 1 *Normal distribution of the verbal condition (Data set 1)*

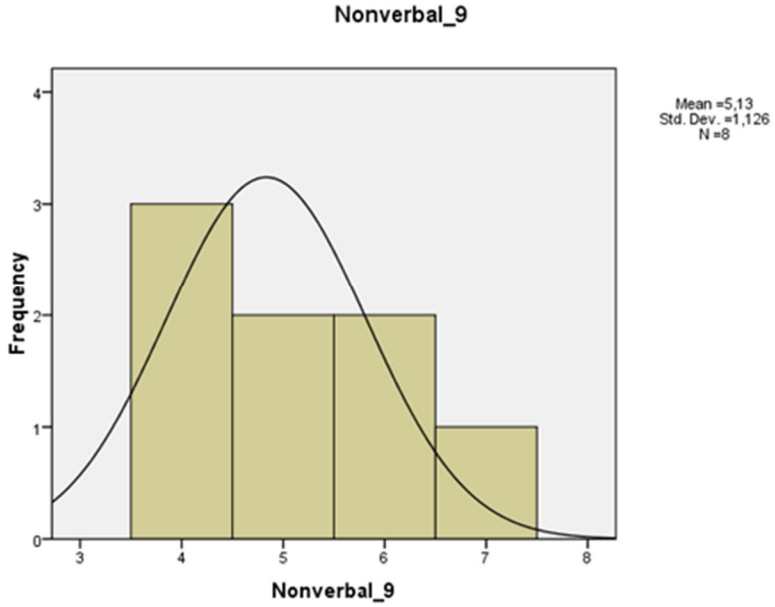


Figure 2 *Normal distribution of the non-verbal condition (Data set 1)*

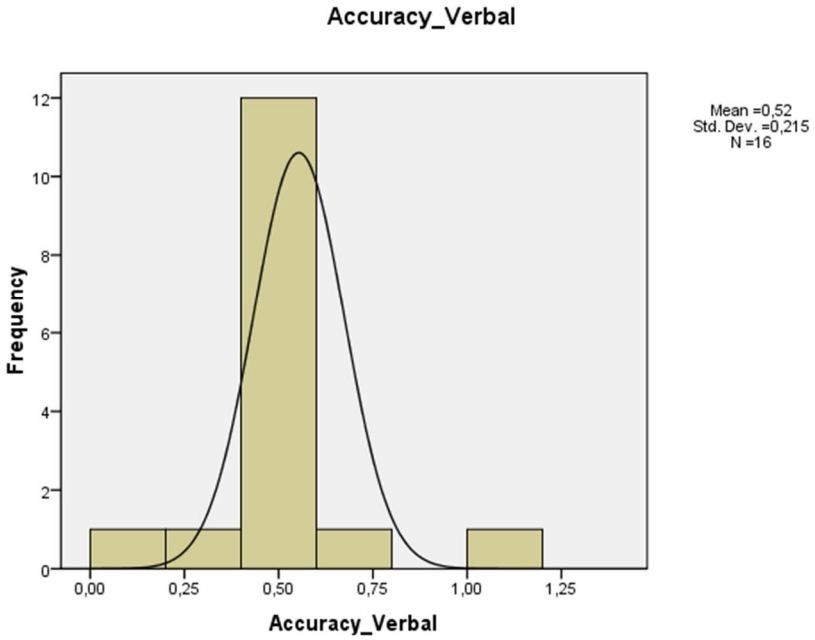


Figure 3 *Normal distribution of the accuracy in the verbal condition (Data set 2)*

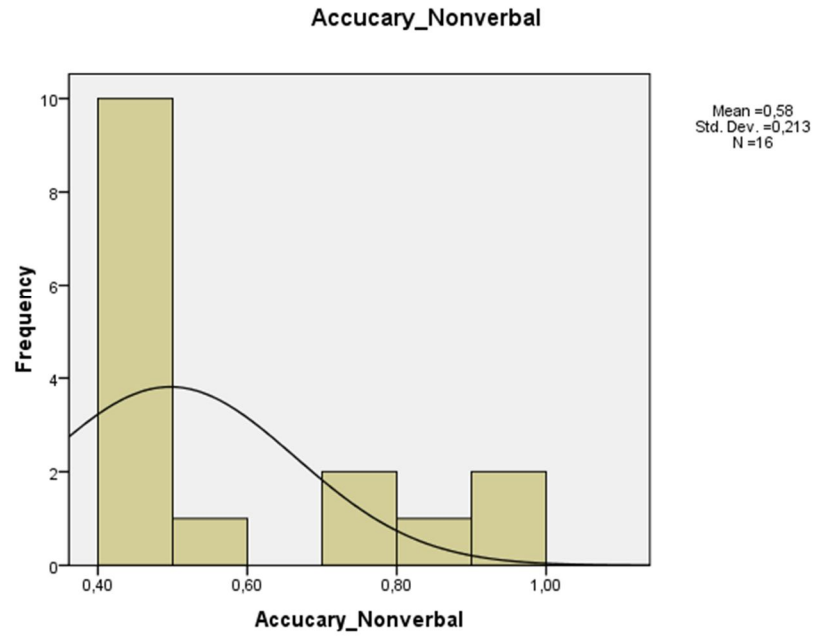


Figure 4 *Normal distribution of the accuracy in the non-verbal condition (Data set 2)*

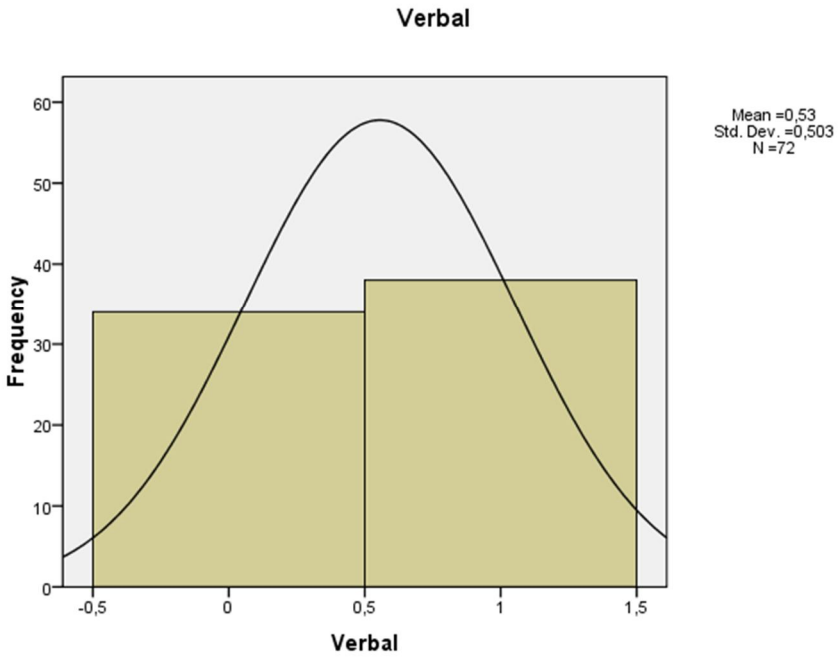


Figure 5 *Normal distribution of remembrance in the verbal condition (Data set 3)*

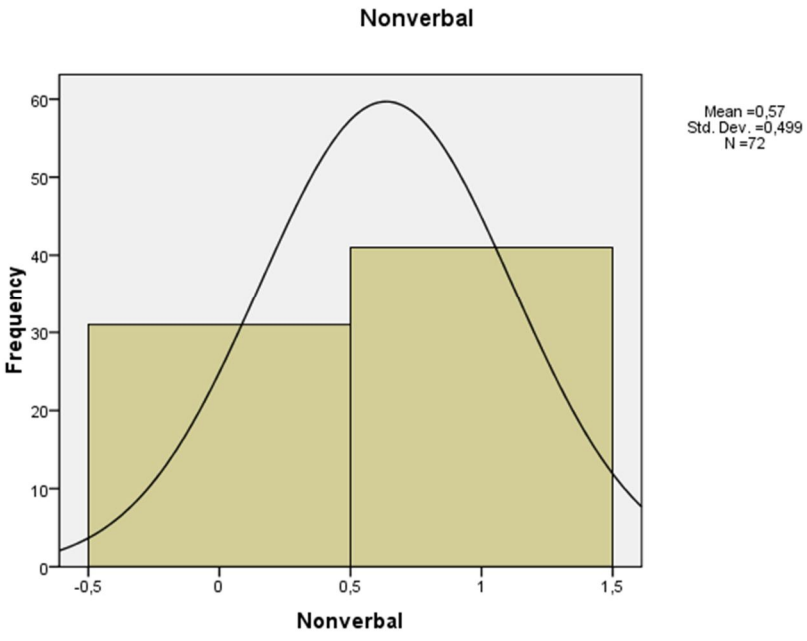


Figure 6 *Normal distribution of remembrance in the non-verbal condition (Data set 3)*