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Multisensory Storytelling: the effect on positive social responsiveness in children with profound multiple disabilities



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Abstract

Introduction: The current research evaluates the effectiveness of Multisensory Storytelling (MSST) in individuals with profound multiple disabilities living in Sizanani Home, South Africa. With Multisensory Storytelling a personal story is told and the child is encouraged with sensory stimulation to explore objects that belong to the story in order to enhance their responses to the story (object) and storyteller. **Methods:** In order to measure effectiveness of MSST, a new scale has been developed for this study which measures social responsiveness (Social Responsiveness Scale). This scale includes items like facial expressions, vocalizations, attention, exploration of objects, pointing, nodding, waving and clapping hands. The Social Responsiveness Scale (SRS) is a normally distributed, reliable measure of social responsiveness in which two subscales can be distinguished, namely an Attention Scale (AS) and a Motor Scale (MOS). The effectiveness of MSST is therefore measured on the total SRS and the two subscales. A pre-posttest design (N=34) is used, partly with a control group (N=20) of children with a comparable level of disability, and partly with a repeated measures design (N=10). **Results:** All designs resulted in significant effects of MSST on SRS and the subscales AS and MOS, except for the pretest-posttest matched control group design, in which only a nonsignificant trend was found on the Attention Subscale. The follow-up data suggest that children who received MSST intervention maintained their acquired skills after six weeks without intervention. The capabilities of the children measured with initial levels in terms of Social Responsiveness (SRS prior to the intervention), Motor Skills (Fine and Gross Motor Skills), and cognitive capabilities (initial level of play abilities) did not moderate the effect of MSST on SRS and the two subscales. Also, the effect of another intervention that was given simultaneously, namely Conductive Education (CE) (i.e. achieving the motor skills) did not moderate the effect of MSST on SRS and the two subscales. **Conclusion:** Results suggest that MSST has a positive effect on social responsiveness and all children improve, irrespective of their capabilities or their effect on another co-occurring intervention. These results indicate that MSST is a promising approach for children en young adults with disabilities in Sizanani Home.

Keywords: Cerebral Palsy, Sensory stimulation, Multisensory Storytelling, MSST, social responsiveness, profound multiple disabilities.

Samenvatting

Introductie: De huidige studie evalueert het effect van een interventie, Multisensory Storytelling (MSST), die gericht is op kinderen en jong volwassenen met ernstige meervoudige beperkingen. MSST is een persoonlijk verhaal waarbij kinderen worden gestimuleerd met behulp van sensorische stimulatie om de aangeboden objecten te exploreren en als gevolg hiervan worden de kinderen gestimuleerd te reageren op het object of de voorlezer. **Methode:** Voor deze studie is een nieuwe schaal ontworpen om de reacties van de kinderen op het verhaal te meten (Social Responsiveness Scale (SRS)), hiertoe behoren items als gezichtsuitdrukkingen, vocalisaties, aandacht, exploratie van objecten, wijzen, knikken, zwaaien en klappen. Deze schaal bleek een normaal verdeelde, betrouwbare maat om “social responsiveness” te meten, waarbij twee subschalen kunnen worden onderscheiden, namelijk de “Attention Scale” (AS) en de “Motor Scale” (MOS). De effectiviteit van MSST werd daarom gemeten met SRS en de twee subschalen. Een pretest-posttest design werd gebruikt, gedeeltelijk met een controle groep (N=20) waarin kinderen met een vergelijkbaar niveau aan de twee condities werden toegewezen en een gedeelte daarvan werd met zichzelf vergeleken (N=10). De MSST duurde zes weken waarin in totaal tien sessies hebben plaatsgevonden. De eerste en tiende sessie werden gefilmd en gescoord. **Resultaten:** Alle designs resulteerden in significante effecten van MSST op “social responsiveness” en op de twee subschalen, met uitzondering van een nonsignificante trend op de subschaal AS tussen de MSST groep en de controle groep (N=20). De follow-up data suggereren dat kinderen die MSST gekregen hebben, hun aangeleerde vaardigheden na zes weken zonder MSST behielden. De aanvankelijke sociale, motorische en cognitieve vaardigheden van de kinderen en de vooruitgang op een gelijktijdig gegeven interventie bleken het effect van MSST op “social responsiveness” en de twee subschalen niet te beïnvloeden. **Conclusie:** De resultaten suggereren dat alle kinderen verbeteren op ‘social responsiveness’ na tien MSST sessies, onafhankelijk van hun aanvankelijke sociale, motorische en cognitieve vaardigheden of het effect van een andere interventie. MSST lijkt dus een veelbelovende aanpak voor kinderen en jong volwassenen met beperkingen in Sizanani Home.

Sleutelwoorden: Cerebrale Parese, Sensorische Stimulatie, Multisensory Storytelling, MSST, sociale responsiviteit, ernstige en meervoudige beperkingen.

Introduction

In the field of profound intellectual and multiple disabilities, a variety of methods have been used to socially engage and educate individuals (Lindsay, Black, Broxholme, Pitcaithly, & Hornsby, 2001; Hogg, Cavet, Lambe, Smeddle, 2001; Perry, Felce, & MacLean, 2005; Matson, Bamburg, Smalls, 2004), and especially methods concerning sensory stimulation seem promising (Ashby, Lindsay, Pitcaithly, Broxholme, & Geelen, 1995; Young, Fenwick, Lambe & Hogg 2011; Chan, Fung, Tong, & Thompson, 2003; Vlaskamp & Oxener, 2002). Among these approaches is the use of Multisensory Storytelling (MSST). MSST enables people with profound and multiple disabilities to share human experience through the medium of storytelling (Multiplus, 2008; PAMIS, 2002). The purpose of the present study is to give insight in the effectiveness of MSST, and to assess for which individuals with profound multiple disabilities MSST is most effective. This study is conducted in Sizanani Home, South Africa.

Sizanani Home is a residential facility for children¹ and youth with moderate to profound physical and intellectual disabilities located in Bronkhorstspuit, South Africa. 64 Children, who are orphaned, abandoned, or neglected, live in Sizanani Home (Nispel & Vermeer, 2010). Most children are diagnosed with Cerebral Palsy (CP), a neuromotor disability. CP is an umbrella term consisting of variable clinical symptoms secondary to an anomaly and/or damage to the motor regions of the brain in the early stages of development, causing graded levels of observable motor dysfunction (Self & Shevell, 2010; Rosenbaum, 2003). There is a common presence of comorbidities, including communication and cognitive impairments (Self & Shevell, 2010; Rosenbaum, Walter, Hanna, Palisano, Russel, Raina, Wood, Bartlett, & Galuppi, 2002). For these children special interventions are needed to facilitate social skills (Hosokawa, Kitahara & Nakamura, 1985).

Multisensory Storytelling

The methodology of Multisensory Storytelling, as applied in Sizanani Home, was elaborated by PAMIS (2002) and further refined by Boer and Wikkerman (2009). With

¹ In this thesis the inhabitants of Sizanani Home will be indicated as children, although the age range varies from 5 to 34 years.

MSST a personal story is told and the child is encouraged with sensory stimulation to explore objects that belong to the story (e.g. push a button for sound, feel a teddy bear, or smell the bath foam) (Multiplus, 2008). A MSST story exists of a big box containing six or seven different white A3-format card board pages with two simple sentences and an own object that stimulates one or more senses (Boer & Wikkerman, 2009; Multiplus, 2008). MSST aims at the integration of sensory information in order to improve responses towards the objects and the storyteller. Through MSST language can be directly experienced, resulting in emotional responses or vocalizations. Children do not need to understand language in order to understand the meaning of the story (Park, 1998).

To stimulate infants in their communicative abilities, ‘intuitive parenting’ is applied during the MSST sessions. This means that caregivers look at the infants constantly, exaggerate their own mimics, use short melody sentences and apply repetition and imitation (Durkin, 1998; Schaffer, 2000; Piaget, 1963). Within MSST repetition of the same story leads to recognizability and predictability (Piaget, 1963; Gaver, 1996) which stimulates social responses. To enhance recognizability and predictability in MSST, short sentences with clear acoustic information are used within MSST (Boer & Wikkerman, 2009; Multiplus, 2008; PAMIS, 2002). ‘Intuitive parenting’ also includes certain aspects of the voice and physical contact, which are important in early interactions (Durkin, 1998). Within MSST the reader’s prosody, changes in rhythm and intonation that gives speech its melody, affords the child to experience the story and the story’s emotions. Furthermore caregivers simplify their behavior, adjust to the preferences and skills of the infant, enlarge the emotional message, give immediate and consequent responses, and regulate (in)appropriate behavior (PAMIS, 2002; Durkin, 1998). Positive feedback is given to the children during the MSST session when children show positive social responses; this encourages them to show these responses more often.

Besides ‘intuitive parenting’, also sensory stimulation with objects is of great significance for children with profound multiple disabilities (Brodin, 1999; Brodin, 2005; Multiplus, 2008). Visual, auditory and tactile stimuli coming from objects intensify responses (Brodin, 2005). By offering sensory stimuli the child is more attracted by the story and stimulated to explore objects (i.e. look, reach, hold, touch, and point to the objects).

Children learn new skills in exploring these objects by means of ‘framing’ or the construct ‘zone of proximal development’. Vygotsky (1987, in Fu & Stremmel, 1993) refers to these as the area in which a child's learning, with sensitive assistance, exceeds the reach of his or her current developmental level. By working within this zone, adults create opportunities for children to perform at levels they cannot achieve on their own. In terms of MSST, an object is brought into the reaching area of the child (depending on the different abilities of the children) to enable reaching, grasping and exploration of the object and to the potential use to which it can be put.

Furthermore, infants learn how to explore and manipulate an object through watching their caregivers in tackling the objects first, which is referred to as modeling (Durkin, 1998). Modeling appears when the storyteller shows the child how to manipulate the objects. This creates a situation in which a child can imitate the storyteller in order to enhance in social responses by showing more frequent and variable responses.

Finally, a pleasurable activity affords the child to improve on concentration and alertness. When a child enjoys an activity, better possibilities for exploratory behavior are available, like looking at the object or storyteller (Gibson, 1986; Kono, 2009).

‘Intuitive parenting’, sensory stimulation and a pleasurable activity are important aspects in all early stages of infancy and thus for children with profound multiple disabilities. These aspects are all part of MSST and therefore MSST suits well for children with multiple disabilities. All aspects seem to improve exploration of objects, vocalizations, expressions and other early behaviours like pointing. These responses as a group are referred to as ‘social responsiveness’.

Empirical findings

The first experiences of MSST seem promising (PAMIS, 2002; Multiplus, 2008; Jonckheere, 2008; Young, Fenwick, Lambe & Hogg, 2011). PAMIS and Multiplus are institutions for people with profound multiple disabilities, and linked to the University of Dundee and the University of Leuven, respectively. However, these studies just begin to appear in peer reviewed literature; therefore conclusions about their research should be seen as preliminary.

Jonckheere (2008) assesses improvement by using questionnaires. No significant effect of MSST was found in ten sessions in involvement (i.e. looking at the object, listening, reaching or holding the object and negative involvement) and wellbeing (joy, happiness and positive tension, and negative emotions). However, questionnaires were filled out by the storytellers, and their opinion about the initial wellbeing of the children was already relatively high at the beginning of the sessions, which suggests a possible ceiling effect.

Two other studies analyzed videotapes of children (n=10) and young adults with profound multiple disabilities and storytellers on eight or ten MSST-sessions (PAMIS, 2002; Young et al, 2011). Results showed an increase in frequency of measures of social engagement (looking at storyteller, positive emotional responses), and in measures indicative of engagement with the story (orientation and exploration towards the stimuli,) (PAMIS, 2002; Young et al, 2011). Qualitative research involving interviewing storytellers, confirmed the outcomes of this study (Young et al, 2011).

These studies are marked by several limitations. All studies examined the effect of MSST using small sample sizes and without the use of a control group (PAMIS, 2002; Young et al, 2011; Jonckheere, 2008). Further, the outcome measurements are limited to behaviours usually seen in the first half year (PAMIS, 2002; Young et al, 2011), and to the opinion of the storytellers (Jonckheere, 2008).

Social responsiveness

Children with profound multiple disabilities often have a mental age of two years or younger, this encompasses the sensorimotor period (Siegler, Deloache & Eisenberg, 2006; Piaget, 1963; Petry & Maes, 2005). In Sizanani Home most children have profound multiple disabilities and can therefore be compared to infants during the first two years. During the first two years the infant passes five interactional development stages (Durkin, 1998; Schaffer, 2000), these interactional behaviours of the different stages are therefore comparable to the children in Sizanani Home. However, the sequence of the developmental stages might differ and some stages might not develop at all.

The first stage encompasses the most basic interaction styles: crying and smiling (Durkin, 1998). Within the second stage, infants make direct eye contact with the partner,

periods of more prolonged gaze ensue and the first social smile and cuing can be elicited. Social interaction occurs primarily in the context of face-to-face encounters. In the third stage motor skills increase the manipulative abilities emerge which means that infants can turn increasingly to the world of things – objects they can grasp, touch and explore and with which they can stimulate and amuse themselves (Durkin, 1998; Schaffer, 2000). During the fourth stage cognitive changes take place, namely the beginnings of object permanence and the ability to differentiate means from ends. This makes the child able to act reciprocally and intentionally in social encounters. In the fifth stage infants are able to use symbolic representations and language in interactions (Durkin, 1998).

Within MSST these early communicative abilities are embedded in the storytelling and the different stories to stimulate their responses. All responses that are usually seen in the first two years (mental age of the research population) need to be measured to establish the effectiveness of MSST.

Children with disabilities in Sizanani Home show very diverse responses in their interactions. Therefore it seems important to include also the more advanced responses in our study. Previous research focused only on behaviour related to the early stages of development. We believe that responses seen in stage four and five, which are seen frequently in children with disabilities, such as pointing, positive nodding, and vocalizations (Petry & Maes, 2006; Siegel-Causey & Bashinski, 1997), are important additional signs of responsivity that should be included in measures of effectiveness of MSST.

In comparison to previous research on the effectiveness of MSST (PAMIS, 2002; Multiplus, 2008; Jonckheere, 2008; Young, Fenwick, Lambe & Hogg, 2011), this study attempts to ameliorate the research by increasing the number of participants (n=34), and by adding a control group. Furthermore, a broader range of behaviours of the children in reaction to the storyteller or the object will be investigated with video-analysis. These behaviours, which will be included in this study, are the behaviours from all five stages of the early child-caregiver interactions. These responses are referred to as ‘social responsiveness’.

Research questions

For this study a new scale has been developed to measure ‘social responsiveness’ (Social Responsiveness Scale (SRS), which includes items about facial expressions, vocalizations, attention, exploration of objects, pointing, nodding, waving, and clapping hands. This scale is based on previous studies (Multiplus, 2008; Jonckheere, 2008; PAMIS, 2002; Young, Lambe, Fenwick and Hogg, 2010), literature on early childhood development and development of children with profound disabilities (Siegel-Causey & Bashinski, 1997; Petry & Maes, 2006; Verpoorten, 1983 in: Jonckheere, 2008), and on own pilot observations of the MSST sessions given in Sizanani Home. This Social Responsiveness Scale will be explored on reliability, i.e. internal consistency and inter-rater reliability. Moreover, the existence of subscales for ‘attention’, ‘positive emotions’ and ‘manipulation of objects’ will be explored, as it is expected that responses covering these subscales may differ between the children.

In the present study a pre-posttest matched control group design, a repeated measures design and for a subset of the children only pre-posttest measures are used to explore the following research questions 1) if MSST has a positive effect on social responsiveness, 2) if the effectiveness of MSST depends on developmental level of the child, in terms of their social, motor and cognitive skills prior to the MSST intervention, 3) if the effectiveness of MSST depends on another intervention that is given simultaneously, and 4) if another intervention effects ‘social responsiveness’ in a six weeks period without MSST.

Initial developmental levels

The development or progress of children due to MSST may depend on their initial developmental level (Smith & Thelen, 2003), considering the great diversity of disabilities and capabilities of the residents of Sizanani Home. Children with different levels of disabilities and inabilities might show different capabilities, so they are expected to profit differently from MSST.

In order to enhance social responses during MSST a child needs to, for instance, have appropriate reaching and grasping behavior, physical strength to lift an object and the essential concentration and motivation to focus on the story. The notion that various capabilities, constraints and opportunities need to interact and develop in order to

ameliorate in social responses, is a thought envisioned by the Dynamic Systems theory (Smith & Thelen, 2003; Thelen, 2000). Within MSST, sensory and tactile capabilities, cognitive skills, motor skills and communicative skills are examples of capabilities or constraints that might influence the effect of MSST. Behaviour is thought to be dynamic and different systems influence each other in order to evoke new behavior patterns (for example, social responses) (Smith & Thelen, 1997).

The ecological theory of Gibson (1988) states that people live in interaction with a world of properties or possibilities, so called 'affordances', for exploratory activities that are available and can be learned in functional ways during development (Gibson, 1986; Kono, 2009). For instance, superior motor functioning enables a child to explore the environment and know more affordances, which provides more and different experiences to learn from.

In theory, it is believed that the effectiveness of MSST is moderated by the initial developmental level of the child, in terms of their social, motor and cognitive skills prior to the MSST intervention. From both a practical as well as a theoretical point of view, it is helpful to map out for which specific children MSST is most effective.

The second research question assesses, therefore, for whom MSST has the largest effect (i.e. which initial skills contribute to improvements in MSST), which provides Sizanani Home insight in whom will benefit most. This insight serves a practical goal, as it helps Sizanani Home in offering the intervention to children for whom MSST is most suitable. For each of the initial developmental levels hypotheses are formulated below.

Initial level of social responsiveness. With a greater initial level in social responsiveness it is expected that children learn and experience more from the story and the interaction with the storyteller. Children who show more responses evoke more attention from the storytellers and as such more affordances and opportunities are available to learn from. This enhances the interaction between the child and storyteller, resulting in an increase in social responses shown by the children.

In contrary to the above, it is also expected that children with a lower initial level in social responsiveness enhance more from MSST, since they have more to gain from the MSST sessions.

As regards to the initial level of social responsiveness it is hypothesized that both the children with lower scores and the children with higher scores on social responsiveness improve most of MSST.

Initial level of motor skills. It seems logical to suggest that when a child is more capable of performing motor actions like manipulations, reaching, pointing, a child would profit more of multisensory storytelling, particularly of the parts that requires reaching and grasping.

Piaget (1963) states that a child in sensory motor stage (our research population) uses motor activities to understand reality and develops concepts and schemes through physical interaction with the environment. With adequate motor skills children will be able to experience what the storytellers afford them and facilitate one's ability to participate in various aspects of social life (Sleeuwenhoek, Boter & Vermeer, 1995; Vermeer, 1991). As children develop, more exploratory behaviours become available (Gibson, 1988). Furthermore, as the hands become more active and controllable, a whole new set of affordances is opened up and, as a result, a child can better respond to the objects (like reaching, grabbing, and holding the object) (Gibson, 1988; Roemer & van Dam, 2004; Multiplus, 2008; Vermeer, 1991), the child is, therefore, more actively engaged. For example, the manipulation of the objects (i.e. reaching, grasping, and manipulation) is essential since it informs the child on properties of the object resulting in more attention and exploration of affordances.

Consequently, we expect that the story provides more pleasure and therefore motivation for children who are more capable in performing fine motor actions. As a result the children show more positive emotions and vocalizations. Furthermore, their attention towards the story is enhanced, since their capabilities ensure them to explore the objects. This results in more pleasure and motivation, which in turn results in an increase in attention.

Moreover, we hypothesize that a child more capable of performing fine motor actions will profit more from the MSST sessions and therefore improve more on social responses, particularly on responses (i.e. exploration of objects) that require reaching or grasping, and to a lesser extent on responses like vocalizations, facial expressions and

attention. It is further hypothesized that the initial level of gross motor skills (for example lifting head up in prone position; sit with support, head steady; sit without support, creep; crawl; standing with support; walking with support; walking without support) do not influence the effectiveness of MSST on social responsiveness.

Initial level of cognitive skills. Besides fine motor skills and social responsiveness, it is plausible that the effect of MSST is also moderated by the initial level of cognitive skills. It is difficult to measure cognitive skills of children with profound multiple disabilities, therefore a new scale is developed which assesses the level of cognitive play abilities, namely the Play Observation Scale (POS) (Flesch, 2012; Vos & Westrhenen, 2009). This scale is based on Smilansky's (1986) play behavior representing different stages of cognitive development within Piaget's sensorimotor stage, which can be classified into three successive stages: functional play, constructive play and dramatic play. 'Functional play' is described by. 'Constructive play' is characterized as manipulating objects and creating things with the objects offered. 'Dramatic play' is defined as, requiring a higher level of cognitive functioning (McCabe, Jenkins, Mills, Dale & Cole, 1999). The POS encompasses simple functional actions that vary from simple repetitive physical behaviors ('functional play') to pretend play ('dramatic play'). Possible play actions for each toy are indicative for the different stages of cognitive play.

The level of play abilities is a reflection of the level of intellectual abilities, and observing play performance therefore provides insight into the development of these cognitive abilities (Gowen et al., 1989; Messier, Ferland & Majnemer, 2008; Piaget, 1962; Power & Radcliffe, 1989; Ungerer, Zelazo, Kearsly & O'Leary, 1981). Especially, the 'constructive play' and 'dramatic play' reflect on the level of executive functions, in other words knowledge about affordances and purposes of the actions. Learning to play with toys increases the ability to manipulate objects, enabling the children to explore the unique physical properties of objects, as well as their spatial, causal and functional relations (Fenson, Kagan, Kearsley & Zelazo, 1976). For MSST executive functions seem required to show more advanced responses to the stimuli and storyteller. More specifically, children with higher cognitive abilities have more possibilities to react with advanced motor responses, like pointing, functional manipulation and reaching (Fogel &

Thelen, 1987). Children can only respond with these motor responses when the purpose of the behaviour is available to them.

Within MSST predictability, recognition and exploration of objects are important factors that enhance responsivity. Higher cognitive abilities are expected to play an important role as well in executing these factors which stimulates social responses.

Consequently, analysis of how children play can give crucial insight into their capabilities for improvement on communicative and social competencies (Knox, 1997), for example during MSST. Therefore we expect that the initial developmental level in cognitive abilities moderate the effectiveness of MSST.

Third research question: moderation effect of Conductive Education

To assess for whom MSST has the largest effect, the present study investigates if the effectiveness of MSST depends on the effect of another intervention that takes place simultaneously, namely Conductive Education (CE) (Twilhaar, 2012). CE is focused on progression in specific individual motor goals.

Another student will examine whether children with profound multiple disabilities achieve their individual motor goals after two months of Conductive Education and thus the effectiveness of CE (Twilhaar, 2012). An important part of the daily program of Sizanani Home is focused on CE (Visser, 2010). CE is an educational approach concentrating on improving general abilities in order to teach functional motor skills to become more independent in daily activities (Coles & Zsargo, 1998). In small steps skills are taught to overcome their physical disabilities (Coles & Zsargo, 1998). Assistance is provided verbally, manually or mechanically in such a way that the child is able to execute a task and so experience success (Visser, Magyarszeky, Stoffer, 2008). Individual motor goals are contemplated for each child. Most children practice in gross motor skills, like walking, eating with a spoon, crawling, sitting without support, lifting up their head and brushing their teeth.

Mastering these goals is not assumed to elicit social responses. Therefore, it is hypothesized that a positive result of CE will not influence the effect of MSST on social responsiveness.

Fourth research question: effect on social responsiveness of six weeks Cognitive Play Intervention

MSST is followed by a six weeks follow-up period in which another intervention is given to the children in Sizanani Home, namely Cognitive Play Intervention (CPI). CPI is given for six weeks after MSST intervention; where after a follow-up measurement is performed.

Another student will examine whether children with profound multiple disabilities improve on play abilities. The Cognitive Play Intervention (CPI), implemented in Sizanani Children's Home, is a structured play therapy aiming to improve cognitive functioning through play (Flesch, 2012; Van Velzen & Mathot, 2010; Vos & Westrhenen, 2009). More specifically, it seeks to enhance cognitive play performance by elaborating play skills with toys (Flesch, 2012). Higher levels of play (i.e. 'dramatic play'), in other words pretend play, requiring a higher level of cognitive functioning like building a house with the blocks and pretending to live there. Executive functions play an important role in this process. Within MSST only very early and simple responses, like facial expressions and vocalizations are measured which are expected not to require executive functioning.

In contrary to the differences between both programmes there are also resemblances which might influence the social responsiveness level. For instance, some possible actions during CPI overlap with responses shown during MSST, like the exploration of objects. Moreover, within CPI social stimulation is encouraged by the childcare workers which in turn leads to increases in social responsiveness.

In conclusion, it is expected that that two months of CPI without MSST, will influence the social responsiveness level, since there is some resemblance between both interventions. Therefore, it is assumed that the SRS will increase in this period, but less than during MSST.

Methods

Participants

Children, who were assumed to have a mental age of less than two years and therefore were thought to benefit most from MSST, were selected by the management of Sizanani Home for participation in the intervention. Participants were 34 children (47.1 % boys)

from Sizanani Home, aged from 5 to 34 ($M = 21.41$, $SD = 7.19$), which is 55% of all children living in Sizanani Home.

The main diagnosis of the children in this group was as follows: spastic quadriplegia $N=10$, spastic diplegia $N=5$, athetosis $N=3$, spastic hemiplegia $N=3$, ataxia $N=1$, severe learning difficulties $N=7$, mental retardation $N=2$, and other (i.e. Down Syndrome, epilepsy, blindness, autism and hydrocephaly) $N=4$. In addition, many of the children also suffer from either epilepsy, visual and hearing impairments, microcephaly or hyperactivity.

Design

To explore the effect of MSST on social responsiveness three designs were employed. These designs are drawn in figure 1 to clarify how the effect of MSST is studied. First, a pretest-posttest design was used for the total group ($N=34$)², shown in figure 1 as the first two groups ($N=24$ and $N=10$) within the period they received MSST. The MSST intervention takes six weeks with ten sessions in total; the first and tenth session were videotaped.

For a subset of the total group ($N=18$), MSST was followed by another intervention, Cognitive Play Intervention (CPI) during six weeks, after which a follow-up measurement of MSST was performed.

Next, a pretest-posttest matched control group design was used. Of the total participants, ten children were selected and paired with a child of comparable level of disability according to the Sizanani Home management team. This results in 20 children who were assigned to one of the two conditions of comparable level of disability (MSST group (with MSST) and control group (without MSST)).

Furthermore, a within control group design was employed ($N=10$; all children participating in the control group). After a control period of six weeks with no intervention the planned intervention MSST was implemented for six weeks, allowing for a comparison within the same group. Most participants ($N=23$) received simultaneous to MSST another intervention, namely Conductive Education (CE).

² Due to data loss during this research, 20 participants of the original population were lost.

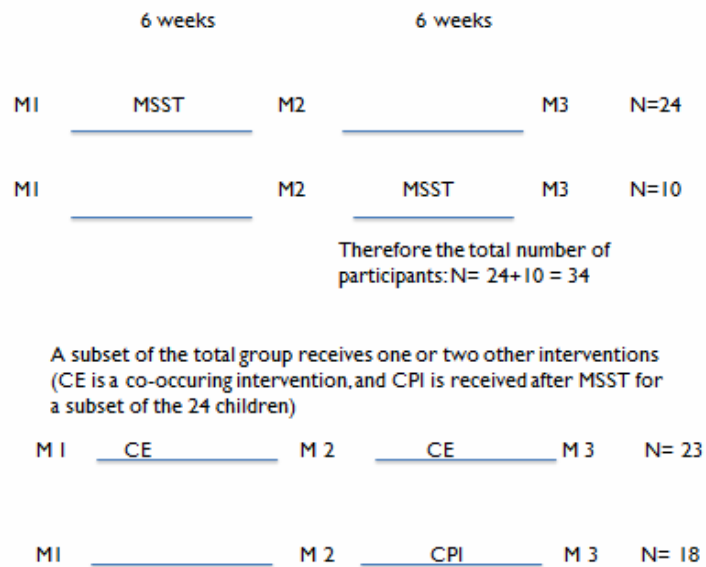


Figure 1: Three designs that were used to measure the effect of MSST, where M1 is measurement 1, M2 is measurement 2, and M3 is measurement 3.

Note: MSST: Multisensory Storytelling

CE: Conductive Education

CPI: Cognitive Play Intervention

Instruments

Social Responsiveness Scale. A social responsiveness scale was developed, based on an initial item-pool of 26 items (Appendix 1). The items are based on previous studies (Multiplus, 2008; Jonckheere, 2008; PAMIS, 2002; Young, Fenwick, Lambe and Hogg, 2011) and literature on development with children with profound disabilities or early development (Siegel-Causey & Bashinski, 1997; Petry & Maes, 2006; Verpoorten, 1983 in: Jonckheere, 2008) and own observations of the MSST sessions in Sizanani Home. The items describe behavioural responses made by the child towards the objects of the story or to the storyteller, which are typical for this research population.

In this study video-observations were used. This was found useful by children with profound disabilities (Petry & Maes, 2006). The researcher operated the camera from a distance of around two to three meters from the child and storyteller. Consistent with other measures on effectiveness of MSST (Pamis, 2002; Young et al. 2011), items

are scored on the frequency of occurrence per page, and counted from the moment a page or object is presented to the child until the childcare workers retracts the page and object.

After using the 26-item instrument in practice the scale was reduced to 16 items, because some items proved to be ambiguous and some were too rare to be useful. Furthermore, three more items were deleted. Factor analyses show low communalities (after rotation) for two items. These two items were, therefore, deleted (Singing, .12 and Negative shaking head .02). One item was deleted based on low inter-rater reliability. The inter-rater reliability of the items was explored with inter-rater correlations. Another master student was trained to score ten videos of MSST. The scores of the two raters were correlated per item. Except the item “movements” (r .49), all items scored above r .78. Therefore the item “movements” was removed, which resulted in a final scale of 13 items. These 13 items are shown in table 1. The definitions of the behaviours in the observation scheme are explained extensively in appendix two; the observation scheme is shown in appendix 3.

Cronbach’s alpha of this final scale was Cronbach’s α .80. Next, the normality assumption was tested and resulted in a skewness of 1.06 and kurtosis of .64 for the total scale. This was considered acceptable.

To empirically explore the factor structure of the remaining items a principal components analysis was performed. Inspection of the scree plot with the remaining items (eigenvalues factor 1: 4.98) showed that a single-factor solution with an explained a variance of 35.5%. Principal components analyses showed, furthermore, that additional factors don’t account for much extra variability in the data. In short, one factor containing all 13 items is found to be satisfactory.

Based on literature on MSST (Jonckheere, 2008; Pamis, 2002; Young et al. 2011) and own observations of the diverse disabilities seen in the children in Sizanani Home and their diverse capabilities (i.e. cognitive and motor skills), it was expected that more distinct factors are required. More specific, seeing large motor differences between the children in Sizanani Home suggests that a separate subscale for motor actions (manipulations) is plausible. Based on observations in Sizanani Home, attention and emotional responses seem plausible distinct factors as well. Therefore, it was explored if the Social Responsiveness Scale comprises three subscales, namely an attention subscale,

positive emotions subscale and a manipulation of objects subscale. These subscales are expected to be different concepts, since they require different behaviours. Responses that were expected to measure attention like looking at a page, looking at an object and looking at a storyteller were defined as one subscale, namely the Attention Scale (AS). The positive emotions subscale was thought to consist of happy facial expressions and happy vocalizations. The responses that were expected to cover motor exploration of the objects like reaching, short touching, manipulation of object, functional manipulation of object were defined as the Manipulation of Objects Scale (MOS).

Calculating Cronbach's alpha for the expected subscales Attention Scale, Positive Emotions Scale (PES) and Manipulation of Objects Scale revealed acceptable scores for the AS (Cronbach's α .72; three items) and MOS (Cronbach's α .80; four items). However, for the subscale PES no acceptable scores were found and this subscale was therefore not included in the present study.

Skewness and kurtosis for the subscale Attention was resp. 1.17 and .85 and for the subscale Manipulation of Objects Scale resp. 1.08 and 1.34. Using squared roots improved normality to resp. .36 and -.49 for the total scale and for the subscales AS to .48 and -.28, and for MOS -.16 and -.75. Therefore the Squared Roots of the scales will be used in the further analyses.

The inter-correlation between AS and MOS is .48, indicating that the two subscales are related to each other, but still are separate concepts.

In summary, the results suggest that the final version of the Social Responsiveness Scale (SRS) is a normally distributed, reliable, measure of social responsiveness in which two subscales can be distinguished, namely the AS and the MOS.

Table 1: *Description of the items of the final version of the Social Responsiveness Scale*

13 items	Definition
Happy facial expressions	smile: form one's features into a pleased, kind, or amused expression, typically with the corners of the mouth turned up and the front teeth exposed

Happy vocalizations	laughing or other happy sounds
Looking at the page ^a , Looking at the object ^a , Looking at the childcare worker ^a	eyes are focused on object/page/storyteller (face of the storyteller) and head is turned towards that direction
Waving	move one's hand to and fro in greeting or as a signal
Positive nod/shake no	as a positive response to the object/storyteller, for example imitation of the same behaviour performed by the childcare worker or answering a question <ul style="list-style-type: none"> • Nod: lower and raise one's head slightly and briefly (especially in greeting, assent, or understanding) Shake no: move head from left to right side or vice versa
Pointing	When a child uses the outstretched arm and index finger to focus attention on a particular referent. For children who cannot use their index finger or other finger this part is not necessary
Clapping hands	brings two hands together and puts them on each other in one movement. Sound is not necessary
Reaching for the object/page ^b	extend one's hand or arm in an attempt to touch or grasp the object/page
Short touching ^b	stroking the object/page, hitting the object, touching the object for less than two seconds without grasping the object/page
Manipulation ^b	holding the object/page, rattle the object for at least two seconds
Functional manipulation ^b	press the button, or relating to the way in which the object works or operates, using it in a functional manner. the manipulation of objects to construct or to create something. The child may take on a role of someone else, or may be engaged in pretend activity, such as imitating the sound of a driving car while playing with a toy car.

Note: ^a indicates that this response is included in the subscale attention

^b indicates that this response is included in the subscale manipulation of objects

Motor Scale. To measure motor skills at the start of MSST, the fine motor scale and gross motor scale for children with severe, multiple disabilities is particularly developed for the research population in the Sizanani Children's Home in South Africa (Twilhaar, 2012).

The gross motor scale is based on various studies on motor development (Allen & Alexander, 1990, 1997; Frankenburg & Dodds, 1967; Husaini et al., n.d.; Shirly, in Netelenbos 1998; Netelenbos, 1998; Ornitz, Guthrie & Farley, 1977), including 13 milestones: fetal position; lifting head up in prone position; sit with support; sit with support, head steady; roll over from prone to supine position; roll over from supine to prone position; sit without support, body is not upright; sit without support, body is upright; creep; crawl; standing with support; walking with support; walking without support. The number of mastered gross motor milestones forms the score for this subscale. (Twilhaar, 2012).

The fine motor scale is based on grasping patterns as described by Halverson (1931, in Netelenbos, 1998) and Touwen (1977, in Netelenbos, 1998). On the basis of reaching and grasping patterns, children are grouped in three sequential categories: no reaching or grasping, reaching and grasping (Twilhaar, 2012).

Both the fine motor subscale (Cohen's $\kappa = .81$) and the gross motor subscale (ICC = .99) show acceptable inter-rater reliability.

Play Observation Scale.

The Play Observation Scale measures the level of cognitive play abilities indicating the level of cognitive development within Piaget's sensorimotor stage. The POS is based on Smilansky's stages of play behavior representing different stages of cognitive development within Piaget's sensorimotor stage. Three successive stages of play requiring different cognitive tasks that should be mastered by the child and give an indication of the children's cognitive level were distinguished by Piaget (1962), namely 'functional play', 'constructive play' and 'dramatic play'.

For a subset of the children (N=18), participating in CPI, the begin level of cognitive play abilities was assessed with the Play Observation Scale (POS) (Vos & Westrhenen, 2009; Flesch, 2012). The POS exists of nine items (toys) which encompass

three stages of play based upon Piaget's (1962) classification of successive stages of play: 'Functional play', 'Constructive play' and 'Dramatic play' (Vos & Westrhenen, 2009). These stages require different cognitive tasks that should be mastered by the child and give an indication of the children's cognitive level. Scores of the POS are obtained during a 15-minute play session. Children are offered nine toys (i.e. ball, xylophone, car, wooden blocks, puzzle, puzzle box, number puzzle, memory and animals) in a free play session and their play performance without any assistance will be observed. The level of cognitive play performance is calculated by counting the mean score over the toys offered. For more information on the POS the POS manual can be consulted (Flesch, 2012).

Effect of Conductive education – Goal Attainment Scaling (GAS). The progress in Conductive Education was established by means of the goal attainment scale (GAS). The GAS assesses the individual achievement of personal goals during the CE therapy (after two and four months). These goals were defined previous to the intervention by the management of Sizanani Home. The scores were ascribed according to a 5-point scale assessing if the participants have achieved their goals entirely, partly or not at all. Another possibility within this scale is for children to achieve their goals far beyond expectations (Twilhaar, 2012; Kirusek & Sherman, 1960). However, in this study the scores were simplified into 'progress' or 'no progress', since most variance was found in goals achieved or not achieved.

Interventions

Multisensory Storytelling in Sizanani Home. The methodology of Multisensory Storytelling, as applied in Sizanani Home, was elaborated by PAMIS (2002). MSST has been introduced in May 2009 in Sizanani Home (Nispel & Vermeer, 2010), and has been continued to be performed at low frequency. In Sizanani Home MSST is performed by the staff (Nispel & Vermeer, 2010).

Nispel & Vermeer (2010) constructed 11 books together with the staff. Pictures of the stories are shown in appendix four (Appendix 4). The stories that were used in this study are: going to school; going to a concert; sitting in the sun; playing on the ground;

going to a ball; massage; going to the zoo, taking a walk; taking a bath; making music; going to bed. Per unit, two or more stories have been developed, based on the daily activities of the children. The form, content and presentation of the story are adjusted to people with profound multiple disabilities.

A MSST 'book cover' consists of a big red box (Multiplus, 2008) with a short title and a symbolic touchable object. Before the start of the story the box is presented. The story is written on six or seven different white A3-format cardboard pages (Multiplus, 2008). Every page has its own object that stimulates one or more senses. The story has maximally two short and simple sentences per page (Boer & Wikkerman, 2008). The child's name is mentioned every sentence to optimize recognizability. Furthermore, the familiar elements within the story, the repetitive storytelling in the same words and form make the story more recognizable. For this research population repetition is important to learn/absorb from the story (Piaget, 1963). A clear end enhances the understanding of the ending of the story; therefore a typical song was chosen which is utilized when activities end in Sizanani Home.

A workshop was given to all childcare workers and succeeded with a certificate. Since MSST was only performed at low frequency, a short refreshment workshop was given to all childcare workers at the start of the MSST intervention in February 2011. The most important aspects of MSST were rehearsed and the goals of MSST explained by means of a PowerPoint presentation (Appendix 5). Per staff member the researcher attended at least two sessions to coach the staff member with their storytelling. Furthermore in each MSST box extra information was added for the storyteller about the script, the sequence of the story, instructions/suggestions on presentation of the story and a checklist if all stimuli are present.

MSST is an interactive process, where the reader encourages the child to explore the objects (e.g. push a button for sound, feel a teddy bear, or smell the bath foam). The story is always told in the same manner, in the same order, in a low speed and the reader uses a lot of intonation in his/her voice and has reads with expression. By acknowledging the efforts, and immediately encouraging more interaction, the reader can improve and enhance responses (Boer & Wikkerman, 2009). Furthermore, the objects are offered within the child's reach and in consideration with their possibilities and disabilities (i.e.

deafness, blindness, Cerebral Palsy). The child is given the opportunity to respond with his own capacities. The child will be supported to explore the objects at its own level.

Different childcare workers read the stories to the children on a set time of the day, namely between 2.00 pm and 3.30 pm on weekdays. A session of MSST takes between six to ten minutes. Pictures of a MSST session are presented in appendix 6. For more information on the procedure of MSST the manual of MSST (Multiplus, 2008) is available.

Conductive Education. An important part of the daily program of the Home is focused on Conductive Education (CE) (Visser, 2010). The aim of this intervention is to improve the children's self-help skills and decrease their dependency on childcare workers in daily activities and to improve mobility (Visser, Magyarszaky, Stoffer, 2008; Nispel & Vermeer, 2010).

During the 1940s, Andras Pöto, a physician in Hungary, developed CE for adults and children with motor dysfunction (Hur, 1997). CE facilitates the development and fulfillment of the intentions and enables to find solutions to the problems of everyday life (Coles & Zsargo, 1998). Every child in the CE intervention in Sizanani has a specific motor developmental goal focused on becoming more functional participants in daily activities. The CE conductors formulated goals like putting on shoes independently, sitting in a chair independently, getting in a wheelchair with the help of a cushion independently, bringing five blocks from a table and like putting them in a box and maintaining a prone position independently for five minutes. The intervention makes use of social stimulation, such as a child-oriented group setting, to facilitate psychosocial learning and to increase the level of participation (Visser, Magyarszaky, Stoffer, 2008).

The children with more severe disabilities in Sizanani Home participate in this intervention. For each child two months, four months and six months goals are contemplated, which are practiced during weekdays from 9.00 until 10.30.

Cognitive Play Intervention. In 2010 Cognitive Play Intervention (CPI) has been developed (Van Velzen & Mathot, 2010). This intervention aims to improve cognitive abilities through play therapy with toys and was given in the six weeks after the MSST

intervention. Only a subset of children who also received MSST received CPI (N=18) (Flesch, 2012). The children received two toys during a 10- minute play session during seven sessions spread over six weeks. Each session these toys were replaced by two other toys, which were of an equal level of complexity. Verbal instructions, encouragement and physical assistance were given by the researchers following the Guideline for Level of Encouragement for CPI program (Flesch, 2012). The program has been adjusted according to Vygotsky's concept of sensitive assistance (Rogoff, 1990; in Fu & Stremmel, 1993) in the Guideline Level of Encouragement. The Guideline Level of Encouragement is a program based on the Zone of proximal development which is tailored to the needs of individual children and young adults with CP, making it possible to stimulate cognition depending on their of physical and cognitive functioning (Van Velzen & Mathot, 2010).

Results

Progression in Social Responsiveness between the baseline and final assessment

All participants (N=34) completed a pretest measurement and posttest measurement after six weeks of MSST. Repeated measures ANOVA's were conducted to measure progress in social responsiveness between the pretest and posttest of the Social Responsiveness Scale as well of the two subscales 'Manipulation of Objects' (MOS) and 'Attention' (AS) as independent variables. Table 2 shows the mean progression in MSST, for the total group (N=34), as measured with the three scales in the six-week period, between the pretest (M1) and posttest (M2). The analysis showed an increase for SRS ($F(1, 33) = 55.77, p < .001$) and also for MOS ($F(1,33) = 46.56, p < .001$) as for AS ($F(1,33) = 63.35, p < .001$).

To investigate if the effect of MSST depends on the initial level of social responsiveness, a covariate was included in the analyses, namely the initial level of social responsiveness. In none of the analyses this covariate was significant nor was the interaction with the intervention (within)effect, which means that the improvement after MSST was irrespective of the initial level of social responsiveness.

Table 2: *Measures of Social Responsiveness Scales at baseline, and after a six weeks period of MSST.*

	Pretest (M1) (n = 34)		posttest (M2) (n = 34)	
	M	SD	M	SD
SRS	2.35	.80	3.18*	1.03
MOS	.75	.56	1.26*	.60
AS	1.62	.45	2.20*	.69

Note. M1 = pretest, M2 = posttest after six weeks of MSST
 * M1 and M2 differ significantly at $p < .001$.
 SRS= Social Responsiveness Scale
 MOS= Manipulation of Objects Scale
 AS= Attention Scale

MSST group versus control group

Although, the results on the three scales showed significant improvement after six weeks of MSST, results are more reliable when an experimental group is compared with a control group. First, ten children in a control group were compared with ten children in an experimental group that received ten sessions of MSST in a period of six weeks. Children in the control group received MSST in a successive six-weeks period after the control period. Thus, children in the MSST-group (N=10) received MSST during the first six weeks. Moreover, children in the control group (N=10) were matched with the ten children of the experimental group based on a comparable level of disability and received MSST in the second six weeks. Therefore, the second possibility to compare an experimental group with a control group was by comparing the progress in social responses of this control group (n = 10) to its own progress during the first six weeks without MSST.

First, the comparison between the MSST-group and the control group in the first six weeks is explored. In table 3 results of the repeated measures ANOVA's are presented for each of the three scales as independent variables and the group as dependent variable. An interaction effect for group*SRS, $F(1,18) = 9.94$, $p = .006$ was found and similar analyses also showed an interaction effect for group*MOS, $F(1,18) =$

15.04, $p < .001$, indicating that children in the MSST-group improved in social responses significantly more on SRS and MOS than children in the control group. For group*AS a nonsignificant trend for an increase was found, $F(1,18) = 4.01$, $p = .06$. No main group effect was found for SRS and AS, indicating that both groups showed comparable levels of social responsiveness at the first measurement. Only for MOS the two groups showed no comparable level of social responsiveness at the first measurement, $F(1,18) = 6.24$, $p = .022$.

Table 3: *Measurement of Social Responsiveness Scales at baseline, and after a six weeks period for the MSST-group and the control group.*

	MSST-group				control group			
	M1		M2		M1		M2	
	M	SD	M	SD	M	SD	M	SD
SRS	2.11	.85	2.84	1.13	1.85	.66	2.07	.65 ^b
MOS	.60	.55	1.23	.45	.45 ^a	.49	.34	.55 ^b
AS	1.48	.43	2.03	.63	1.32	.40	1.57	.37

Note. M1 = baseline measurement, M2 = final assessment after six weeks,.

^a Initial level differs significantly between MSST-group and Control group at $p < .01$.

^b Difference between M2 and M1 of MSST-group and Control group differ at $p < .01$

SRS= Social Responsiveness Scale

MOS= Manipulation of Objects Scale

AS= Attention Scale

Intragroup comparisons for progress on social responsiveness scales

Reliability of the results will be increased when the progress in social responses of the control group (N=10) in a period with MSST is compared to its own development during the first six weeks without MSST.

First, repeated ANOVA analyses were conducted to reveal whether improvement in social responsiveness differed significantly between six weeks baseline condition (without MSST) and six weeks of subsequent MSST training. These results for all (sub)scales are shown in table 4. Results with the Social Responsiveness Scale as dependent variable showed a significant main effect, $F(2,8)=15.55$, $p=.002$. Similar repeated measures ANOVA's were also conducted with either Attentions Scale or

Manipulation of Objects Scale as dependent variables to reveal whether social responsiveness improved significantly between six weeks baseline condition (without MSST) and six weeks of subsequent MSST training. Results showed a significant main effect for AS, $F(2,8)=14.56, p=.002$ and also for MOS, $F(2,8)=7.87, p=.013$.

Furthermore, to explore which period showed significant improvement, two posthoc analyses were performed, each for one of the six weeks periods, namely the period with MSST and the period without MSST. Separate posthoc analyses were done with either SRS or each of the subscales MOS and AS as dependent variables. The analyses of SRS revealed a main period effect in both the period without ($F(1,9)=8.08, p=.019$) and with MSST ($F(1,9)=23.70, p=.001$), indicating that children improved significantly on SRS in the first period of six weeks without receiving MSST and also improved significantly on SRS in the second successive period when the children received MSST. Analyses of the effect of MSST on MOS showed only a main effect in the period with MSST ($F(1,9)=17.68, p=.002$), indicating that only when receiving MSST the children improve on MOS. The analyses of the effect of MSST on AS showed a main effect for AS in the period with MSST ($F(1,9)=30.49, p=.000$) and in the period without MSST ($F(1,9)=6.89, p=.028$). In table 4 the results of these analyses are indicated with an a or a b.

Consequently, it was analyzed in which period children improved most on SRS and AS, since results showed that children improved both in the period with and without receiving MSST. Therefore, for the period without MSST (M2-M1) a difference score (i.e. the increase in social responses in one period) was calculated, for either SRS or AS, and compared with the difference score of the period with MSST (M3-M2) in a repeated measures ANOVA. Results revealed that SRS increased more in the period with MSST ($F(1,9) = 9.73, p = .012$) than in the period where children didn't receive MSST. The two periods also differ significantly in progress on AS, $F(1,9) = 5.17, p = .049$. This means that children improve more on AS in the period with MSST than in the period without MSST.

Table 4: *Measurement of Social Responsiveness Scales at baseline, after a six weeks period without MSST followed by a period with MSST.*

	baseline (N = 10)		pretest (N = 10)		posttest (N = 10)	
	M	SD	M	SD	M	SD
SRS	1.85	.66	2.07 ^a	.65	2.87 ^b	.97
MOS	.45	.49	.37	.55	.84 ^b	.77
AS	1.32	.40	1.57 ^a	.37	2.10 ^b	.54

Note. M1 = baseline measurement, M2 = assessment after six weeks of no MSST, M 3 = final assessment measurement after six weeks of MSST.

a M1 and M2 differ significantly at $p < .05$

b M2 and M3 differ significantly at $p < .05$

SRS= Social Responsiveness Scale

MOS= Manipulation of Objects Scale

AS= Attention Scale

Follow-up effect of MSST and effect of Cognitive Play Intervention on Social Responsiveness

Furthermore, a possible follow-up effect of MSST was explored in 24 out of 34 participants. During the period between posttest measurement (M2) and follow-up measurement (M3) 18 of the 24 children received another intervention, namely Cognitive Play Intervention (CPI). Analyses are performed only for these 18 children, since the remaining group of six children is too small to analyse (i.e. as a control group).

To investigate if receiving seven sessions of CPI influenced social responsiveness, the differences between M2 and M3 for these 18 children was analyzed. Repeated measures ANOVA's were conducted with either SRS or each of the two subscales as independent variables. Results are shown in table 5. These analyses showed no significant main effects for the three (sub)scales, which means that CPI did not have an effect on the three (sub)scales. As such, it can be concluded that MSST increases social responsiveness and another intervention that also measures and stimulates social cognition didn't increase responsivity.

To explore whether the progress in social responsiveness within the period within MSST shows significant progress for the 18 children receiving CPI, table 5 also shows the progression in MSST as measured with the three scales in the six-week period

between the pretest (M1) and posttest (M2) for the 18 children participating in CPI. The analysis showed an increase for SRS ($F(1, 17) = 23.46, p = .000$) and also for MOS ($F(1,17) = 15.45, p < .001$) as for AS ($F(1,17) = 23.66, p = .000$).

Table 5: *Measures of Social Responsiveness Scales at baseline, after a six weeks period of MSST, and after six weeks follow-up period with Cognitive Play Intervention (without MSST)*

	M1(N = 18)		M2 (N = 18)		M3 (N=18)	
	M	SD	M	SD	M	SD
SRS	2.73	.74	3.63 *	.97	3.80	.74
MOS	1.04	.40	1.53 *	.39	1.64	.55
AS	1.76	.43	2.37 *	.79	2.44	.62

Note. M1 = baseline measurement, M2 = final assessment after six weeks of MSST, M 3 = follow-up measurement after six weeks of Cognitive Play Intervention (without MSST).

* differ significantly at $p < .05$ (M2-M1).

SRS= Social Responsiveness Scale

MOS= Manipulation of Objects Scale

AS= Attention Scale

Influence of covariates on progression in SRS and the two subscales MOS and AS

The development or progress of MSST could be moderated by initial developmental levels. Therefore, this study explores whether cognitive capabilities, fine and gross motor skills and the effect of another intervention that was given simultaneously, namely Conductive Education moderated the effect of MSST.

For a subset of 18 children the initial cognitive level (measured by the Play Observation Scale) was included as a covariate in the repeated measures ANOVA to investigate if the initial level of cognitive play of the children moderated the progression on social responsiveness. The results showed no moderation effect for the initial cognitive level.

Furthermore, it was examined if fine motor skills moderated the progression on social responsiveness. Therefore, for a subset of 23 children the Fine Motor Scale was

included as a between variable, since Fine Motor Scale is a three level variable. Analysis showed that fine motor skills didn't influence the effect of MSST.

The influence of gross motor skills on the effect of MSST was also studied. Therefore, for a subset of 23 children the Gross Motor Scale was included as a covariate in the repeated measures ANOVA. Analysis showed that gross motor skills didn't influence the effect of MSST.

Within the subset of 23 children the progression in Conductive Education was analyzed and entered in the analyses as a between variable, because CE is a dichotomous variable. Separate analyses were done with either SRS or each of the subscales MOS and AS as dependent variables. CE didn't moderate the effect of MSST on social responsiveness.

The effect of the initial level of cognitive play, the fine and gross motor scales, and the effect of CE were not significant, indicating that none of the factors moderated the effect of MSST. These results suggest that all children profit from MSST and improve, irrespective of their capabilities or progress on CE.

Discussion

The purpose of this paper was to study the effectiveness of Multisensory Storytelling and to assess for which individuals, with profound multiple disabilities living in Sizanani Home, MSST has the largest effect. For this aim a Social Responsiveness Scale was developed to measure the effectiveness of MSST.

Social Responsiveness Scale

The final version of the Social Responsiveness Scale (SRS) is a normally distributed, reliable, measure of social responsiveness in which two subscales can be distinguished, namely the Attention Scale and the Manipulation of Objects Scale.

Based on literature on MSST (Jonckheere, 2008; Pamis, 2002; Young et al. 2011) and own observations of the diverse disabilities seen in the children in Sizanani Home and their diverse capabilities (i.e. cognitive and motor skills) the existence of three separate factors that measure the effect of MSST was examined. Seeing large motor differences between the children in Sizanani Home suggested that a separate subscale for

motor actions (manipulations) was plausible. Moreover, based on observations in the Sizanani Home, attention and emotional responses seemed plausible distinct factors as well. Results revealed that only two subscales could be distinguished, namely an Attention Scale (AS) and a Motor Scale (MOS). The AS consists of responses like looking at page, looking at object, looking at storyteller were defined as one subscale, namely the Attention Scale (AS). The responses which pertain to the MOS cover motor explorations of the objects like reaching, short touching, manipulation of object, functional manipulation of object were defined as the Manipulation of Objects Scale (MOS). Analyses showed that the items describing both subscales were normally distributed, reliable and were found to be related to each other, but still are separate concepts.

Effectiveness of MSST on Social Responsiveness

The effectiveness of MSST was therefore measured on the total SRS score as well as the scores of the two subscales. We expected to find a significant increase on SRS and the two subscales between the pre-measurement and post-measurement after six weeks. Three different designs were used to explore these relations: a pretest-posttest design, a pretest-posttest matched control group design, and a within control group design. All designs resulted in significant effects of MSST on SRS and the subscales AS and MOS, except in the pretest-posttest matched control group design, in which no significant effect was revealed on the Attention subscale. However, a nonsignificant trend was found, indicating that with this small sample size ($N=20$) an effect may exist, when tested in larger groups.

The follow-up data, suggest that children who received the MSST intervention maintained their acquired skills. MSST thus had a significant and long-term (i.e. six weeks) effect on social responsiveness. After receiving another intervention, namely Cognitive Play Intervention, that also measures and stimulates social cognition, the same frequency of social responses were maintained on the (sub)scales. A plausible explanation for this could be that CPI has no effect on the three (sub)scales. As such it can be concluded that MSST had a significant effect on social responsiveness, and another intervention that also measures and stimulates social cognition doesn't influence

the results on these (sub)scales. However, there is no information about the effect of a follow-up period when no other intervention is received. A study with a control group design can give more clarity about the progress in Social Responsiveness in a period without MSST and as such give better insight in the effect of CPI on social responsiveness (i.e. whether it increases the responsivity or doesn't affect the responsivity). Further research hereafter is therefore recommended.

Initial developmental levels

It was also explored whether the initial levels in terms of Social Responsiveness (SRS prior to the intervention), Motor Skills (Fine and gross motor skills), and cognitive capabilities (initial level of play abilities), and the effect of co-occurring Conductive Education (i.e. achieving the motor goals) moderate the effect of MSST on SRS and the two subscales. Results suggest that all children improve from MSST, irrespective of their capabilities or effect on CE. This result is in contrast with our expectations based on the dynamic systems theory and ecological approach (Thelen, 2000; Gibson, 1988). We expected that a person with more capacities would progress more in social responsiveness. However, for gross motor skills and CE no moderation effect was expected. For the other moderators it is remarkable that none of them influenced the effect of the Social Responsiveness Scale.

Gross motor skills. For gross motor abilities this may be understandable, since they don't have a strong effect on social responses.

Conductive education. Also, the success of CE, i.e. achieving the individual goals, doesn't seem to moderate the effect of MSST. This is plausible and expected, since many of these goals, for example sitting; eating with a spoon; and walking don't directly influence the social responses during MSST sessions.

Fine motor skills. However for the other variables a moderation effect was expected and seemed plausible. For fine motor abilities a moderation effect was expected, especially for the subscale Manipulation of Objects (MOS), since responses on this

subscale include reaching, short touching, manipulation and functional manipulation (Gibson, 1988; Roemer & van Dam, 2004; Multiplus, 2008; Vermeer, 1991). All responses depend on fine motor skills like grasping measured with the Fine Motor Scale as described by Halverson (1931, in Netelenbos, 1998) and Touwen (1977, in Netelenbos, 1998). However, in contrary to the measurement of the fine motor skills, the storytellers stimulate and support the children in social responsiveness during MSST. First, by means of 'intuitive parenting' (Durkin, 1998; Schaffer, 2000; Piaget, 1963), repetition of the same story and short sentences with clear acoustic information, social responses are enhanced. Second, with 'sensitive assistance' (Vygotsky, 1987, in Fu & Stremmel, 1993) children exceed the reach of their current developmental level, since adults create opportunities for children to perform at levels they cannot achieve on their own. For example, to measure fine motor skills a pin is offered to the children and their way of grasping is observed. However, within MSST an object is brought into the reaching area of the child (depending on the different abilities of the children) to enable exploration, as such it can also be placed in the hands of the child. As a consequence there is a difference between the scores of social responsiveness and the scores of fine motor skills, as the storytellers (childcare workers) compensate for the inabilities of the children, whereas the fine motor skills measure the actual capabilities of the children without help from the childcare workers.

Cognitive abilities. Also the initial level of the cognitive play abilities doesn't seem to moderate the effect of the responses on social responsiveness. An explanation for this could be found in the different aims of both MSST and Cognitive Play Intervention. MSST aims to improve social responses, in other words the more simple social responses. CPI also focuses on enhancing social cognition, but in order to improve on these responses children need to use their executive function. The responses covering SRS require less use of executive functioning than the responses on Play Observation Scale. Even though the POS and SRS contain some similar responses, it can be stated that children need more advanced and complex responses in comparison to SRS. Executive functioning plays an important role to have higher cognitive skills as measured with the initial level of POS.

Strengths within the present study

This study has several strengths. First, a significant effect was found for the total group (N=34) of participants.

Second, compared to previous studies this study evaluated MSST by a broader variety of responses, including more advanced responses of the sensorimotor period, like pointing, positive nodding and functional manipulations (PAMIS, 2002; Young, Fenwick, Lambe & Hogg, 2011).

Contrary to previous studies (PAMIS, 2002; Jonckheere, 2008; Young, Fenwick, Lambe & Hogg, 2011) this study analyzed the effect of MSST, for a subset of the participants, as compared to a control group without intervention. A pretest-posttest matched control group design (N=20) and a within control group design (N=10) were used to compare the improvement in social responses with and without MSST. Thus, the third strength of this study is the use of two different designs of control groups and therefore stronger evidence of the effect of MSST on social responsiveness. Our finding that significant differences between the period with and without MSST occur, although we only had a sample of ten children, indicates that the effect of MSST is consistent.

A fourth strength is that the research population was heterogeneous with respect to age and disabilities, but initial differences in social responsiveness, motor skills and cognitive abilities didn't influence the effectivity; this indicates that results might be generalized to a broader population.

Limitations within the present study and future recommendations

This study also has some limitations. First, children with disabilities develop differently than normal children and they often cannot perform all behaviours due to motor limitations or they might never develop the ability to talk or even make sounds (Petry & Maes, 2005). Few children (N=4) within this research population could talk, therefore only vocalizations could be analyzed in the scale and not talking behaviours. The result was that the talking behaviours of the four children were not analyzed. Future research needs to refine the SRS by reformulating the item 'talking'. When the item talking, which is seen less frequent, is reformulated to a broader definition, the frequency of the responses is expected to increase.

Second, based on the inter-rater reliability the item 'movements' (i.e. all movements children make with their lower limbs) ($r=.49$) was removed from the original scale. This item seems very relevant since most children show such responses. In future research it is recommended to refine the description of 'movements'. As a consequence of this the inter-rater reliability might increase.

Other limitations concern the study itself. In this study only the effect after a short time (six weeks) is examined where children received only ten sessions of storytelling. Although a significant effect was found, this research population needs repetition. It might be worthy to explore whether more sessions of MSST would lead to a greater improvement in social responses, and if so how many more sessions would lead to a greater improvement.

Although the storytellers were trained to read the story in the same manner, children seemed to respond differently to the different storytellers. This suggests that the effect of MSST could also be influenced by the quality of the behaviour of the storytellers. In future research the influence of the storytellers should be examined to find out which characteristics of the storytellers are most effective in MSST, for example sensitive assistance. Also, a close watch must be kept on guaranteeing the quality of the intervention. The quality of the intervention can be operationalized through the integrity of the intervention. The integrity of the intervention, i.e. executing like it is meant by PAMIS (2002), is also expected to be of interest for the effectiveness of MSST. Future research should evaluate the integrity of the intervention and determine the influence of this variable on the effectiveness. As a consequence of the above mentioned recommendations the effective aspects of MSST can be further determined.

After the first session of MSST the storytellers received a workshop, to improve their storytelling, followed by extensive training where all storytellers received feedback after a MSST-session. Therefore a difference exists in the quality in storytelling between the first and tenth MSST-session. Since MSST is a relatively new intervention in Sizanani Home this training was found necessary. However, the results might be influenced by the training of the storytellers, since the first and the tenth video were scored. Results of the within control group show that a possible difference in quality doesn't influence the effect of MSST, since they received their first session after training

the storytellers. Despite this possible training-effect, children improved significantly on SRS.

For the control group design a significant improvement on SRS and AS was found in the period where no MSST was received. This might suggest that these children improved irrespective of an MSST intervention was given or not. However, in this period the childcare workers were trained in giving MSST. As a consequence of this the childcare workers improved in quality of giving the MSST intervention which might lead to an increase in responsiveness in the children.

Another limitation concerns the video analyses. There was no blinding when scoring the videos. The researchers were aware of which measurement it was (i.e. premeasurement, postmeasurement or follow-up). In future research this can be avoided by scoring all video-tapes at the same time after the intervention has taken place by independent observers.

This study shows that social responses improve within the MSST intervention. It is important to investigate if the improvement of social responsiveness generalizes to situations outside the intervention, for instance by examining if other stories have the same effect as the story that was read to the children repeatedly or by exploring the effect of MSST on general everyday activities or an enhancement in responsivity during these general everyday activities like brushing teeth, washing or eating. With PAMIS (2002) the stories embody individual learning targets as coping with anxiety, and learning to brush teeth. This can be employed in Sizanani Home, where no individual learning targets were used, to examine the effect of MSST on general everyday activities.

In conclusion, future research efforts should concentrate on five issues: 1) improving the Social Responsiveness Scale, 2) replicating the effects of MSST and the moderators within a larger group, 3) and over a longer period of time, 4) and exploring generalization effects to other situations (especially in daily life situations), and 5) investigating if characteristics of the storyteller influence the effect of MSST.

Conclusion and recommendation for Sizanani Home

The first results are promising. All children profit from MSST and improve, irrespective of their capabilities or progress on other interventions. This confirms previous research of

the effectiveness of MSST (Young, Fenwick, Lambe & Hogg, 2011). So MSST is a promising approach for children and young adults with disabilities in Sizanani Home. Therefore we recommend continuing with MSST in Sizanani Home for all children, maybe also including the more able children (who were left out in this study), as this study showed that the level of the moderators did not influence the effect. In conclusion, we believe that MSST is a suitable intervention for children with disabilities.

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Appendix 1 Original observation scheme Multi-Sensory Storytelling

Emotional responses (facial and vocalisations)

Behaviour	red box	1	2	3	4	5	6	7
Positive facial expression								
Negative/unclear facial expression								
Happy vocalisations								
Negative/unclear Vocalisations								
Singing								

Attention

Behaviour	red box	1	2	3	4	5	6	7
Looks at object								
Looks at page								
Looks away from page/object/storyteller								
Looks at storyteller								

Motor arousal, head movements and gestures

Behaviour	red box	1	2	3	4	5	6	7
Turns head to storyteller								
Turns head to object								
Movement of lower limbs								
Wave								
Positive nod/shake no								
Negative shake no								
Clap one's hands								
Pointing when looking at storyteller								
Pointing without looking at storyteller								

Manipulations of objects and Page

Behaviour	red box	1	2	3	4	5	6	7
Reaching for the object/page								
Short touching manipulation								
Functional manipulation								
Negative manipulation								

Appendix 2 descriptions of the Social Responses

The behaviours can only be scored when the page is brought into the story, until the page is taken out of the story, with the exception of showing of the box.

Positive Facial expression: smile (Definition oxford dictionary): form one's features into a pleased, kind, or amused expression, typically with the corners of the mouth turned up and the front teeth exposed (oxford dictionary, 2010)

Happy vocalizations: laughing or other happy sounds

Looks at object/ page/ storyteller: eyes are focused on object/page/storyteller (face of the storyteller) and head is turned towards that direction.

When object is still attached to the page and child looks at both, the behaviour 'looks at page' should be scored.

Wave: move one's hand to and fro in greeting or as a signal (oxford dictionary, 2010)

Positive nod/shake no: as a positive response to the object/storyteller, for example imitation of the same behaviour performed by the childcare worker or answering a question

- Nod: lower and raise one's head slightly and briefly (especially in greeting, assent, or understanding) (Oxford Dictionary, 2010)
- Shake no: move head from left to right side or vice versa

Clap hands: brings two hands together and puts them on each other in one movement. Sound is not necessary.

Pointing: *is one of the first manifestations of shared gestures, as well as one of the most useful. Pointing is the nonverbal equivalent of saying "this", "that". It is very much a social gesture, since the point of pointing is to guide someone's attention.*

When a child uses the outstretched arm and index finger to focus attention on a particular referent. For children who cannot use their index finger or other finger this part is not necessary (Durkin, 1998).

Reaching the object/page: extend one's hand or arm in an attempt to touch or grasp the object/page (oxford dictionary, 2010)

Short touching: stroking the object/page, hitting the object, touching the object for less than two seconds without grasping the object/page

Manipulation: holding the object/page, rattle the object for at least two seconds

Functional manipulation: press the button, or relating to the way in which the object works or operates (oxford dictionary, 2010), using it in a functional manner. the manipulation of objects to construct or to create something. The child may take on a role of someone else, or may be engaged in pretend activity, such as imitating the sound of a driving car while playing with a toy car (Piaget, 1962).

Emotional responses

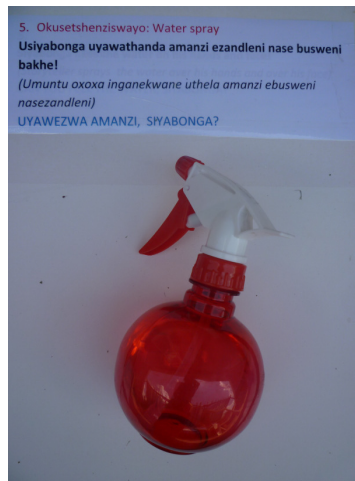
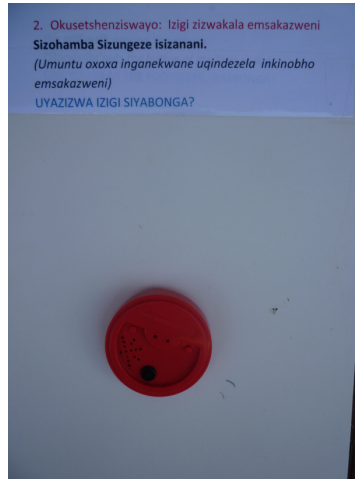
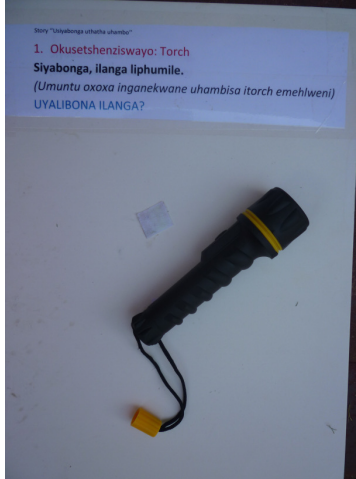
Manipulations of objects and Page

Behaviour	red box	1	2	3	4	5	6	7	Total/8 =
Reaching for the object/page									
Short touching									
manipulation									
Functional manipulation									

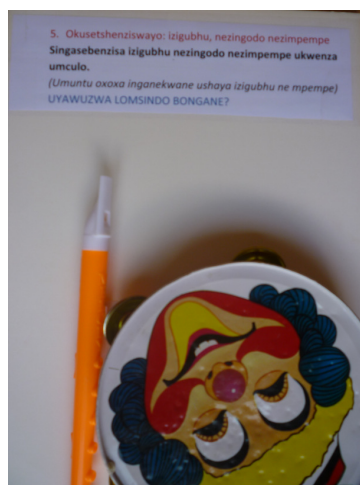
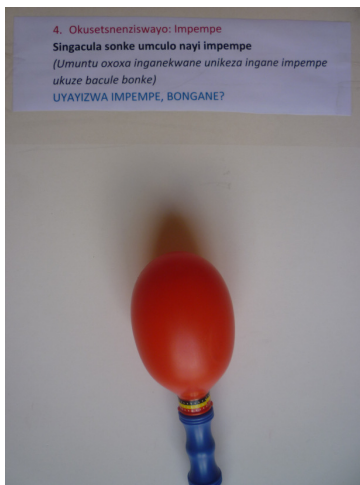
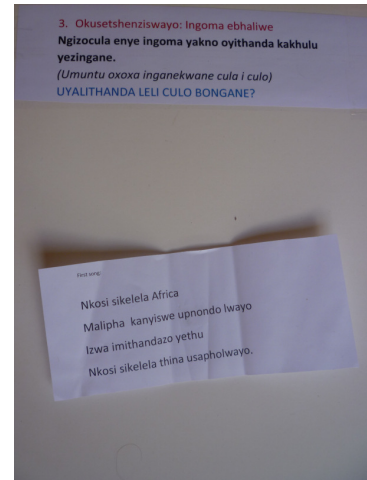
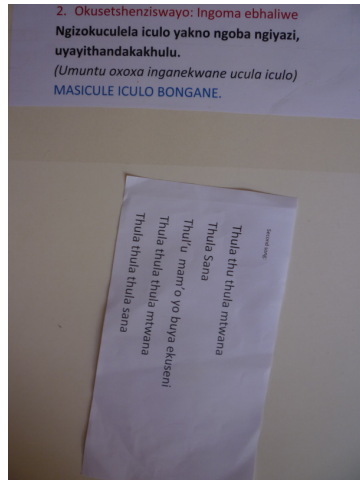
Explanation of the use of this observation scheme: a videotape is made from every session. These schemes are filled in with the help of the video. The responses can only be scored during the MSST, indicating times that a page, box or object is presented to the child or the story is read. Every time the behaviour is seen one mark is written down in the table next to the response and under the right page (1-7). When there is no box or page or object presented to the child no response can be scored. Per item all responses are added and divided by the number of pages of the story plus one (this is for all responses seen when the box is offered to the children). Some stories have six pages and other stories contain seven pages. The total score per item will give an average of the responses shown during the MSST session.

Appendix 4 Examples of the different stories in pictures and texts

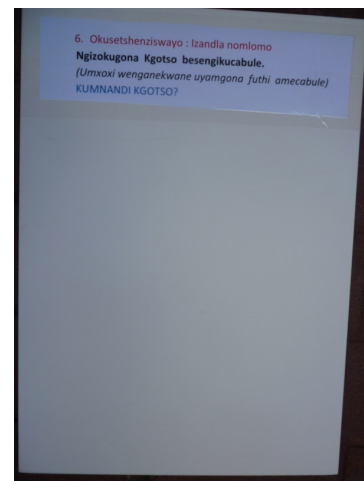
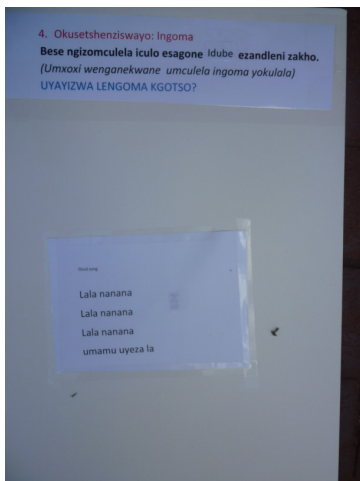
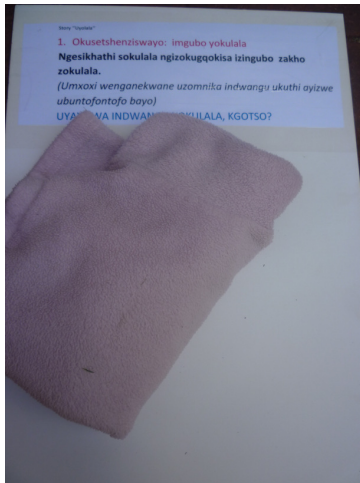
Story: Taking a walk



Story: Making Music



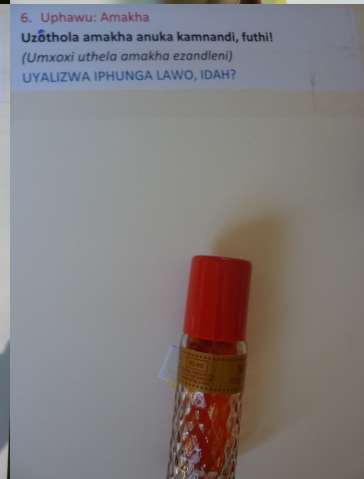
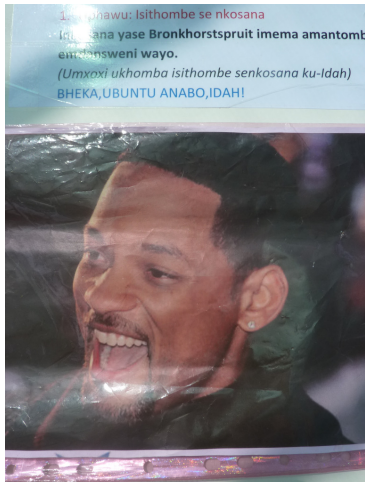
Story: Going to bed



Story: Going to the zoo

<p><small>Inqetho: "Iya kubo"</small></p> <p>1. Okusetshenziswayo: Iphepha elinesikhumba sesilwane Uskhumbuzo use Zoo phakathi kwezilwane eziningi. (Umxoxi ngizomnikela iskhumba sesilwane uskhumbuzo asizwelele) UYASIZWA SKHUMBUZO ISKHUMBA?</p> 	<p>2. Okusetshenziswayo: Imfene Nayi imfene Skhumbuzo. (Umxoxi Ngimbambise iskhumba semfene) UYASIZWA ISKHUMBA SEMFENE SKHUMBUZO?</p> 	<p>3. Okusetshenziswayo: Imfene Imfene yenza umsindo, uyezwa skhumbuzo? (Umxoxi Ngimbuzwe uyawuzwa umsindo wemfene skhumbuzo) UYAYIZWA IMFENE SKHUMBUZO?</p> 
<p>4. Okusetshenziswayo: Indlovu Nayi indlovu enkulu. (Umxoxi Ngimkhombe indlovu.) UYAYIBONA INDLOVU?</p> 	<p>5. Okusetshenziswayo: Idube nomsindo walo Lalela idube. (Umxoxi Ngigcindezele inkobho elinomsindo wedube) UYAWUZWA UMSINDO WEDUBE?</p> 	<p>6. Okusetshenziswayo: Idada Hawu, taze labalincane idada bol (Umxoxi Ngimbambisa idada) UYALIZWA IDADA?</p> 
<p>7. Siyavalelisa Isikhatshi sokuvalalisa nasezilwaneni, Salanikahle! (Umxoxi wengane kwane uzacula iculo lokuvalalisa) UYALITHANDA LELI CULO!</p> 		

Story: Going to a ball



Story: Taking a bath

Story "Uyogaza"

1. Okusetshenziswayo: Amakomishi amabili u Collin uyogeza, namanzi avulelwe.
(Umxoxi wengane kwane uyawuzwa umsindo wamanzi NGIZOTHELA AMANZI EMAKOMI SHINI NGIPHINDA PHINDE?)

2. Okusetshenziswayo: Ibhodlela lokuspraya Ngizokuthela ngamanzi Kenny
(Umxoxi wengane kwane uyamthela ukuze ezwe amanzi ezandleni)
ANJANI AMANZI, COLLIN AYABANDA NA?

3. Okusetshenziswayo: Insipho Ngizokugeza ngensipho Collin.
(Umxoxi wengane nkwane usondeza insipho kweni akhe ukuthi ezwe iphunga lensipho UYALIZWA IPHUNGA COLLIN?)

4. Okusetshenziswayo: Thawula Ngizokusula ngethawula.
(Umxoxi wengane kwane manje uyamesula ngethawula) UYALIZWA ITHAWULA, COLLIN?

5. Okusetshenziswayo : Umsakazo omncane onengoma nezwi lika Collini Ngizokuculela ingoma oyithandayo lalela.
(Umxoxi wengane kwane ugcindezela ikinobho emsakazweni) UYAYITHANDA LENGOMA, COLLIN?

6. Okusetshenziswayo: into yokugcobisa umzimba Collin ngizokugcobisa umzimba wakho ngento yokugcobisa umzimba.
(Umxoxi wengane kwane umacobisa ezandleni, nasebusweni kanye nomzimba) UYALIZWA IPHUNGA COLLIN?

7. Okusetshenziswayo : Izandla nomlomo U Collin uselungile.
(Umxoxi wengane kwane uyamgona bese amcabule) UYAKUTHANDA LOKU?

Story: Going to school



Story: Playing on the ground



Story: Sitting in the sun



1. Okusetheniwayo: Uayela
Nafidol itimbalane enhle ethanda ukukhulisa
ngayela.
(Mosi wengonekane uchenisa uyela ezandeni
nawinyani)
UYANLUWA NA?

2. Okusetheniwayo: Upholisi wengonekane
Pholisi wengonekane wena linyapho saka Nafidol zihlola.
(Mosi wengonekane pholisi uhlolisi zihlola)
UPHATHA NA?

3. Okusetheniwayo: Ithoyi elintofotofe
Uma ngivula iandla vikaNafidol uyakwazi ukubamba ithoyi
entofotofe.
(Umosi wengonekane ngivula iandla ngimika ngimika
ithoyi)
NGEMPELA KUTANCOMENYA UKWAZI UKUBAMBA ITHOYI?

4. Okusetheniwayo: Ukheshelhele
UNafidol uyokwazi ukwenza umculo omuhle nalo
ikheshelhele
(Umosi uyamnika ukheshelhele)
UYEZWA NA?

5. Okusetheniwayo: Iandla nemikono
Nglokuthatha ngkusasa esihlelweni sakho nglokuthatha.
(Umosi wengonekane uyomasa esihlelweni sakho)
YEZA KUNNANDI KANJANI NADI?

6. Okusetheniwayo: Encane enomculo epholile
Emuva kokumika umjikelelo uNafidol angakela imculo
wokaphumula.
(Umosi ugnetsela inkonzo yomculo)
UYANLUWA UNMCUDI?

7. Okusetheniwayo: Izwi nomculo wokavalelisa
Ngengoba ubhori ndawonye sizola isalo lokavalelisa.
(Umosi uyacela isalo lokavalelisa)
SALAKHLE!

1. Okutseshenzisiwayo: Uwoyela
Nadia intombazane enhle ethanda ukuhlakhlaka
ngowoyela.
(Mxali wengokwane usebenzisa uoyela ezandleni
nasezinyoweni)
UYAWUZWA NA?



2. Okusetshenziwayo: Upholishi wezinzipho
Pholishi wezinzipho wenza izinzipho saka Nadia zitoforela.
(Masi wengamekwane ufaka upholishi ezinzipheni)
UYATHANDA NA?



3. Okusethenziswayo: ithoyisi elintofontofo
Uma ngivula isandla sikaNadia uyakwazi ukubamba ithoyi
elintofontofo.
(Umxaki wengane kwane ngivula isandla ngimnika ngimnika
ithoyisi)
NGEMPELA KUYANCOMEXA UKWAZI UKUBAMBA ITHOYI?



4. Okusetshenziswayo: Ukhehlekekhehle
UNadja uyakwazi ukwenza umculo omuhle nansi
lkhehlekekhehle
(Umxaki uyamnika ukhehlekekhehle)
UYEZWANA?



5. Okusethenziswa: Izandla nemikhono
Ngizokuthatha ngikususe esihlalweni sakho ngikujikelise.
(Umxaki wengane kwane uyamiusa esihlalweni sakhe)
YIZWA KUMNANDI KANJANI NADIA?

5. Okusetshenziswa: Encane enomculo ophoile
Emuva kokumnika umjikelelo uNadia angalalela imculo
wokuphumula.
(Umxosi uginelezela inkino eba yomeula)
UYAWUZWA UMCULO?



7. Okusetshenziswayo: Izwi nomculo wokuvalalisa
Njengoba sithlezi ndawonye sizocula iculo lokuvalelisana.
(Umxani uyacula iculo lokuvalelisana)
SAJAKAHLE!

Story: Going to a concert



Appendix 5 Workshop on Multi-sensory Storytelling

24 Feb. – 4 March 2011

Look for a quiet place, outside or inside (not near the other storytellers).

Always read the story to one child only!

Prepare the story:

- take all the cardboards from the red box and put them in the right order,
- check if all objects are there,
- check if objects are working,
 - o do batteries work,
 - o is there water in the cups,
- Place objects also in order.

Position the child so that the child can look at you and you are close to the child.

Tell the story in the language that the child speaks best.

Position the cardboards on a table or chair close to you.

Greet the child at the beginning of the story,
then show the red box:

- encourage the child to touch the box,
- and to listen to the title.

Read the story out loud and show each page to the listener, so they can see the page and object. Object should be attached to the page.

Do not change the story in any way, use the exact same words written on the cardboard and use the same objects. You can repeat the same sentence again, so that the child will understand better.

Give the children enough time to explore the objects:

- always present the objects within the child's earshot, eyesight and reach,
- let them hold the objects,
- smell the objects (if there is a smell),
- give them enough time to listen to the music, and let them also press the button,
- give them enough time to make the puzzle.

When the child reacts to the object, encourage the child with:

- praise, tell them how good they are,
- positive comments like 'good job',
- a happy face, smile.

Tell the story in an expressive manner:

- pay attention to intonation, speak enthusiastically,
- speak slowly and give the listener enough time to take in what is being told,
- take a few breaks to let the child think of what you said,
- speak loud enough so the child can really hear you.

Ask if the child liked the story and always end the story with a goodbye.

The story should be between six and ten minutes!

It should be fun for you and the child!!!

Appendix 6 Pictures of a MSST session in Sizanani Home

